University College London

Doctorate in Clinical Psychology

Psychological Adjustment Following Severe Lower Limb Trauma: A Repertory Grid Study

Alison Brown

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ABSTRACT

The study explores prospectively how people come to terms with a severe injury to a lower limb following acute trauma. Participants were adults admitted to plastic surgery or orthopaedic surgery wards with open tibial fractures undergoing reconstructive surgery. Participants were seen within six weeks of injury, and asked to complete three short questionnaires (the Hospital Anxiety and Depression Scale, the Impact of Events Scale, and the Short-form McGill Pain Questionnaire). In addition, participants completed a repertory grid using self and social role elements. After a three-month interval participants were sent the questionnaires and were asked to re-rate their repertory grid elements according to the constructs generated in the initial interview.

The repertory grid data was analysed using Principal Component Analysis and by examining construct correlations and inter-element distances. The constructs generated were also considered thematically. Data from the questionnaires was used primarily to describe the population and changes over time. The results are discussed in relation to psychological theory and previous research findings on adjustment, trauma, self-concept and construct systems. Findings indicate that the personal meaning of lower limb trauma influences the impact on the self-concept, and that changes in the construct system are apparent over time suggesting a process of adjustment to injury. Limitations of the present study are discussed and the implications of the findings for service provision and further research are presented.
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INTRODUCTION

1.1 Overview

The past twenty years have witnessed a growing interest in the application of clinical psychology to the area of physical health. Within this developing field there is a recognition of the importance of psychological factors in the experience of health and illness, which can influence engagement in risky behaviours, treatment adherence, and response or adaptation to illness or disability. This shift away from a purely biomedical model of health has revealed a role for the psychologist in the conceptualisation and management of medical and surgical patients.

Advances in medical technology have led to dramatic reductions in mortality rates following traumatic injuries, while accidental injuries remain a major cause of disability in our society. The impact of an accidental injury often presents different challenges to the patient, and therefore to the team of professionals involved in their care, to those presented by illness or disease. Injuries generally entail sudden onset, with the associated trauma of an accident and disturbance of body image, and they may raise issues of preventability and guilt or blame. There is increasing emphasis on the role of psychological factors such as these in rehabilitation and adjustment following injury.

The study described here examines the particular psychological issues faced by people after sustaining severe lower limb trauma. In this chapter I first discuss the nature and prevalence of lower limb injury, and the treatment options available to the clinical team. I then describe the psychological aspects of these injuries and the findings of
previous research in this field. Psychological models of adjustment are then outlined. The interaction of body and identity, social adaptation, and psychological well-being consumed in the principle of 'self-concept' are of particular interest in the context of disfiguring and disabling injuries, and are discussed here. The chapter concludes with a consideration of the application of research methods to the population under study, and an introduction to the principal questions to be addressed within this thesis.

1.2 Lower limb injury

1.2.1 Prevalence

Casualties from non-fatal accidents are not recorded centrally in the UK, making the task of determining the prevalence of specific injuries such as lower limb trauma difficult. However, available statistics provide an indication of the frequency of injuries sustained in England each year. The ICD-10 (WHO, 1992) diagnostic group classified as 'injury and poisoning' constitutes 6 - 7% of all finished consultant episodes within NHS hospitals in England each year. In the year ending 31 March 1998 there were a total of 603,000 recorded finished consultant episodes for injury and poisoning among adults (over 15 years) in English hospitals (Source: Hospital Episode Statistics cited in Howe et al., 1999). A survey of around 16,000 adults aged 16 and over, carried out within England in 1995 on behalf of the Department of Health (Purdon, 1995), found a 10% annual rate of major accidents (those resulting a hospital visit or doctor consultation). 70% of these accidents resulted in limb injuries (arm or leg); little can be inferred from the survey, however, with regard to severity of the injuries sustained.
Purdon's (1995) survey found that 80% of sporting accidents and 77% of falls (excluding sports) resulted in limb injuries, compared to 66% of accidents involving moving vehicles, 65% of those involving tools or implements, and 63% of workplace accidents. Unsurprisingly, social class had an impact on work-related major accidents among adults recorded in the survey, with those in manual labour (Social Classes III-Manual, IV and V) having a higher rate of work-based accidents than those in non-manual occupations (Social Classes I, II, and III-Non-manual) (Purdon, 1995). Data collated for a report on the health of Britain, showed that in 1990/91, approximately 75% of non-fatal injuries sustained at work were fractures (Nicholl and Coleman, 1997). Among work-related and sports injuries young men aged 15-34 years predominate (Nicholl and Coleman, 1997).

Researchers have identified severe lower limb injuries as a major cause of severe and long-term disability. Seekamp and colleagues (1996), for example, noted that in patients with multiple injuries severe lower limb injury was a dominant predictive factor of long-term disability. Richmond and colleagues (1998) supported previous findings (e.g. Bull, 1985) with the statistic that those patients whose most severe injury was to the extremities were 2.9 times more likely to experience severe disability than patients with any other type of non-central nervous system injury.

1.2.2 Nature of lower limb injuries

Injury to a limb generally becomes more severe the more systems that are damaged. Limb damage may involve the systems of skin, nerves, blood vessels, muscle and bone. Fractures below the knee usually involve the tibia (the smaller fibula may or
may not also suffer damage), and "the subcutaneous location of the shaft of the tibia makes the complication of treatment of this injury higher than any other fractured long bone" (Marsh, 1994 p.194). Tibial fractures are commonly associated with an open wound, which increases the risk of infection and thus increases the severity of the injury. The severity of open tibial fractures is classified primarily according to the extent of damage to the skin (Gustilo-Anderson classification system: Gustilo et al., 1984; Gustilo and Anderson, 1976). Type III tibial fractures are the most severe and are divided into three subgroups: Type-III A describes fractures with extensive skin damage but adequate soft tissue coverage of the bone; Type-III B describes extensive soft tissue loss and exposure of the bone; Type-III C fractures involve vascular injury requiring repair (McRae and Kinninmonth, 1997). With increasing risk of infection the risk of amputation increases. For Type-III C injuries, for example, the reported incidence of wound infection is 25-50%, and around 50% of such injuries may result in amputation. Where the incidence of wound infection is lower (7% for Type-III A fractures, and 10-50% for Type-III B fractures) the amputation rate is also lower (Christian, 1998).

Soft tissue damage, and the associated risk of infection, is not the only factor affecting prognosis. Blood loss from vascular injury, the extent of bone or muscular injury, nerve damage, the interval between injury and arrival in the operating room, and other injuries sustained, in addition to comorbidities (e.g. diabetes, cardiac history) and the pre-injury status of the leg (e.g. vascular insufficiency, age, smoking, sensation) all have important prognostic implications (e.g. Tornetta and Olson, 1997).
1.2.3 Psychological factors

So why should psychologists be interested in this type of injury? Despite the importance of physical prognostic factors, such as those identified above, it has been demonstrated that adjustment is not wholly related to the type or severity of injury (e.g. Shontz, 1991). The immediate consequences of a severe injury include shock, restricted mobility, pain and hospitalisation, and there will be individual variation in the way in which people respond to these conditions. The literature on traumatic hand injuries has identified sequelae of anger, resentment, depression, anxiety, shame, guilt, symptoms of traumatic stress, or difficulty with concentration, attention span, and memory, which may seriously impede both patients' physical recovery and their ability and motivation to co-operate with rehabilitation (e.g. Johnson, 1986; Grunert et al., 1988). In a description of patients' experiences after traumatic hand amputations, Mendelson and colleagues (1986) noted the following difficulties:

"The patient's desire to withdraw from people; to be angry and lash out at people trying to help; to identify a new self-image and cope with feelings of hopelessness, despondency, and depression create stress and difficulty for both the surgeon and rehabilitation staff."

(Mendelson et al., 1986 p.580-581)

In addition, psychological distress following a severe injury has been shown to adversely affect quality of well-being (e.g. Holbrook et al., 1998), to increase the risk of severe disability (e.g. Richmond et al., 1998), and to limit return to work after injury (e.g. Michaels et al, 1998).

Psychological aspects of serious limb injury may be overlooked by medical and surgical staff whose primary focus is naturally on the absence of infection and mechanical recovery. However, a greater awareness of the psychological challenges
faced by patients undergoing treatment following traumatic injury may aid short-term management of these patients and their long-term adjustment.

1.2.4 Treatment options

The medical treatment of lower limb injuries with extensive soft tissue loss is likely to have important psychological consequences. There is some research to suggest that the type of treatment received affects psychological adjustment, and this literature will be discussed following a brief consideration of the various surgical options.

There are two major treatment options for open fractures to a lower limb with extensive soft tissue loss. Both options involve surgical procedures, lengthy hospitalisation and rehabilitation. Historically, the only option in treating such severe injuries would be to amputate the limb. However, with improvements in managing infection and technological advances in surgical procedures surgeons now have the option of attempting to reconstruct the damaged limb. The principal development which provided surgeons with a viable alternative to amputation was a procedure of transferring muscle and bone segments from donor sites elsewhere on the body to the injury site, termed ‘free flap transfer’ and pioneered in the 1970s. In addition, the bone must be stabilised and this achieved with either internal nails or with an external fixator. Furthermore, it will frequently be necessary to graft skin from donor sites to cover the wound area. Multiple operations will be necessary in the process of reconstructing the damaged limb.
Reconstructive surgery of this type is not free from infection risk, vascular complications, or a failure of union of the flap to the injury site. A proportion of attempted reconstructions will, therefore, terminate in (secondary) amputation. Studies of Type-IIIC fractures have shown that between 40% and 88% of attempted reconstructions result in amputation (Turen and Di Stasio, 1994). The surgical procedures involved in attempted reconstruction may continue over a number of years, during which the mourning process may be suspended (Kohl, 1984), and, furthermore, patients may be left “depressed, divorced, unemployed, and significantly disabled” at the end of treatment (Tornetta and Olson, 1997 p.511). In particular, if the reconstruction ultimately fails, “the patient may realise that he or she is much better off after the amputation is finally done but that everything has been lost during the duration of the treatment” (Hansen, 1987 p.800). In addition, it may be more difficult to accept a delayed amputation which is likely to be seen as a failure of treatment rather than as a consequence of the trauma (Tornetta and Olson, 1997).

Moreover, reconstructive surgery may give a patient unrealistic expectations that full function will return to the limb. Some authors have claimed that if the aim is functionality, in terms of regaining pre-injury activity, some patients may be better served by undergoing early amputation. Increasingly, the desirability of reconstruction over immediate amputation is being called into question. Dr Sig Hansen for example, in a much-cited editorial (Hansen, 1987), has claimed that medical advances are tempting surgeons “to seek triumphs of technique over reason”, and that “a decision to salvage limbs with [Type-IIIC] fractures may result in a serious disservice to the patient” (p.799).
In the face of such criticisms, the decision to attempt reconstruction rather than amputate a severely injured limb has been described as “one of the most difficult faced by the orthopaedic traumatologist” (Tornetta and Olson, 1997 p.511). To place this decision-making process on safer ground, orthopaedists have attempted to catalogue predictive indicators of successful reconstruction, i.e. those not terminating in delayed amputation. ‘Salvage indexes’ or ‘amputation indexes’ began to be developed in the 1980s and were based on objective criteria of the extent of injury to different organ systems. They aimed to “avoid a prolonged, ultimately unsuccessful salvage attempt, and thus minimize morbidity and possible mortality” (Dagum et al., 1999 p.1212). Unfortunately, studies have generally concluded that these indexes are little better at predicting successful outcome than standard clinical judgement, and indeed may call for unnecessary amputations (e.g. Dagum et al., 1999; Tornetta and Olson, 1997).

Perhaps the reason why indexes like these have failed to provide the answers that surgeons seek is because psycho-social factors are overlooked. For example, patients’ interpretation of the injury and the events surrounding it, the nature of their occupation and their degree of social support, may all be expected to influence how an individual adjusts to their injury. Increasing recognition of the influence of individual differences in personality or lifestyle has led clinicians to conclude that “the same treatment may not be appropriate for the same injury in two different patients” (Tornetta and Olson, 1997 p.511).

In summary, severe lower limb trauma produces significant disruption to an individual, regardless of the treatment received. There is some indication that medical
advances which aim to save a severely injured limb, may proliferate more difficulties for an individual than they solve. The chapter now moves on to examine the research literature on outcome (variably defined) following physical trauma, in an attempt to draw conclusions as to factors affecting adjustment.

1.3 Factors affecting outcome

1.3.1 Clinical research studies of quality of life and psychological morbidity following injury

Much of the research attempting to identify factors influencing outcome after severe lower limb injury has been carried out from an orthopaedic perspective, oriented to the outcomes of the surgical procedures themselves rather than on the improvement in the health and well-being of the patients following treatment (Gartland, 1988). Studies have traditionally tended to focus on physical function, morbidity, mortality, cost and effectiveness as outcome indicators. A better understanding of the long-term functional consequences of these injuries has provided clinicians with more realistic expectations for recovery (MacKenzie et al., 1993). More recently, however, a growing recognition of the role of psychological factors in recovery and adjustment, has led researchers to consider psychological well-being and quality of life as indicators of successful outcome.

A study in the US by Georgiadis and colleagues (1993) sought to assess retrospectively the long-term outcomes and quality of life of patients with open tibial fractures undergoing reconstructive surgery (N=16) or early amputation (within three
weeks) (N=18). They compared these two treatment groups on the following variables: the nature and rate of complications, hospital charges, limb function, pain, employment status, and subjective quality of life (as measured by the Nottingham Health Profile and the General Well-Being Schedule). Patients with successful limb reconstruction were followed up at an average of thirty-five months; those with below-the-knee amputation were followed up at an average of forty-four months post-injury. They found that, within both groups, the quality of life scores fell outside the range of positive well-being, particularly in the areas of pain, energy expenditure, mobility, sense of social isolation, enjoyment of recreational activities, and ability to work. However, more of the amputation group were working or willing to work at follow-up, and significantly fewer considered themselves severely or moderately disabled when compared with the reconstructive surgery group. In addition, those patients undergoing early amputation had significantly lower rate of complications and shorter hospital admissions than those undergoing reconstruction of the limb. The researchers concluded that early amputation may lead to superior long-term outcomes when compared to reconstruction. The poor functional outcomes and extensive hospitalisation evident in the reconstruction group were hypothesised as contributing to this discrepancy.

A recent study by Canadian researchers (Dagum et al., 1999) challenged these findings. Dagum and colleagues compared patients who had received primary amputation (N=9), secondary amputation following attempted reconstruction (N=5), and successful reconstruction (N=40) at an average of 4-6 years post-injury. They concluded that all groups were comparable on length of stay in hospital. Furthermore,
although the primary amputation group returned to work at an average of 9 months compared to 17.6 months for the reconstruction group and 36 months for the secondary amputation group, these differences were not found to be significant. In contrast to the findings of Georgiadis and colleagues (1993), there was significantly better physical functional outcome among those with successful reconstruction. They also found that subjective mental health status, as measured by the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), was close to the general population mean, with no significant differences between groups (although the pattern of scores shows those with primary amputations were highest and secondary amputation were lowest on a scale of positive mental health).

Despite these somewhat mixed findings, the authors concluded that “a below-knee amputation is probably an inferior reconstructive option to a successfully salvaged leg” (Dagum et al., 1999 p.1218). Unfortunately, the difficulty of predicting the success of reconstruction remains. In their review of the available research on different treatment options of open tibial fractures, Dagum and colleagues (1999) conclude that “the literature remains divided as to whether the long-term functional outcome of a salvaged leg is better or worse than an immediate amputation” (p.1217). Moreover, these two studies are divided in their findings of the presence of psychological morbidity following lower limb injury, regardless of which type of treatment is received.

The size of the groups under comparison may go some way to accounting for the differences between these studies. In addition, the retrospective assessment at several
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years post-injury reveals nothing of the initial impact of a severe injury in terms of psychological disturbance. The findings of Dagum and colleagues (1999) do, however, reflect those of a large (N=107) prospective, longitudinal study carried out in Norway of the psychiatric consequences of a range of accidental injuries\(^1\) (Malt, 1988). Malt assessed participants during their initial hospital stay, at 6 to 9 months, and at 2 to 4 years post-injury. The researcher found that only 17% of participants suffered from a psychiatric disorder at some time in the first year following their accident. There were surprisingly low incidences of anxiety and only one participant developed Post-traumatic Stress Disorder (PTSD). Depression was evident in 8% of participants; the researcher concluded that a subjective perception of loss of functioning was the main psychological trauma experienced.

The majority of studies assessing psychopathology following physical injury have, however, found significant levels of disturbance. I will discuss several of the most significant studies here. A prospective, longitudinal, multi-centre study of outcome after lower limb fractures\(^2\), was carried out in the US (MacKenzie et al., 1993; Jurkovich et al., 1995), to examine the relationship between physical impairment and disability. The investigators used the Sickness Impact Profile (SIP) to assess disability in an attempt to “encompass patient-oriented outcomes of functional status and health-related quality of life” (Jurkovich et al., 1995 p.629). The SIP examines subjective limitations in the ability to perform everyday activities. Patients (N=329) were assessed before discharge from the trauma centre where they were asked about

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\(^1\) The majority of patients had sustained either minor or moderately severe injuries. Those with severe brain injury were excluded.

\(^2\) 23% of lower limb fractures in the study were open wounds. A trend toward greater disability at six months (as measured by the SIP) was apparent for open compared to closed fractures (Jurkovich et al., 1995).
their pre-injury status\(^3\), and were followed-up at six and twelve months post-discharge. At six months patients remained functionally impaired, and SIP scores indicated a moderate level of disability among the group, with the areas of ambulation, work, sleep and rest, emotional behaviour, home management, recreation and pastimes the worst affected. At twelve months SIP scores indicated improved levels of disability, although 48% continued to show some level of disability at this time. However, the improvement was evident in the physical dimension of the SIP and, compared with scores at six months, emotional behaviour showed no overall improvement (Jurkovich et al., 1995).

Of particular interest was the investigators' finding that variance in SIP scores was poorly associated with level of impairment, suggesting that other factors were influential in the ability to return to usual activities following injury (MacKenzie et al., 1993). Moreover, the persistent emotional dysfunction, which was, according to the authors, "unexpected in both its severity and duration", indicates a role for psychological intervention in the rehabilitation of injured patients.

The persistence of emotional disturbance following injuries of varying severity was also demonstrated in a retrospective study of physical trauma patients (N=137) looking at the relationship between injury severity and psychosocial adjustment (Landsman et al., 1990). Participants completed postal questionnaires\(^4\) which included the Impact of Events Scale (IES), the Personal Adjustment and Role Skills scale

\(^3\) The validity of assessing pre-injury status post-injury is questionable, as it does not account for the influence of the injury on memory, for example idealisation of one's pre-injury situation.

\(^4\) A potential sample response bias due to the reliance on postal responses was acknowledged by the authors of this study.
(PARS), and the Brief Symptom Inventory (BSI), at an average of 15 months post-injury (range 3 to 36 months). In addition, information was gathered from hospital records regarding length of hospital stay, cause, nature and severity of injury. Scores on the BSI indicated a level of psychiatric symptomatology much higher than norms, but neither injury severity nor, perhaps surprisingly, time since injury were correlated with psychological outcome. Psychological distress (as measured by the IES, BSI and PARS) was related to injury-related employment and financial problems. Scores on the IES were significantly correlated with ‘symptomatic’ scores on the BSI, leading the researchers to suggest that psychological intervention such as cognitive therapy to assist patients “to deal with the subjective perception of the event” may be beneficial (Landsman et al., 1990 p.579).

A large-scale prospective study in the US - the Trauma Recovery Project - has examined functional, quality of life and psychological outcomes following a variety of major physical traumas. Holbrook and colleagues (1998) reported the data collected from assessments at discharge from the trauma centres and at six months post-discharge for 826 patients (54% had limb injuries). The Quality of Well-Being scale (QWB) was used to measure functional outcome, and in addition measures of depression (Center for Epidemiologic Studies Depression scale (CES-D)), post-traumatic stress (Impact of Events Scale (IES)), and social support (Social Support Questionnaire) were utilised. QWB scores improved over the six months following discharge, but indicated significant functional limitation associated with the mechanism of injury (specifically assaults and penetrative injuries), with length of
hospital stay, and with the presence of serious extremity injuries (as discussed in section 1.2.1 above).

Levels of depression (as measured by the CES-D) were high at discharge; 60% of patients showed scores above the cut-off. By six months this had dropped to 31% of patients. Depression and post traumatic symptoms of avoidance and intrusion (as measured by the IES), in addition to a negative change in social satisfaction, were significantly associated with outcome at six months as measured by the QWB. The investigators postulate that clinically significant levels of depression and post traumatic symptomatology post-injury may be important indicators of functional outcome.

The prospective study of disability following physical trauma carried out in the US by Richmond and colleagues (1998) similarly showed that high levels of post traumatic distress prior to discharge (as measured by the IES) were predictive of disability at three months (as measured using the Sickness Impact Profile). Patients (N=109, 58.7% with limb injuries) with high levels of intrusive thoughts (IES-Intrusion score ≥ 20) were 2.9 times more likely to be severely disabled than those with low or moderate levels.

Michaels and colleagues (1998, 1999) demonstrated the impact of psychological morbidity on return to work following traumatic injury. Participants (N=56, 36% of participants had sustained lower limb fractures) were assessed prior to discharge, and at one month and five months post-injury. Measures of psychological outcome
included the Brief Symptom Inventory (BSI), the Sickness Impact Profile (SIP), the Short Form 36 (SF-36), the Impact of Events Scale (IES) and the Michigan Critical Events Perception Scale (MCEPS), plus, at follow-up, diagnostic tools of Acute Stress Disorder and Post-traumatic Stress Disorder. At the time of injury around one third of participants showed psychosocial disturbances (as measured by BSI and SIP). 51% showed IES scores >30 at the time of injury, indicating high levels of traumatic stress, and IES scores and MCEPS scores were shown to be predictive of ASD at one month and PTSD at five months post-injury. The IES was also predictive of global psychological impairment as measured by the BSI. In examining return to work after injury, these researchers concluded that “posttraumatic psychological morbidity is responsible for compromised return to productivity at 5 months after injury by a mechanism that is independent from and additive to physical disability” (Michaels et al., 1998 p.648).

British researchers Feinstein and Dolan (1991) report on a prospective study examining psychopathology following lower limb fractures requiring surgical correction, without loss of limb. Patients (N=48) were assessed within one week of admission, at six weeks and at six months post-injury, using the General Health Questionnaire (GHQ), the Clinical Interview Schedule (CIS), the Impact of Events Scale (IES) and the Standardized Assessment of Personality (SAP). At the initial assessment information was also collected on participant demographics, cause and severity of injury, subjective assessment of responsibility for and stressfulness of the accident. Data on self-reported PTSD symptoms at follow-up, length of hospital stay and physical morbidity at six months was also collected. Approximately two-thirds of
participants showed symptoms indicating psychiatric ‘caseness’ (as measured by the
CIS) within one week of injury, falling to less than one quarter at six months. Neither
the nature of the trauma nor physical morbidity at six months were significantly
correlated with psychopathology at six months. The researchers concluded that levels
of distress post-injury were indicative of difficulty with cognitive assimilation of the
traumatic event, and highly predictive of psychiatric morbidity at six months.

The study by Feinstein and Dolan (1991) identified two variables that were predictive
of developing PTSD, namely initial IES scores and weekly alcohol consumption
above their respective medians. Initial IES scores were found to have a predictive
power of 87%. A prospective study (Shalev et al., 1996) of 51 patients at one week
and six months after physical injury due to trauma found a 25.5% rate of PTSD at six
months. Predictors of PTSD were higher levels of peritraumatic dissociation and more
severe depression, anxiety, and intrusive symptoms at one week.

On the whole it appears that studies have moved away from purely focusing on
functional impairment and return to work as indicators of outcome following physical
trauma. Richmond and colleagues, for example, have noted the expansion of the
evaluative dimensions of disability:

"As the understanding of disability has evolved, the dimensions have been broadened
beyond the more classic markers of self-care and [return to work] to the comprehensive
examination of resumption of one's roles … [O]nce disability is viewed from this broader
perspective, measures of disability are, by necessity, based on individuals’ personal (self-
report) evaluation of their status." (1998 p.638)
Nonetheless, studies of this patient group have tended to continue to rely on questionnaires standardised to a healthy population. The relatively small numbers of patients with specific injuries such as lower limb trauma precludes standardising measures to this group. Particular items within standard measures, for example those regarding activity, may be inappropriate for this population, and scores may therefore be misleading. The study by Georgiadis and colleagues (1993), for example, found that on direct questioning many participants stated they were quite satisfied with their lives, although their scores fell well outside the 'normal' range on quality of life questionnaires. This discrepancy may be understood in terms of differences among patients and researchers applying standardised measures in perceptions of 'satisfaction' following injury. A study of patients with below-knee amputations (Purry and Hannon, 1989) asked how disabled they considered themselves to be at several years after amputation. None considered themselves very disabled (although three quarters considered themselves to have some degree of disability); 68% thought their lives were very or quite similar to the non-disabled population. Similarly, Furst and Humphrey (1983) attempted to assess the impact of amputation by asking participants (N=19) to place themselves on a linear scale according to how fortunate-unfortunate they felt at present and before their amputation one to five years earlier. They found there was almost no difference. These findings highlight the importance of exploring patients' own perceptions of the impact of a traumatic injury on themselves.

To summarise, the clinical research studies discussed in this section, demonstrate somewhat variable levels of psychological morbidity following traumatic injury. For example, at the time of injury the incidence of clinically significant scores on measures
indicating psychiatric disorder has ranged from 37% (Michaels et al., 1998) to 62.5% (Fernstein and Dolan, 1991). The prevalence of PTSD diagnosed at six months post-injury has ranged from 17.9% (Feinstein and Dolan, 1991) to 42% (Michaels et al., 1999). This variation is likely to be due, at least in part, to differences in methodology, sample sizes, and the nature and severity of the injuries under study. Nevertheless, several studies (e.g. Richmond et al., 1998; MacKenzie et al., 1993) have recognised a potential role for psychological factors in long-term adjustment.

In addition, investigators have increasingly recognised the need to extend outcome criteria to incorporate patient values (e.g. Michaels et al., 1999). Although there is clearly a need for assessment of the influence of factors such as physical function, the presence and severity of pain, or the ability to return to work, of equal importance is a recognition of individual differences in what is considered to be a good outcome. For example, it is critical to consider whether a person values function over appearance in their own definition of 'quality of life'.

1.3.2 Clinical research studies of the phenomenological experience of injury

The findings of clinical studies of psychological morbidity following physical trauma (section 1.3.1), have demonstrated large individual differences in adjustment. Phenomenological methods allow examination of an individual’s psychological conceptions of events and their consequences. Research exploring the phenomenological experience of adjustment to severe physical trauma has tended to
investigate individuals with spinal cord injury or amputations. Some of this research is described in this section.

Parkes (1972) considered similarities of experience between the loss of a limb and the death of a close relative. The sample of amputees (N=45) were interviewed by the author at one month and at one year after amputation of an arm or a leg. As far as possible, the same questions were asked of the amputees as those put to a group of widows at one month after bereavement and at various times during the following year. Parkes identified two main aspects of similarity shared between these groups in their reactions to loss: an externally oriented pining for something that is missed outside the self, and an internally oriented "sense of mutilation". However, some key differences were also apparent. For example, among the amputees the feelings of external loss tended not to be directed at the physical absence of the limb, but more frequently centred around pining for aspects of their lives from which they were separated, such as functional abilities, jobs or leisure activities. In addition, among amputees the sense of mutilation reflected not only loss but "a sense of being vulnerable, laid open and helpless in a potentially hostile world" (p.346), leaving "a gap in the self" whereby one's sense of self is threatened. This experience was less frequently expressed by the widows in Parkes' sample. Parkes attributed the similarities of experience of loss shared by amputees and widows to the persistence of 'working models' (Bowlby, 1969) of, for example, a part of the body or an important relationship, which are at odds with changes in one's environment. Following a loss,

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5 Parkes' paper also discusses the findings of a study by Fried (1962) on reactions to the loss of a home through compulsory rehousing, and finds comparisons with both the loss of a limb and of a spouse.
the old working models need to be modified "in such a way that they contribute to
effective functioning rather than interfering with it" (p.348). While a discrepancy
between self and environment remains, difficulties may present themselves:

"[The individual's] ability to control, predict and plan his life in a meaningful and
satisfying way is reduced and he is relatively less able to deal with common dangers and
expectations. By comparison with his previous homeostasis he is and feels vulnerable,
helpless and empty. It is this, I believe, which accounts for the sense of mutilation and
emptiness which I have described." (Parkes, 1972 p.348)

A study by Heinemann and Shontz (1984) applied the representative case method^6
(Shontz, 1965) to explore adjustment to disability. They used a variety of interviews
and standardised tests and measures, including the Role Repertory Technique and a
Q-sort, to describe two individuals aged 24 years who had sustained spinal cord
injuries more than two years previously. The participants were asked to recall four
incidents covering different aspects of the adjustment process: an event typical of life
before the injury; an event occurring shortly after hospitalisation; an event post-injury
at a time of despair; and an event post-injury when hope for the future was high
(Heinemann and Shontz, 1984). One participant showed increasing acceptance of
disability over time, as demonstrated by positive rating of current self, and positive
correlations between typical self and ideal self. It is interesting to note that this
participant demonstrated (retrospectively) greater acceptance of disability during the
first week post-injury than at the time of the study over two years later. The
participant reported that at the time of initial hospitalisation she perceived her injury

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^6 This methodology adopts detailed analysis of individuals to "illuminate complex structures of
personality" (Heinemann and Shontz, 1984 p.6). Individuals are not considered primarily to be
representatives of a population, but are 'expert consultants' in a unique position to understand
processes occurring in whole persons.
as temporary and expected to recover full function. The second participant, however, showed little change across recalled episodes, and demonstrated poor acceptance of self characteristics. Both participants reported clinically significant levels of depression\(^7\) at some point post-injury. The importance of the meaning of disability for each individual was noted by these researchers. The participant for whom self-definition included physical activity and achievement was found to have more difficulty in accepting his injured self, although in the areas of academic and prevocational functioning he appeared to be managing well. The need to consider personal values in adjusting to injury is discussed further throughout this chapter.

Keren Fisher (1985) conducted a retrospective study of adjustment, applying the repertory grid technique to examine the individual's experience of amputation and change in 'self-image'. She noted the lack of research employing recognised psychological testing procedures to the study of self-image of people suffering serious injuries. Participants (N=12)\(^8\) were assessed at a mean time from amputation of upper or lower limbs of twenty-five months. Fisher compared participants deemed, by surgical opinion, to be 'successful' (N=6) or 'unsuccessful' (N=6) in terms of rehabilitation. Outcome criteria were functional ability in the context of return to work and performance of household duties, and frequency of requests for physician consultation.

Analysis of the repertory grids revealed that participants (both groups) most commonly held monolithic construct systems (Makhlouf-Norris and Norris, 1972),

\(^7\) Beck Depression Inventory scores of 10 or above.

\(^8\) Eight participants had received accidental injuries.
that is they see the world in a rigid and inflexible way that allows little room for change. Fisher postulated that difficulties arise when attempting to fit a changed self into this inflexible pattern. There were no significant differences between the groups on their perceptions of self on variables of success, happiness, adjustment or independence. Patterns were apparent, however, suggestive of factors contributing to unsuccessful rehabilitation, such as holding an extreme ideal self which may lead to unrealistic beliefs about what one should be like. In addition, Fisher concluded that “the unsuccessful group seem to have a lower opinion of themselves even before their accidents, so it is not surprising that their adjustment to the amputation has been affected” (p.114-115). Even those deemed to be successfully rehabilitated demonstrated a significant degree of self-alienation or low self-esteem, defined as a negative correlation between actual and ideal selves.

The absence of significant differences between the groups in this study may reflect the definition of ‘successful adjustment’ which relied on surgical criteria of functionality and help-seeking behaviour, rather than participants’ own criteria of success (Fisher, 1985). The findings of this study indicated that self-alienation and rigid construct systems are common among amputees, irrespective to a large extent of rehabilitation success as defined here. The potential disadvantages of holding a rigid construct system could be seen to reflect Parkes’ application of ‘working models’. The hypothesis appears to be that successful adjustment following amputation requires a flexibility in one’s conception of oneself and the world. Fisher concluded that it may be possible to identify certain psychological difficulties which will interfere with
rehabilitation success and to offer psychotherapeutic measures at an early stage to potentiate rehabilitation and reduce unnecessary medical consultations.

1.4 Psychological theories of adjustment

1.4.1 What is meant by adjustment?

As discussed above, the clinical definition of 'outcome' has covered a variety of factors, but more recently the importance of successful outcome as defined by the patient has been recognised (e.g. Michaels et al., 1999). But what are the theoretical understandings of adjustment? Psychological research into adjustment has covered a range of changed life circumstances such as chronic illness, disfigurement, disability, loss of a home and many more. What connects these groups is the experience of a traumatic event that has a sudden, unexpected, and massively extensive effect on a person's life (Gunther, 1971). In general, theoretical models have described adjustment as a process, indicating that one's cognitions about an event and its consequences change over time. Adjustment implies that one's belief system is adapted to incorporate changed circumstances, as opposed to attempting to fit the new situation into one's current belief system:

"The impact of a sudden physical disability creates alterations in the individual's psychological equilibrium. A state of disequilibrium results with gradual attempts at achieving a renewed equilibrium. The attainment of a new psychological equilibrium is equivalent to the so-called final adjustment, adaptation, reorganization, or reintegration."

(Livneh, 1991 p.113)
Adjustment can be seen as a dynamic and heterogeneous process of coming to terms with an event and adapting to the demands of change involving several independent domains from occupation and lifestyle, through social relationships, to mood and cognitive functioning (Watson and Kendall, 1983). Therefore, adjustment viewed as process has been conceptualised as involving “a temporal sequence of psychosocial development stages” (Livneh, 1991 p.113). This view has prompted several authors to propose models which describe the sequence of these stages.

1.4.2 Stage models

Despite recognising human variability in response to traumatic events, stage models propose some underlying universality to the process of adjustment. A model put forward by Fink (1967), and elaborated by Shontz (1975), suggests that following a “crisis-inducing event” an individual passes through four stages: shock, defensive retreat, acknowledgement, and adaptation. There are clear links with models of grief reactions in bereavement which are viewed as adjustment to loss of a significant other in a similar way to loss of health, physical ability, or a limb through amputation. Parkes (1972), for example, in comparing reactions to the loss of a limb to bereavement following the death of a spouse, connected these experiences in terms of “a process of realization, of making real inside the self events which have already occurred in reality outside” (Parkes, 1972 p.344). He proposed that both amputees and bereaved individuals proceeded through the same adjustment process: shock and numbness, followed by anxiety and distress, giving way to depression and apathy, and

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9 This study is described in more detail in section 1.3.2.
finally to "a reorganization and redirection of feelings and behaviour" (p.344).

Perceived similarities of adjustment have led to the application of a model of the
 grieving process described by Kubler-Ross (1969), to adjustment following burn
 injury (Atkinson, 1997). This model involves five stages of denial, anger, bargaining,
 depression and acceptance. Atkinson proposed that the first three stages will usually
 be experienced by the burn-injured patient while in hospital. The bargaining phase is
 evident in statements such as 'everything will be all right when ...', and will be
 followed by depression when these expectations are not realised.

It would not be possible to provide an exhaustive list of models proposed by stage
 theorists here. Livneh (1991) attempted to produce a unified model of adjustment to
 disability based on a literature review of over 40 explicit and implicit stage models.
 This unified model conceptualises the process in five stages:

 I) Initial impact 1) shock, 2) anxiety

 II) Defence mobilisation 1) bargaining/denial

 III) Initial realisation 1) mourning/depression, 2) internalised anger

 IV) Retaliation 1) externalised anger

 V) Reintegration 1) acknowledgement, 2) acceptance and final adjustment.

Further theorists have developed the 'stage model' further, and have proposed models
 of the internal processes involved in the attainment of positive adjustment. Sybil Kohl
 (1984), for example, has identified a comprehensive list of psychosocial issues to be
 mastered in the process of adjustment following traumatic limb loss: survival struggle;
 ideations of death; thought disturbances; phantom sensations; mourning; quest for
meaning of injury; role relationships; body image; intimacy; vocational options. These ten issues highlight the scope of the impact of injury on one’s life. Another model, put forward by Dembo, Leviton and Wright (1956) and explicated by Wright (1960), focuses on the task of adapting one’s values following disability. These authors described four criteria of adjustment: expansion of one’s values, containment of the effects of disability, subordination of physique, and appreciation of one’s assets. The importance of an individual’s conceptualisation of self and of the world is evident in both these models. Within these psychological models, injury forces the individual to confront where his values lie.

There appears to be little empirical basis for these models, although some have cited clinical experience in support of the proposed stages. Kohl’s (1984) identification of psychosocial issues, for example, arose from her “psychosocial counseling sessions, observations, and interactions with patients ... and their families” (p.115). However, the study by Heinemann and Shontz (1984) described above (see section 1.3.2) challenged the application of stage models to the process of adjustment to spinal cord injury. Although the process of adaptation did appear to occur in stages for one participant, these were strongly influenced by external events and did not occur in the order proposed by theoretical models. The other participant showed little evidence of following a stage model of adjustment, and demonstrated little change over time. On the other hand, it could be inferred that this participant had failed to successfully negotiate the stages necessary to reach a point of adjustment or adaptation.
1.4.3 Ascertaining positive adjustment

Adjustment can not be measured in absolute terms, but only considered relative to status prior to a significant life event. The consideration of pre-trauma levels of psychopathology or function is necessary in determining what levels of psychological well-being or function would represent a return to pre-injury status. In this context, achieving positive adjustment following a trauma is seen to be the norm:

"Despite serious setbacks such as personal illness or the death of a family member the majority of people facing such blows achieve a quality of life or level of happiness equivalent to or even exceeding their prior level of satisfaction." (Taylor, 1983 p.1161)

A further consideration is the distinction between being adjusted and being unaffected. Following a severe physical injury, for example, one will be left with the scars of the injury. Robert Weiss argues that ‘recovery’ is the return to “effective functioning”. He has suggested a list of ‘reasonable expectations’ that might be considered to indicate effective functioning: 1) ability to give energy to everyday life; 2) psychological comfort as evidenced by freedom from pain and distress; 3) ability to experience pleasure or gratification; 4) hopefulness regarding the future; and 5) ability to function adequately in social roles (Weiss, 1988). Such indicators suggest methods of ascertaining adjustment. For example, favourable psychological adjustment might be demonstrated by measurable outcomes such as positive self-concept, life satisfaction, social roles, and the absence of anxiety or depression.

In general, research in the field of adjustment has tended to overlook the task of defining adjustment, and has simply measured psychological symptoms such as anxiety, depression, and traumatic stress, or ability to participate in activities of daily
living. However, as the psychological models of adjustment show, there is another consideration in the field of physical injury. Severe injury triggers changes in one’s conceptualisation of oneself. The next section will discuss the importance of examining the ‘self-concept’ in considering the impact of lower limb trauma.

### 1.5 Self-concept

One assumption purported to be shared by the various stage models described in section 1.4.2, is that in order for adaptation to an altered body to occur, changes are expected in an individual’s body image, self-concept, and personal identity (Livneh, 1991). In this section I discuss factors which might be expected to influence the self-concept following severe lower limb trauma. First, however, a note is needed to clarify the variety of terms used in the literature to describe different components of self, which are often used interchangeably.

#### 1.5.1 Definitions

The concept of ‘identity’ is commonly taken to incorporate the different facets of the self such as body image and self-esteem that make each individual distinct from others. In general, ‘body image’ has components of both self experience and others’ perceptions of oneself. Body images are not merely mental reflections of the physical self, but are associated with others’ appraisals and reactions, and they are fundamental in the development of self-concept, they contribute to personality and organise our social behaviour (Van der Velde, 1985). ‘Self-concept’ consists of the more cognitive aspects of self-perception, and encompasses such constructs as self-esteem, self-
satisfaction, and perceptions of acceptance by others (Brantley and Clifford, 1979). There is an undeniable link between body image and self-concept, which Cash (1990) explained succinctly: "Obviously, if one dislikes the body one 'lives in,' it's difficult to be satisfied with 'the self who lives there'" (p.61). Body image thus constitutes a significant aspect of one's self-representation and plays an important role in self-esteem or self-satisfaction.

1.5.2 Body image distortion

There is a large body of literature looking at adjustment to acute disfigurement, and much of this research has been carried out on burn victims, although a considerable amount has been written on amputees. Kohl (1984), for example, in describing the process of psychological adaptation to the loss of a limb noted that "the experience leaves some people with a sense of isolation from their previous identities, both physically and emotionally" (p.125). Much of the literature, however, suggests that emotional reactions to an acute disfigurement are more dependent on an individual's value system and on variables such as social support and personality, and, rather than being a direct product of injury to the body structure, appear to be unrelated to the severity of deformity (e.g. Shontz, 1991; Hill, 1985; Kleeman, 1977). The degree to which one's identity is invested in the disfigured body part will influence one's reactions to the injury. For example, if someone has invested much of their self-concept in physical attractiveness, then any alterations in appearance carry a greater perception of threat than if one's self-concept is invested in academic achievement. Successful adaptation to severe physical injury will thus require a sense of self that can be separated from physical attributes.
Appearance is not the only factor affecting an individual’s perception of his or her body and self-image after an injurious trauma. One aspect of the initial impact of a disabling injury, is a reduction in independent mobility. The assistance required from others for basic activities of daily living can provoke high levels of frustration with oneself, contributing to a negative image of one’s body as ineffectual and cumbersome (Dewing, 1997). Similarly, the initial unpleasantness of the wound may lead the individual to conclude that “his entire physical and emotional self is repugnant” (Kohl, 1984 p.137). In addition, pain experienced as a result of injury may affect body image; Price (1990) proposes that people will not be able to ‘trust’ their bodies in the same way as before the injury. Physical factors such as these may, therefore, have a profound effect on one’s sense of self. Kleeman (1977), for example, has claimed that “any alteration in the body structure or function is a disturbance of one’s integrity and thus a threat to one’s self” (p.79). Following a severe injury there is a need to reintegrate the damaged part into the body image and to accept it as a part of oneself. The task of recreating oneself may involve adapting previously-held self-concepts, ideas of worth and world views (e.g. Blakeney et al., 1998), and the successful completion of this process is considered vital for positive adjustment. Kleeman (1977) goes so far as to claim that:

“The ability to gain any positive satisfaction from rehabilitation and/or restorative surgery largely depends upon whether or not the defect was ever incorporated into the body image. In cases where it has not been incorporated, there has been very little discernible success with rehabilitative efforts” (p.86).
Several writers have attempted to identify factors which are likely to impact on this process of reintegrating one's body image following a disfiguring injury. Scott Brown (1977) suggested the following factors to influence adaptation to body image distortion: 1) the functional significance of the affected body part; 2) the value placed on physical appearance by the individual, that is the extent to which the appearance of the body part is intrinsic to self-identity and self-worth; 3) the visibility of the body part (both to the individual and to others); 4) the feasibility and availability of rehabilitation, which may be a societal or cultural factor; 5) the degree of change and the speed with which the change occurred; and 6) the individual's previous coping pattern. Applying this model in considering a specific population, such as adults with severe lower limb trauma in the UK, several of these factors could be seen to hold constant among the group. For example, with the same body part affected the factors of functional significance (1) and visibility (3) would carry the same weight across the group. A population within a single society would vary little in terms of access to rehabilitation (4). In addition, the nature of traumatic injuries is to produce sudden and significant changes, and controlling for injury severity would allow factor (5) to remain constant across the group. Thus, individual differences within a specific population would be explained by this model as due to differences in personal values and coping patterns.

Personal values, for example the value of appearance, are, nevertheless, not independent of social values. Dewing (1997) has written: "body image and the experience of disability must not be solely considered from the context of the body image but from the context of the disability experience, which in itself is socially and
culturally determined” (p.112). Acknowledging the influence of society, which is discussed in the next section, is crucial in understanding the impact of a severe physical injury on an individual’s sense of self.

1.5.3 Stigma

It has been recognised that people acquire and develop self-concept through interaction. Society acts as a social mirror: we interpret the reflections society gives us, and form self-concepts according to our perceptions of the impressions others form of us (Bull and Rumsey, 1988). Self representations are formed “through the assimilation of and comparison to representations of others” (Hardy, 1982 p.181). Moreover, society dictates acceptability and unacceptability of aberrations in appearance and ability. The term ‘stigma’ was used by Goffman (1968) to refer to a physical or psychological attribute that is deeply discrediting, marking the individual out as less desirable or worthy than others. The prevailing attitudes held and expressed within one’s culture, society, peer group and family will highly influence the attributes deemed unacceptable or undesirable in others. In general, our western culture places a great deal of value on the body. The ideal focuses on youth, beauty, vigour, intactness and good health (Price, 1986). Social messages of inferiority or pity are conveyed through media, politics, and discrimination. Culture, therefore, plays an important role in body image.

Gender stereotypes are also determined by society and culture. Western culture can be seen to place a greater emphasis on attractiveness in females than males. Preoccupation with appearance is a central feature of the female sex-role stereotype
(e.g. Rodin et al., 1985). It may be, therefore, that women place greater value on their body than men, which may differentially influence adjustment to disfiguring injuries. In support of this theory, Furst and Humphrey (1983), in a study of lower limb amputees, found that 75% of women rated the change in body image above the impairment of function as the more intrusive handicap, while only 27% of men did the same, although numbers were small in this study (N=19). An alternative explanation for this difference might be awareness that one falls short of social expectations that people conform to gender stereotypes. For example, scars carry different social meanings on men, where they might imply heroism, than on women, where they might imply carelessness (Pertschuk, 1990).

Inevitably linked with stigma is the experience of shame: the knowledge that one is in some way deficient in the eyes of others. The extent to which shame is experienced will depend on whether an individual considers these judgements to be "accurate and fair" (Shontz, 1991). Shame has been linked with self-consciousness, helplessness, feelings of inferiority, and anger directed towards the self (e.g. Gilbert et al., 1994). Shame therefore affects self-esteem, interrupts positive affect, especially in social situations, and leads to withdrawal from others. Indeed, in a study of social responses to amputees, Furst and Humphreys (1983) found that people with amputated limbs may lead restricted lifestyles due to "fears of exposure and looking ridiculous" (p.155). Kohl (1984) noted that disfigurement due to scarring can have long-lasting implications for socialisation due to people feeling that they will appear repulsive to others, and may precipitate withdrawal from sexual intimacy.
Views about disability have become “embedded in our individual and social consciousness” (Dewing, 1997). Studies of social reactions to people with disfigurements (e.g. Goldberg, Bernstein, and Crosby, 1975; Kleck and Strenta, 1980; Rumsey and Bull, 1986) have demonstrated that members of the general public either show avoidance behaviours, or show inordinate attention and curiosity through staring or asking questions. Disfigured individuals are therefore denied the anonymity in a crowd enjoyed by others, and deprived of a measure of control over social interactions. The unpredictability as to how others will react can lead to a preoccupation with oneself, which may impede the adjustment process:

“When a physical disability or the body-image problems that result from it become the main focus of concern in a person’s life, that life becomes narrowed and restricted. Psychologically, to overcome a disability means to stop thinking about it all the time and to get on with the business of living as best one can.” (Shontz, 1990 p.167)

When society consistently reacts to the appearance or function of the body, however, body awareness becomes a permanently major issue for disabled or disfigured people, and profoundly shapes the construction of the self-concept. Individuals must work to maintain a self-esteem without relying upon appearance in an environment which values an ideal (i.e. intact, able, attractive) body. Furst and Humphrey (1983) attempted to explain “the public’s horror of disablement” by demonstrating that members of the general public tended to markedly exaggerate the physical handicap of losing a leg (p.153). Physical trauma may be perceived as one of the worst experiences imaginable (Bulman and Wortman, 1977), and it may be that observing physical impairments in others highlights everyone’s own fears of fragility (Bernstein, 1990).
1.5.4 Changing roles

Alongside adaptations to an altered body, a severe limb injury carries wider practical implications which can influence an individual's sense of self. Recovery from severe lower limb trauma necessitates a lengthy period of treatment and rehabilitation, and the effects of prolonged hospitalisation have been well documented. For example, there are economic factors resulting from a period of unemployment: statistics show that after two years of ongoing hospital treatment there is almost a 100 per cent probability that a patient will never return to work (Hansen, 1987). Attempted reconstruction of a limb may take this length of time, over several hospital admissions.

One impact of severe injury may be that one can no longer function in their previous occupational role due to physical limitations. This potential loss of productivity, in addition to a change in social standing through the loss of occupational role, and perhaps the taking on of a more dependent role within the family or social system, may impact on self-esteem and psychological well-being. The study by Landsman and colleagues (1990) described above (see section 1.3.1), found a clear association between employment and financial problems and psychological distress, though direction of causality is unknown. However, the loss of a previous occupational role will not be perceived negatively by a number of individuals, who may find value in the opportunity to try something new or to spend increased time with family. Adaptation involves a process of determining the extent to which work will continue to be a central focus in life (Kohl, 1984).
The forced change in roles will also influence relationships. A change in financial circumstances, due to altered vocational options, may have a significant effect on the family system. In addition, when injury precludes maintaining the role of primary provider for the family, loss of pride or sense of worth may result. Similarly, negotiation of dependency needs and distribution of household tasks may affect established family roles and put a strain on relationships. In a paper written by a psychologist who had suffered a major upper limb injury, Paterson describes how his wife had to “shoulder the burden of my frustration”, while experiencing her own frustrations and difficulties (Paterson and Burke, 1995 p.778).

In his editorial, Hansen (1987) goes as far as to say: “if this [incapacity] continues for a long period of time the individual’s self-image, ego, and position in the family may be forever destroyed” (p.800). However, such consequences of severe physical injury as described here, are not inevitable outcomes. Individuals will experience different challenges and obstacles to recovery depending upon their own values and self-conceptualisation. Further mediators to adjustment are discussed in the next section.

1.6 Mediators to adjustment

Franklin Shontz (1991) asserted that physical disability does not always lead to maladjustment, disturbance or distress; a view which is supported by the absence of psychological morbidity among a proportion of participants in the research studies described in section 1.3.1. A significant life event, such as an injury, can act as a catalyst for change, presenting an opportunity to re-categorise oneself, or to re-
prioritise one’s goals and values in life. Disability will generally affect the body experience, but the impact is not always negative:

“When a disability interferes with, stops, or actually reverses psychological growth, it is a source of worry and concern ... By contrast, when a disability opens up opportunities for learning, challenges the persons to achieve successfully, in short, promotes ego growth, it is a source of growth and ultimate maturity.” (Shontz, 1991 p.110)

Mediators to adjustment have been postulated to include self-esteem (e.g. Fisher, 1985; Kohl, 1984), social support network (e.g. Hill, 1985; Furst and Humphrey, 1983), past coping skills (e.g. Heinemann and Shontz, 1984; Scott Brown, 1977), and sense of mastery or personal control over one’s life (e.g. Taylor, 1983; Kobasa, 1982). Adjustment, therefore, is influenced by patterns of pre-injury characteristics, which may act as a buffer to the effects of life stress.

1.6.1 Social support

Cohen and Wills (1985) conducted a comprehensive review of studies examining the role of social support and concluded that social support acts as a “buffer”, protecting people from the potentially adverse effects of stressful events. The provision of emotional, material, and informational support has been shown to be positively related to mental and physical health. However, in their study of predictors of disability after physical trauma (see section 1.3.1) Richmond and colleagues (1998) failed to find high correlations between disability at 3 months post-injury and either the availability of or satisfaction with social support. They hypothesised that patients age may

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10 See section 1.3.2 for an elaboration on Fisher’s (1985) hypothesis of the role of self esteem in adjustment to amputation.
influence the buffering effect of social support, citing a study of functional recovery after hip fractures where the number of social supports was more strongly related to recovery in the older sample (Cummings et al., 1988).

In their study of lower limb amputees, Furst and Humphrey (1983) found that amputees tended to attribute their ability to come to terms with their injury to family support. However, in the same study these researchers found that the partners of amputees felt that the amputees own personality had been the most important coping factor.

1.6.2 Previous coping styles

The reapplication of previously established coping styles in response to a crisis has been well-documented in the literature (e.g. Heinemann and Shontz, 1984). In addition to the presence of close and supportive family ties, the patients who progressed well in a study of adjustment following traumatic upper extremity amputations, were those who had previously mastered life's crises (Schweitzer and Rosenbaum, 1982). The way in which one has coped with difficulties in the past will influence the way in which one perceives traumatic life events (Moos, 1977). If an individual has an internal model of his own ability to overcome adversity he is more likely to perceive a serious injury as a challenge, to be motivated to engage with rehabilitative programmes, and to be proactive in the process of his own recovery. Richard Lazarus recognised the importance of one's appraisal of personal resources in determining stress responses (Lazarus, 1966; Lazarus and Folkman, 1984). He
proposed that stress is the outcome of a negative balance between the individual's interpretation of situational demands and the resources available to him.

1.6.3 Attributional style

The ability to see change as a challenge rather than a threat is due, in part, to attributional style. Attributions play an important role in one's sense of mastery or control over events, and in this way have been shown to influence coping. It has been suggested that differences in adaptation to illness can be accounted for by differences in perceptions or understanding of one's situation (e.g. Cohen and Lazarus, 1979), that is whether events are attributed to internal or external causes. For example, if one holds an external locus of control one may adopt a 'sick role', playing a passive role in one's recovery; holding an internal locus of control motivates one to take responsibility for one's own recovery. Support for the role of attributions in adjustment is evident in a study by Bulman and Wortman (1977) who examined accident victims' attributions of blame. They found that attributing responsibility for injury to oneself was associated with good coping, and poor coping was associated with blaming external causes or believing that injury had been avoidable. Interestingly, Athelstan and Crewe (1979), in a study examining the causes of accidents which had resulted in spinal cord injuries, found that where people had been 'innocent victims' of accidents they were more poorly adjusted than those who had been actively involved
in the cause of injury\textsuperscript{11}. Thus it may be difficult to separate attributional style from the facts of responsibility for injury.

The mechanism by which attributions contribute to adjustment is hypothesised to be mediated by the preservation or enhancement of self-esteem, a search for meaning and maintenance of a perception of justice in the experience, and a sense of mastery or control (Turnquist et al., 1988; Taylor, 1983). The next section describes a theory of response to trauma, within which the influence of these mechanisms on adjustment can be better understood.

1.7 **Response to trauma**

Ronnie Janoff-Bulman (e.g. Janoff-Bulman and Frieze, 1983; Janoff-Bulman, 1992) has written extensively on the subject of trauma, expounding an influential theoretical perspective for understanding responses to traumatic events. She proposes that the psychological distress experienced in response to trauma is due, in large part, to the shattering of basic assumptions held about oneself and the world. A traumatic experience challenges three basic, previously unquestioned, assumptions: the world is benevolent, the world is meaningful, and the self is worthy. The assumptions follow Lerner's "just world" principle (1975, 1980) which states that events do not occur by chance alone but people get what they deserve in life. These assumptions lead to an 'illusion' of personal invulnerability which is dramatically shattered after confrontation

\begin{footnotesize}
\textsuperscript{11} This was not found to be the case in the representative case studies by Heinemann and Shontz (1984), although the nature of the study was to look at adjustment in two participants only (see section 1.3.2)
\end{footnotesize}
with serious injury or threat to survival forcing victims “to confront their own fragility” (1992). Support for this theory was shown in the study by Parkes (1972) described above (see section 1.3.2) where feelings of personal vulnerability arose following the loss of a limb.

Janoff-Bulman asserts that coping is a process of rebuilding one’s “assumptive world”; a process which may incorporate apparently maladaptive strategies such as self-blame, denial, and intrusive ideation. In fact, she argues, these strategies aim to restore the psychological equilibrium maintained by the assumptions of meaning, justice and personal control, and are driven by a need to make sense of what has happened. Janoff-Bulman stresses the importance of recognising the adaptive value of denial, emotional numbing and intrusive recollections, framing them as automatic efforts to come to terms with and integrate traumatic experiences (1992). Within this theory, denial permits an individual to maintain their old assumptions unchanged. In fact denial has been shown to be associated with good adjustment (e.g. Dinardo, 1971). Other strategies facilitate the coping process by rebuilding shattered assumptions in a way that maximises the possibility of perceiving self-worth and benevolence and meaning in the world. For example, the strategy of comparing oneself with (real or hypothetical) less fortunate others preserves a favourable self-concept. Young adults with spinal cord injuries have been found to compare themselves with others who have suffered a greater degree of paralysis (Bulman and Wortman, 1977). Self-blame (as discussed in section 1.6.3) may reflect a need to minimise the apparent meaningless nature of the event and the possibility of
randomness in the world. Believing that one’s behaviour might have prevented the outcome invokes beliefs in personal control, and the perception that one can positively affect future outcomes. The representative case studies by Heinemann and Shontz (1984), for example, found that the participant who continued to show little acceptance of injury at over two years post-injury, attributed his accident to chance, denying any personal responsibility. He attempted to restore a sense of control over his life through attempting suicide. A further coping strategy put forward by Janoff-Bulman (1992), is for individuals to find positive elements and benefits in the outcome of trauma in order to “find meaning in their suffering” (p.135), and thus attempt to recover their fundamental assumptions.

Janoff-Bulman has stated that “the adjustment of survivors rests largely on whether they experience profound disillusionment and despair, or ultimately, minimal disillusionment and hope” (1992, p.70). The outcome of trauma is thus seen to depend upon the ability to see beyond loss and vulnerability to transform or reinterpret the experience in terms of appreciation of life itself and of one’s personal strengths (Janoff-Bulman and Berger, 2000; Janoff-Bulman and Berg, 1998):

“It is not simply that some trauma survivors cope well and perceive benefits in spite of their losses, but rather that the creation of value and meaning occurs because of their losses, particularly the loss of deeply held illusions. In the end survivors often feel both more vulnerable and more appreciative, two states that are fundamentally linked.” (Janoff-Bulman and Berg, 1998 p. 35 - original emphasis)

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12 MacLeod (1999) has challenged the widely-accepted relationship between self-blame attributions and psychological adjustment, proposing alternatively that attributions following a traumatic episode may actually be driven or influenced by the level of distress experienced.

13 See section 1.3.2 for a description of this research.
In summary, the way in which individuals see themselves and the world in which they live is influenced by trauma. The adjustment process involves an adaptation of these constructions of the self and the world, and will be mediated by factors including self-esteem, personal values, social stigma, flexibility in roles, social support, previous coping skills, and attributional style. A proportion of individuals sustaining physical injury do not display signs of maladjustment as evidenced by psychological morbidity, and appear to recover well (e.g. Purry and Hannon, 1989). However, little clinical research has accounted for the meaning of the injury in the life of the individual or personal definitions of good outcome. Nor has much research been undertaken in exploring how the self-concept is affected following severe physical injury, and the way in which changes in the self-concept promote or impede adjustment. The present study aims to address these areas, and is introduced in the following sections.

1.8 Considerations in studying a population with recent lower limb trauma

In attempting to explore adjustment to a severe lower limb injury several considerations must be addressed. As discussed in section 1.3.1, standardised questionnaires and measures present difficulties when used with such specific populations, being referenced to a ‘normal’ healthy population, and thus limiting interpretation and application. Particular items may be irrelevant or inappropriate, and can be seen to impose assumptions and constructs on individuals which may not hold true for the group under study. Much of the research looking at outcomes after physical trauma has been quantitative, using questionnaires in an attempt to make causal statements linking dependent and independent variables. The importance of
personal values and individual meaning of 'adjustment' to injury has been recognised in the theoretical and clinical literature described in this chapter, and standardised measures necessarily preclude individual meanings. Much of the previous research on adjustment to disability has failed to take into account the meaning of the injury in the individual’s life and therefore can be considered to have had severe limitations (see Cull and Hardy, 1977; Eisenberg and Guilbert, 1978; Hohmann, 1975). Heinemann and Shontz (1984) have proposed that fewer subjects should be studied in greater depth as “a full understanding of how persons actually cope with value loss requires that appropriate persons be examined comprehensively and understood as complex wholes” (p.5), so as not to eliminate the individual differences which are of interest.

George Kelly’s Personal Construct Theory (1955) is a theory of how people make sense of themselves and the world through the construction of a personally organised system of interpretations or constructs of experienced events (Beail, 1985).

“The model underlying construct psychology is explicitly the idea of “every man his own scientist”. Kelly believed that we strive to make sense out of our universe, out of ourselves, out of the particular situations we encounter. To this end each of us invents and re-invents an implicit theoretical framework which, be it well or badly designed, is our personal construct system. In terms of this system we live, we anticipate events, we determine our behaviour, we ask questions. It is in terms of this same system that we evaluate outcome and elaborate changes in the interpretative system itself.” (Fransella and Bannister, 1977 p.4-5)

It is a system, therefore, which is not static but is influenced by external events. Personal Construct Theory may thus be of use in the exploration of how changes, such as the consequences of severe lower limb trauma, are made sense of.
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The repertory grid was developed by Kelly as a method for exploring these systems. This semi-structured interview technique allows individuals to describe their own unique experience in a structured format which allows comparative analysis. The methodology produces more subjective material than any questionnaire, while avoiding the drawbacks of in-depth interviewing such as redundant material and difficulty of analysis. Repertory grids are considered extremely suitable for understanding adjustment problems following serious injury as they make no assumptions about appropriate or typical reactions, and they can be used to explore changes over time (e.g. Fisher, 1985; Heinemann, 1995). They permit an exploration of how an injury impacts on an individual’s view of himself:

“It is an attempt to stand in others’ shoes, to see their world as they see it, to understand their situation, their concerns.” (Fransella and Bannister, 1977 p.5)

This chapter has indicated that injury impacts on the self-concept. Repertory grids permit examination of several different indices of self-concept which may be pertinent in adapting to lower limb trauma, such as self-esteem, body image, role change, and perceived stigma, within a single theoretical framework. In addition, Heinemann (1995) highlighted two dimensions which were of particular interest in the study of adjustment: self-experience through time, and discrepancies between one’s typical self and ideal self that are associated with impairment, disability and handicap. Previous research has employed the repertory grid technique in examining changes over time (Hewstone et al., 1981), and a range of issues within the field of health psychology: coping with chronic pain (Large and Strong, 1997); body image disturbance (Hardy, 1982); and reactions to disability (e.g. spinal cord injury - Heinemann and Shontz,
1984; amputation - Fisher, 1985). The application of this technique to the study of lower limb trauma is therefore indicated.

1.9 Present study

The literature presented in this chapter demonstrates significant levels of psychological disturbance following severe lower limb trauma, which persist to some degree over a period of years post-injury. Injury to a leg can cause severe disablement and impact on multiple facets of a person's life such as work, housing, social relationships and sense of self. Despite the commonality of factors such as these, individual differences in response to similar injuries are apparent, and further research exploring what factors are important for individuals, and how personal values and the self-concept change over the period of time following injury, might increase our understanding of these differences in adjustment. These injuries have implications not only for patients, but also for the clinical team involved in their treatment and rehabilitation. In comparative studies of the relative benefits of amputation versus reconstructive surgery findings have been mixed, although there is some suggestion that reconstructive surgery may not be the treatment of choice.

There is some indication from previous research (e.g. Richmond et al., 1998; Shalev et al, 1996) that individuals at risk of poor psychosocial adjustment after discharge may be identifiable during the initial period of hospitalisation, and preventative treatment strategies may be developed for this population. A greater understanding of the process of adjustment to severe injuries may suggest interventions to aid
adjustment after injury, and enable the caregiver to provide optimal holistic treatment to these patients. However, much of the research in this field has examined adjustment to injury from a retrospective position of a number of years post-injury, where the potential for recall bias is great and exploration of the early processes of adjustment is untenable. In addition, the disadvantages of standardised instruments and the focus on physical function in these studies have been noted. Those studies exploring psychological processes in adjustment in a more phenomenological way have examined amputation, but patients undergoing reconstructive surgery have been largely overlooked.

Psychological models of adjustment and response to trauma have highlighted the role of the self-concept in adjustment. Previous research looking at the ‘self’ has received criticism for defining ‘self-concept’ according to a researcher’s own theoretical viewpoint, for developing measurement instruments specific to particular situations, and adequate control groups are frequently lacking (Bull and Rumsey, 1988). The present study employs a model of self-concept which proposes that the way people perceive themselves and others affects how they feel. Previous research indicates that body image, and hence one’s self-concept, is challenged or disrupted as a result of physical trauma. Previous theory has shown adjustment to be a process of adaptation, and one would therefore expect the sense of self to change over a period of time following a traumatic injury. Rather than directly testing a hypothesis, the present study uses these models to guide an exploration of psychological adjustment following severe lower limb trauma.
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The present study aims to address some of the criticisms previous research has received. The process of adjustment will be examined prospectively from the time of injury and treatment. The study of adjustment will consider the factors of self-concept and the process of change, and to this end will adopt a more idiographic and phenomenological methodology that focuses on subjective experience and details the personal experiences of a small sample rather than surveying a large population. The use of repertory grids allows an individualistic exploration of the meaning of disability and sense of self, and changes over time can be investigated using each individual as their own control. In this way the research seeks to answer the following questions:

1) What is the impact of severe lower limb trauma on one’s sense of self, and how does the meaning that one ascribes to the trauma affect the self-concept?

2) How does one’s sense of self change over time to incorporate a severe injury, and how do these changes relate to adjustment as measured by changes in post-traumatic stress symptoms, pain, and mood?
METHOD

2.1 Design

This prospective, longitudinal study looked at the process of adjustment to serious injury. Changes over a three month period following a recent traumatic lower limb injury were assessed. Three short questionnaires were employed to obtain information on emotional distress, the impact of trauma, and pain. Repertory grids were used to explore the subjective experience of the injury and the adjustment process.

2.2 Setting

Participants were recruited from the plastic surgery and orthopaedic wards at an inner London general hospital. These wards provide treatment for a variety of injuries and medical conditions. Patients with severe injuries of the type under study had been transferred to these wards for surgery, from Accident and Emergency departments or other hospitals in the local area. The consultant plastic surgeon and the consultant orthopaedic surgeon work conjointly in deciding appropriate treatment for these patients.

2.3 Participants

Patients with severe lower limb traumatic injuries (defined as open fractures sustained in an accident and requiring surgery) were identified. They were excluded from the study if they had sustained their injury more than two months previously, had
additional injuries of a severe nature, had pre-injury disabilities, or had a poor understanding or use of the English language.

Fifteen patients met the inclusion criteria and were approached to take part in the study within two months of their injury\(^1\). Four of these patients refused to participate: 3 males and 1 female; all had sustained open tibial fractures of severity Type IIIB (one patient had also sustained a fractured femur of severity Type I), as a result of road traffic accidents (three pedestrian, one bicycle); age distribution is shown in Figure 2.1.

During the ten months of the study, patients were excluded from the study for the following reasons: one had spent several weeks in intensive care with other severe injuries; one patient’s injuries had resulted from complications of infection rather than as the result of a trauma; and one patient had poor use of English. A number of patients were admitted for treatment of injuries sustained at a period of several months to several years previously. Within the first eight months of data collection no early amputations (within two months of injury) were performed at the hospital\(^2\).

The participants in the study (N=11) were predominantly male (10:1), and stated their ethnic origin as white (8:3)\(^3\). The mean age was 41.9 years (standard deviation =

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\(^1\) Several potential participants were missed by the investigator during the study period due to initial difficulties identifying and locating eligible patients within the hospital.

\(^2\) One patient with an early amputation (within one week, due to the failure of a revascularisation attempt) presented in the ninth month of the study. It was considered erroneous in the present study to compare one participant with a group undergoing very different treatment, and the data for this participant has not been presented here.

\(^3\) The characteristics of the sample are described as a whole in order to protect the confidentiality of individual participants.
Figure 2.1 - Age distribution of refusers
19.305, range 19 - 78 years, median = 41 years), and the age distribution of the sample is shown in Figure 2.2. One participant was married at the time of injury, two participants were divorced and two were widowed, with the remaining six participants stating 'single' as their marital status. The distribution of occupation prior to injury is shown in Figure 2.3. Nine participants sustained open tibial fractures of severity Type-IIIB (Gustillo Anderson classification system); one participant sustained an open femoral fracture of Type IIIC; and one sustained an open fracture of the ankle, Type IIIB. The causes of these injuries are shown in Figure 2.4. Reconstructive surgery involved either local or free-flap transfer, and stabilisation with external fixators or intramedullary nailing (or both). All were interviewed following initial surgery. Participants spent between 18 days and $2\frac{1}{2}$ months in hospital between the time of their injury and the assessment at Time Two.

At the time of writing, eight participants were eligible for the follow-up assessment at Time Two. The response rate for the follow-up assessment was five participants. Two were unable to be contacted due to a change of address, and one refused to participate when contacted.

2.4 Measures

In this section I will first discuss salient issues in the assessment of adjustment to illness and injury. I will then describe each of the measures used in the present study,

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4 The study recognises that the status 'single' may not accurately reflect relationship or co-habiting status.

5 Due to limited availability of participants medical records, detailed information on surgical procedures and length of admissions is incomplete and is not presented here.
Figure 2.2 - Age distribution of participants

![Age distribution chart]

<table>
<thead>
<tr>
<th>Age range</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 to 30 years</td>
<td>4</td>
</tr>
<tr>
<td>31 to 45 years</td>
<td>2</td>
</tr>
<tr>
<td>46 to 60 years</td>
<td>4</td>
</tr>
<tr>
<td>over 60 years</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure 2.3 - Distribution of occupations among participants

- Non-manual occupations: 2 participants (18.18%)
- Further education: 2 participants (18.18%)
- Retired: 1 participant (9.09%)
- Manual occupations: 6 participants (54.54%)
Figure 2.4 - Mechanism of lower limb injury

- Heavy object crush: 1 participant (9.09%)
- Fall/slip: 4 participants (36.36%)
- Assault: 1 participant (9.09%)
- Pedestrian: 3 participants (27.27%)
- Motor vehicle: 1 participant (9.09%)
- Sport: 1 participant (9.09%)
considering reliability and validity, and their application with the population under study.

The concept of 'health' has been defined as, not only the absence of disability or disease, but as a state of positive well-being (WHO, 1947), implying completeness, full functioning, and efficiency of mind and body and social adjustment (e.g. Bowling, 1997; Herzlich, 1973). Some research, however, has demonstrated a subjective concept of 'health' which exists alongside serious and enduring illnesses (Blaxter, 1990), implying a view of a 'healthy' self largely independent of physical symptoms. Studies of the quality of life of people with a range of health of problems have shown that the impact of illness on daily life, including psychological distress and social consequences, can be considered by patients to be more disturbing than the discomfort associated with their symptoms (e.g. Janson-Bjerklie et al., 1992; Quirk and Jones, 1990). In considering methods of estimating outcome, Bowling (1997) defines 'quality of life' as follows:

"Basically, quality of life is recognised as a concept representing individual responses to the physical, mental and social effects of illness on daily living which influence the extent to which personal satisfaction with life circumstances can be achieved. It encompasses more than adequate physical well-being, it includes perceptions of well-being, a basic level of satisfaction and a general sense of self-worth." (Bowling, 1997 p.6)

Perceptions of well-being, satisfaction, and self-worth were considered to represent adjustment as discussed in the Introduction (see section 1.4), and the present study aimed to examine these issues following severe physical injury.
Injury or disability preclude a full return to previous physical functioning, but positive adjustment can be seen in terms of mental well-being or the absence of psychological distress. Thus, in the present study, psychological well-being was determined by screening for signs of psychological distress. As discussed in section 1.3.1 of the Introduction, psychological distress following physical trauma frequently takes the form of anxiety, depression and traumatic stress responses. Within the concept of well-being and absence of distress, pain may also be considered to impact on the process of adjustment to injury, and was therefore examined in this study.

The measures employed to assess anxiety, depression, post-traumatic distress, and pain within the present study are described below.

2.4.1 The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983) (see Appendix A)

The HADS is a 14-item screening tool for anxiety and depression which was developed in an attempt to provide clinicians with “a reliable, valid, and practical tool for identifying and quantifying the two most common forms of psychological disturbances in medical patients” (Herrman, 1997 p.17). It was designed to overcome the difficulties of assessment in hospital populations, where the presence of physical illness influenced scores on some generic mood measures. HADS items focus on the psychological symptoms of neurosis and not symptoms which potentially indicate a solely physical disorder, such as weight loss or dizziness. Furthermore, it was designed with the aim of improving the distinction between mood disorders detectable
by such measures (Zigmond and Snaith, 1983). Seven items aim to detect anxiety and seven items aim to detect depression. The HADS was largely derived from clinical experience and emphasises the clinical relevance of results (Bowling, 1997).

The scale asks participants to consider how they have felt in the last few days. Participants are asked to select one of four responses to an item, which is rated according to severity on a scale of 0 to 3 where higher scores indicate greater severity. These ratings produce two sub-scale scores indicating levels of anxiety and depression. Psychiatric diagnoses have suggested that scores of less than 8 indicate non-cases, and scores of 11 or more indicate definite cases. A cut-off of 11 points has been generally accepted (e.g. Carroll et al., 1993).

Zigmond and Snaith (1983) tested the validity of the scale and demonstrated that severity ratings correlated highly with psychiatric assessment (Pearson's $r = 0.70$ for depression, and 0.74 for anxiety). It was found to be easily understandable and acceptable to patients indicating good face validity. Its application among hospital populations was supported by the finding that, in the absence of mood disorders, physically ill patients were shown to have similar scores to a normal population (Zigmond and Snaith, 1983). The two sub-scales have been found to have good internal reliability (Dagnan et al., 2000; Herrman, 1997) and to measure different dimensions (Dagnan et al., 2000; Moorey et al., 1991). Furthermore, Aylard and colleagues (1987) reported that the HADS had good concurrent validity, correlating well with other established depression and anxiety scales (correlations ranging from 0.67 to 0.77). Hamer and colleagues (1991) compared the sensitivity of the HADS to
the Structured Clinical Interview (DSM-III), and found that as a screening tool the HADS has a sensitivity of 88% (at a cut-off of 8). Although studies have generally found a high sensitivity, some studies have found a more modest specificity i.e. a tendency for over-inclusion/over-diagnosis (e.g. Silverstone, 1994). For this reason the HADS is best used as a screening instrument.

In a comprehensive review of available data, Herrman (1997) found support for Zigmond and Snaith's (1983) findings. He concluded that the HADS allows longitudinal assessments, is sensitive to changes in emotional state, and in summary:

"The HADS is a reliable and valid instrument for assessing anxiety and depression in medical patients. Its construction facilitates its use with these patients and it could be expected to have considerable advantages over other established instruments." (1997 p.32)

2.4.2 The Impact of Events Scale (IES) (Horowitz, Wilner and Alvarez, 1979) (see Appendix B)

The IES is one of the most widely used instruments for assessing post-traumatic phenomena (Joseph, 2000). It was not, however, designed to assess post-traumatic stress disorder (PTSD) as defined by the American Psychiatric Association (1980, 1987, 1994), and should not be used as a diagnostic tool. This 15-item self-report measure looks at "the current degree of subjective impact experienced as a result of a specific event" (Horowitz et al., 1979), and follows Horowitz's two-factor theory of a stress response composed of two alternating phases: intrusion and avoidance. Although it can be used to assess the impact of any personal life event, the measure
was originally tested on a population of which around half had suffered a personal injury as a result of road accidents, violence, illness or surgery.

Items were developed from statements of distress commonly made by people after recent life-events. Participants are asked to state the frequency with which each statement has been true for them during the past seven days with regard to their specific event\(^6\), and these are scored as follows: Not at all = 0, Rarely = 1, Sometimes = 3, Often = 5. Two sub-scale scores are produced representing intrusion and avoidance. Horowitz (1982) proposed that total IES scores above 19 indicated high symptom levels corresponding to high clinical concern. However, more recently Neal and colleagues (1994) have recommended a total score of 35 as an optimum cut-off point, as they found that this produced the highest positive predictive value (0.88) with the lowest misclassification error rate (11.4%).

Horowitz and colleagues (1979) report satisfactory validity and reliability statistics which have largely been confirmed by subsequent research. They demonstrated both good internal reliability (Cronbach's alpha = 0.78 for intrusion and 0.82 for avoidance) and test-retest reliability (Pearson's \(r = 0.89\) for intrusion and 0.79 for avoidance). Further research has also supported the differentiation of the two factors of intrusion and avoidance (e.g. Zilberg et al., 1982). Despite its failure to assess the full range of symptoms associated with post-traumatic stress, the IES has been shown to correlate with measures of PTSD (Schlenger et al., 1992; Kulka et al., 1990; Weisenberg et al., 1987), and (as described in section 1.3.1) to have good predictive

\(^6\) In the present study the instructions emphasised the participant's accident, rather than their injury (see Appendix B).
value (e.g. Michaels et al., 1998; Shalev et al., 1996; Feinstein and Dolan, 1991). For example, a prospective study assessing PTSD following traumatic physical injury\(^7\), demonstrated scores on the IES at one week post-injury predicted PTSD status at 6 months post-injury with 92.3% sensitivity and 34.2% specificity (Shalev et al., 1996). The IES has been shown to be sensitive to changes over time (Zilberg et al., 1982), and its usefulness in tracking psychological response to traumatic events is well established (Weiss and Marmar, 1997).

\(2.4.3 \text{ The Short-form McGill Pain Questionnaire (SF-MPQ) (Melzack, 1987) (see Appendix C)}\)

The MPQ (Melzack, 1975) is generally regarded as the leading instrument for describing dimensions of pain (e.g. Bowling, 1997; McDowell and Newell, 1996), and it provides patients with a means of communicating their subjective experience of pain. It was designed to assess pain as “an endless variety of qualities that are categorized under a single linguistic label, not to a specific, single sensation that varies only in intensity” (Melzack, 1975 p.278). A shortened version of the McGill Pain Questionnaire was considered desirable for some research purposes, where, in addition to indications of pain severity, data on the qualities of pain would be beneficial, but in a quick and easily administered questionnaire (Melzack, 1987). The 15 words used most frequently by patients to describe their pain were selected for the short-form MPQ, and these form two sub-scales of eleven sensory (e.g. stabbing, aching) and four affective (e.g. sickening, fearful) descriptors. Patients are read the list

\(^7\) This study has been discussed further in section 1.3.1.
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METHOD

of descriptors and, for each one, are asked to rate the intensity of pain they experience. These are scored as follows: None = 0, Mild = 1, Moderate = 2, Severe = 3. In addition patients are asked to state their Present Pain Intensity (PPI) by selecting from six listed descriptions of overall intensity of pain from ‘No pain’ to ‘Excruciating’ on a scale of 0 to 5.\(^8\)

Melzack (1987) showed that the sensory, affective and total scores of the SF-MPQ were significantly correlated with the long-form MPQ for different types of pain. These findings have more recently been replicated in cancer patients (Dudgeon et al., 1993), where changes over time were demonstrated in a similar manner to the LF-MPQ. It is considered to have good face validity and is simple to administer (Melzack, 1987). The distinction between affective and sensory dimensions of pain is supported by factor analysis using the long-form MPQ (Reading, 1979; Prieto and Geisinger, 1983, Lowe et al., 1991). The PPI has generally been found to be not consistent with the sensory and affective scores, and appears to be more susceptible to influence by variables such as past experience, mood, and expectation (Melzack, 1975). However, although individuals vary in their attribution of words to subjective experiences, the scale is found to be useful in assessing changes in pain experience.

There has been little research into the reliability of the MPQ, and the short-form in particular. The test-retest reliability of the MPQ pain descriptors and scores, where these have been reported, have ranged from weak to moderately good (Reading et al.,

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\(^8\) The SF-MPQ also includes a visual analogue scale, but for the present study this was omitted, as this can only be assessed in written form which may have created difficulties for patients lying on their backs in bed.
1982; Love et al., 1989). However, the MPQ remains the leading measure of pain (Bowling, 1997; McDowell and Newell, 1996), and is used in studies of both chronic and acute pain. A study of the predictive value of the MPQ in the functional status of cancer patients showed that the choice of descriptors selected was more strongly related to function than sub-scale scores (McGowan and Zevon, 1991). The subjective experience of pain and its impact on psychological adjustment was of interest in the present study, and the SF-MPQ was used primarily to examine changes over time in both pain intensity and pain quality.

2.4.4 Repertory Grid Technique (Kelly, 1955)

George Kelly’s Personal Construct Theory (described in section 1.8 of the introduction) states that individuals hold a personally organised system of ‘constructs’ (interpretations or abstractions) of experienced events, through which they come to understand the world in which they live. Constructs can be seen as a way of distinguishing similarity from difference (Beail, 1985), and are therefore bipolar in nature. Kelly’s theory led him to design an assessment tool that could explore the subjective world of the individual in a structured way, allowing for comparisons to be made between subjects and across times. The repertory grid technique is a flexible methodology, taking the form of a semi-structured interview that “allows clients to identify constructs by which they characterize themselves and other relevant people and then to describe the extent to which constructs are relevant to themselves and others” (Heinemann, 1995 p.76). It produces both qualitative data and numerical data to which statistical tests can be applied.
The technique of constructing a repertory grid requires: a) elicitation of ‘elements’ which define the area of construing under investigation (commonly social role descriptions); b) elicitation of bipolar constructs; and c) some method of determining how each element is judged on each construct (Beail, 1985). Elements and constructs can be either generated by participants or supplied by the investigator. Kelly devised several methods of eliciting constructs and of judging elements in terms of the constructs. The methods employed in the present study are described in sections 2.5.1.1 and 2.5.1.2. Contemporary analysis of completed grids typically utilises correlational analyses and principal component analysis. Various computer packages have been developed to assist in this process. The methods of analysis of grid data employed in the study are described in section 2.6.

The issue of reliability and validity of the repertory grid procedure is complex. The advantages of flexibility in the methodology make determining reliability and validity almost impossible, as there is no standard form of repertory grid. Common methods of assessing reliability are thus generally inapplicable to grids (Slater, 1965, 1974). Several researchers have attempted to demonstrate test-retest reliabilities, and have found these to be quite high at around 0.8 (see Fransella, 1981a). In general, studies have found stability of elicited constructs and elements over testing occasions (e.g. Fjeld and Landfield, 1961), and stability in the pattern of construct relationships over time (Fransella and Bannister, 1977).
Both reliability and construct validity have been considered to be conditional on participant co-operation in attending to the task and generating constructs that are personally relevant (Heinemann, 1995). The meaningfulness of constructs to the subject is shown to increase with the use of elicited rather than supplied constructs (see Winter, 1992). Provided that constructs were meaningful to subjects, Slater (1974) demonstrated that experimental grids were distinct from grids generated randomly, indicating a degree of construct validity, i.e. that grids are a valid measure of personal construct systems. Heinemann has stated that “in general, the relevance and meaningfulness of the constructs is assured by the person-focused nature of the task” (1995 p.75).

Predictive validity was indicated by Kelly (1955), who showed that grid measures could, to some degree, predict aspects of social behaviour. In addition, grids have been found to have discriminative value, for example between males and females (e.g. Carlson, 1971; Landfield, 1971), and between ‘neurotics’ and controls (e.g. Makhlouf et al., 1970; Smail, 1970). However, Fransella and Bannister (1977) assert that distinguishing between groups is more significant when it investigates hypotheses concerning psychological processes. Indeed, Kelly saw the question of validity as one of utility. It has been argued that the validity of a grid is better judged by assessing “whether or not it will effectively reveal patterns and relationships in certain kinds of data” (Fransella and Bannister, 1977). That is, does it increase our understanding of a problem? The application of repertory grid technique to the area of physical injury has
indicated that grids can be useful in exploring adjustment to injury (e.g. Fisher, 1985; Heinemann and Shontz, 1984)^9.

Mair and Crisp (1968) stated that Kelly’s repertory grid technique fulfils four requirements of a clinically useful measure: it is tailored to the individual’s particular outlooks and difficulties; it allows for assessment of personal organisation in psychological functioning; it focuses on both unique and common meanings which an idea, action, or feeling may have for a person; and it can be used to measure psychological change.

2.5 Procedure

Ethical approval was obtained from Riverside Research Ethics Committee (see Appendix D). A stipulation of the ethics committee was that each participant had a written information sheet (see Appendix E), and that written consent be obtained for each participant to say they had read this information and agreed to take part in the study (see Appendix F). Due to the hospital context of recruitment it was stressed to patients that the study was independent of the hospital, and that their treatment would be unaffected by their choice of whether or not to participate. A further ethical consideration pertinent to the group under study was their state of physical well-being, and the investigator was sensitive to arranging interviews in terms of recovery from surgical procedures, nausea as a side-effect of medication etc.

^9 See section 1.3.2 for discussion of these studies.
2.5.1 Assessment at Time One

All patients meeting the criteria for the study were approached by the investigator who spoke briefly about the aims of the study and explained what participation would involve. Patients were then given an information sheet (Appendix E) to read at their leisure. The investigator returned in two to five days to answer any further questions about the study and to ask patients whether they would agree to take part. If they agreed, patients were asked to complete and sign a standard consent form (Appendix F), and the assessment was conducted at that point. In general, this interview lasted for between one and one and a half hours.

Participants were interviewed in their hospital beds, either in individual rooms or on a shared ward with curtains drawn around the bed. Some interruptions from medical staff and visitors occurred and were negotiated so that all of the first session was completed in one day. The three questionnaires were completed in order of: the Impact of Events Scale (IES - Horowitz et al., 1979); the Hospital Anxiety and Depression Scale (HADS - Zigmond and Snaith, 1983); and the Short-form McGill Pain Questionnaire (Melzack, 1987). As some participants were lying on their backs during the interview it was anticipated that this might produce some difficulty in writing. To account for this, participants were given a copy of the questionnaire (with the title removed), and the researcher read out the instructions and each item. Participants were asked to respond verbally as the researcher marked their response on another copy.
The repertory grid procedure was tape-recorded with participants’ consent. This section of the assessment was introduced as follows:

“This task is difficult to describe, but it is a straightforward way of looking at what is important to you, your thoughts and feelings about yourself and the world, and how these might have changed since your injury. It’s a good method of asking for your perspective on the experience of a having serious injury.”

2.5.1.1 Eliciting grid elements and constructs

Elements

In order to allow comparisons across participants element role descriptions were provided by the investigator. Element roles were chosen to represent the area under study, namely perceptions of self in relation to time and in relation to others. The repertory grid contained eleven elements of which five were descriptions of self (me now, my ideal me, me before my injury, me at discharge, and me in 5 years time). The remaining six elements were used to provide reference points, and they targeted aspects of relationships considered pertinent to the study. For these, participants were asked to think of someone they knew who fitted the descriptions given (someone I am close to, someone I dislike, a typical person of my age, someone with a similar injury, someone I admire, someone I pity). Some participants found it difficult to identify people they knew to fill these roles, particularly a person they dislike, or someone with a similar injury. In these instances they were asked to think of someone from public life or a television character, or failing that to imagine a stereotype. Each element was written on a card.
Constructs

In accordance with the exploratory nature of the study, all constructs were generated by the participants\(^{10}\). Constructs were elicited using Kelly’s triadic technique. In this method three element cards are selected and placed in front of the participant and they are instructed to think of some important way in which two are alike and different from the third. Participants were told to think wider than physical characteristics such as eye colour, but to think more generally about each element as a person.

In the initial assessment at Time One, cards were attached to a magnetic board which could be held at any angle to allow bed-ridden participants to view triads comfortably. The first triad presented consisted of three non-self elements, as this was considered to be easier for people to conceptualise. Following this, the composition of triads was varied, guided by the need to cover a range of alternatives and the participants ease of conceptualising. Constructs which were considered to be not applicable to all elements, for example specific occupations held, were prompted to be expanded upon. In addition, if triad elicitation produced multiple responses the participant was asked if the descriptors covered the same idea or constituted several different ideas. In the latter case, the response was divided into several constructs. If not produced spontaneously, the contrast poles were elicited through questions such as: “So these two [elements] are X. How is this one different?” or “Some people are X. What is the opposite of this for you?” Constructs were elicited until repetition indicated that

\(^{10}\) Although supplied constructs allow greater standardisation and comparison among participants they are thought to impose or assume meaning.
no further constructs would be obtained, or until tiredness expressed by participants prompted the end of construct elicitation.

2.5.1.2 Rating

Following elicitation of constructs, the participant was asked to describe each element in terms of every construct, using a rating scale. Kelly (1955) described several methods for obtaining this information, but for the present study the rating method was chosen to construct the grid, as it allows for greater flexibility in responding than ranking elements or dichotomising (Fransella and Bannister, 1977). Participants were instructed to rate each element on a scale from 1 to 7 between the two poles of the generated constructs. A seven-point scale permitted participants to select a neutral position (4) when they felt that elements were neither one pole nor the other. A written scale of 1 to 7 was attached to the magnetic board in view of the participant. The first pole of the construct was written on a card and placed at number one, and the contrast pole was written on a card and placed at number 7. Elements were read out by the investigator, and the number assigned to each by the participant was written in a table by the investigator (see Appendix G). This process was repeated with all of the generated constructs, varying the order in which elements were provided, to prevent a responding bias.

At the end of the session participants were asked if they had any questions and these were addressed. The investigator explained that the second part of the study (assessment at Time Two) would involve completing the three questionnaires and rating the grid elements on the seven-point scale. They were then asked if they agreed
to be contacted in three months time to complete the second assessment. The investigator enquired as to the participants’ date of birth, ethnic origin, occupation, and marital status. Further information such as mechanism of injury, nature and severity of the injury, and details of the present hospital admission and treatment was obtained from the participants medical records with the permission of Hammersmith Hospitals NHS Trust.

2.5.2 Follow-up Assessment at Time Two

At the time of the second assessment (three months after the first interview) all participants had been discharged from hospital. Due to distance of participants’ residences, participants’ mobility problems and infrequent outpatient appointments, the second assessment was completed via postal questionnaires or telephone interview. Participants were sent a pack of the three questionnaires and a personalised repertory grid form (see Appendix H), plus a covering letter requesting their participation (see Appendix I). They were advised to contact the investigator with any questions or if they preferred to complete the assessment over the telephone11. If no response was received within three weeks, a second letter and pack of questionnaires was sent.

Completion of the grid at Time Two required participants to re-rate the same elements and constructs from Time One to allow for comparison over time. One exception was the replacement of the element ‘me at discharge’ used at Time One,

11 None of the participants took up this offer.
with 'me on admission'. This exchange was intended to investigate the accuracy of participants' perception and anticipation of themselves at the different times of grid completion. Although the period of time until discharge varied among individuals it was felt that this time-frame was easier for participants to conceptualise and more meaningful than 'three months time'. Participants were requested to state whether their chosen people still fitted the descriptions.

### 2.6 Data Analysis

Due to the difficulty of determining whether the study sample was drawn from a population with a normal distribution, the analysis applied nonparametric or distribution-free statistical tests to the data. These tests do not rely on very restrictive assumptions concerning the specific shape of the distribution, and are often less affected by extreme scores or outliers than parametric tests due to the process of ranking the raw data (Howell, 1992). However, these distribution-free tests may have lower power than parametric tests, being less likely to lead to a rejection of the null hypothesis than the corresponding parametric test for the same data set (Howell, 1992).

With these considerations in mind, the data was analysed using the following tests: Wilcoxon's matched-pairs signed-ranks test for the analysis of differences among the same participants, and Spearman's correlation coefficient for ranked data (Spearman's rho). Two-tailed tests were applied throughout in order to retain the ability to reject the null hypothesis for changes in either direction (Howell, 1992).
The content of the constructs generated by participants was examined in order to identify personal values and characteristics by which the participants label themselves and others. Salient issues and preoccupations at the time of the initial assessment would also be apparent. In addition, through the use of triadic method of elicitation (described in section 2.5.1.1) asking participants to compare themselves before and after their injury (at the present time and in the future), it was anticipated that constructs would indicate aspects of the meaning that injury held for participants. Landfield (1971) was the first to attempt to categorise elicited constructs systematically. Categorisation is a useful process in examining grids among a group of people to identify common themes, although caution must be taken in generalising across participants: "the use of similar verbal labels does not necessarily mean similarity of construing" (Fransella and Bannister, 1977 p.21). The employment of multiple, independent classifiers aimed to overcome this difficulty to some degree. The process of categorisation is described in section 3.2.3.1 of the Results.

Statistical analysis of the repertory grid data was performed using the Flexigrid 6 package for the PC (Tschudi, 1998). Correlational analysis of constructs provides an 'intensity score'; suggested by Don Bannister (1960) as a measure of 'tightness' or 'looseness' of construing. A 'tight' construing system is one in which constructs are highly correlated, and implies a narrow view of the world, leading to "unvarying predictions" (Kelly, 1955 p.565), and a tendency to stereotype (Wheeler, 2000). In contrast a 'loose' construing system is one in which constructs are varied and distinct from one another as evidenced by low correlations or inter-relatedness. Loose
construing implies a broad view of the world. The intensity score is equivalent to the root of the mean squared correlation coefficients in a correlation matrix. The higher the intensity score the 'tighter' the construct system.

Applying the same elements across all grids allowed for comparison of the relationships among elements across all the grids\(^\text{12}\) (Slater, 1985). Large and Strong (1997) in a study of chronic back pain argued that it is permissible to calculate mean inter-element distances across a set of grids, despite different constructs, in order to give a "more nomothetic picture of the relationships amongst elements for these participants" (p.246). Within the present study, inter-element distances between current self and ideal self were considered to indicate level of self-esteem or self-satisfaction (Brook, 1991). Changes over time were examined, and comparisons made with scores on standardised measures of distress.

Each grid was analysed by graphical representation and by a standard two-dimensional principal component analysis. Principal component analysis (PCA) can be used to examine patterns within a repertory grid. The utility of PCA with repertory grid data relies upon "the assumption that statistical relationships within the grid reflect psychological relationships within the person's construing system" (Fransella and Bannister, 1977 p.59). PCA reduces the data from the original constructs into a set of hypothetical factors which explain as much of the variation in the data as possible with the smallest number of 'components'. Thus the first principal component accounts for the most variation. The second principal component is derived to be

\(^{12}\) Maintaining caution in the assumption that different people construe elements in the same way.
orthogonally related to the first, and it accounts for the second largest proportion of
the total variance. Further components account for smaller proportions. It follows that
the more variance accounted for by just one factor, the more one-dimensional
('tighter') is a participant's construct system. Thus, the size of the first principal
component gives an alternative indication of the tightness or looseness of construing
to the intensity score which was generated from construct correlations (Fransella and

The number of components to extract, is generally a subjective decision on the part of
the researcher. A commonly adopted principle is to apply 'Kaiser's criterion', which
states that within a random matrix each component will (roughly) account for the
same amount of variance. Components with less than the average variance (which is
1.0) may therefore be deemed insignificant and can be excluded (Tschudi, 1998).
Eigenvalues are calculations of the sum of squares of factor loadings for each
component, and indicate the amount of variation accounted for by each component.
For ease of visual representation however, two-dimensional plots of the first and
second principal components have been adopted in the present study.

By drawing the first two components orthogonally (i.e. at 90°) to each other, and
using the loadings of each data point on each factor as co-ordinates, a two-
dimensional plot can be generated which pictorially represents relationships between
elements and constructs (Beail, 1985). The Flexigrid analysis package plots both
elements and constructs in the same, joint space. Visual plots of this type may be
more useful when rotation is applied. VARIMAX rotation applies a mathematical
algorithm to the data to produce an alternative set of axes which, as far as possible, allow for purity of constructs. In other words, it can be considered more meaningful to have factors which load highly on one component (or axis) and low on the other. Configuration of the data, and therefore the distance of the constructs from the central point, remains the same; the amount of variance accounted for by two dimensions remains unchanged by rotation (Tschudi, 1998). VARIMAX rotation was adopted within the present study.

Two-dimensional plots account for less than 100% of the variance and should not, therefore, be taken as perfect representations of the raw grid. However, "the plot may be thought of as a rough, but useful map of the structure of the grid", indicating how the elements are clustered (Tschudi, 1998 p.74). The plots produced by participants at Time One and Time Two will be described below (see sections 3.2.3.3 and 3.3.3.3), to investigate the subjective impact of injury on sense of self. The analysis of the results of the study will conclude with a detailed examination of the data from three participants, to illustrate different adjustment patterns among the study population.
Chapter 3

RESULTS

3.1 Overview

The results section is divided into two parts. The first part presents results from the initial assessment (Time One), beginning with a description of the sample in terms of time since injury and scores on the standardised measures of subjective distress (HADS, IES, and SF-MPQ. See section 2.4 for discussion of these measures). I then discuss the repertory grids generated at Time One, examining features of the constructs and elements. Finally, the results of the Principal Component Analysis (PCA) of the repertory grids are presented, and the grid plots produced by the sample at Time One are described. The second part of the chapter presents data from the follow-up assessment (Time Two) and is presented in the same way: a description of the sample, scores on the standardised measures of distress, the repertory grid constructs and elements, and the results of the PCA. The results at Time Two are presented with reference to those at Time One and comparisons are made to examine changes across time. Three case studies, illustrative of different adjustment processes following reconstructive surgery for severe lower limb trauma, are included as Appendix L.

The research questions introduced in section 1.9, are addressed in the following manner:

1) The impact of the trauma on the sense of self will be assessed by examining the grids generated at Time One, looking particularly at the relationships of the current self and pre-injury self. The meaning of the trauma may be inferred by
looking at the constructs elicited, and by examining perceived change of self elements in relation to constructs.

2) Changes in the sense of self over time will be assessed by comparisons of grids at Time One and Time Two. Changes in the construct system and in inter-element relationships will be examined. These changes will be considered in relation to changes in scores on standardised measures of distress.

3.2 Assessment at Time One (within six weeks of injury)

3.2.1 Description of the sample

Eleven participants were assessed at Time One. The mean age of the sample was 41.91 years (standard deviation (s.d.) = 19.305, range 19 to 78, median\(^1\) = 41 years). Age distribution is represented graphically in the previous chapter (Figure 2.2). The assessment at Time One was completed at a mean of 17.18 days post-injury (s.d. = 9.877, range 7 to 39, median = 12 days). Demographic data and injury characteristics of the sample are described in the Method (section 2.3).

3.2.2 Standardised measures of distress at Time One

Standardised measures of distress were employed to describe the study population at Time One and at Time Two, and to examine changes over time as indicative of the process of adjustment to lower limb trauma. For a summary of the scores at Time One see Table 3.1.

\(^1\) Due to high standard deviations, both means and medians are presented to indicate the accuracy of the central tendency measure (mean) in representing the data.
Table 3.1 Summary of scores on standardised measures of distress at Time One.

<table>
<thead>
<tr>
<th>R01</th>
<th>7</th>
<th>6</th>
<th>16</th>
<th>11</th>
<th>27</th>
<th>8</th>
<th>1</th>
<th>9</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>R02</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>3</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>R03*</td>
<td>8</td>
<td>10.5</td>
<td>(6 to 11)</td>
<td>(20 to 30)</td>
<td>(26 to 41)</td>
<td>(10 to 16)</td>
<td>(4 to 7)</td>
<td>(14 to 23)</td>
<td>2</td>
</tr>
<tr>
<td>R04</td>
<td>15</td>
<td>14</td>
<td>30</td>
<td>18</td>
<td>48</td>
<td>16</td>
<td>9</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>R05</td>
<td>8</td>
<td>2</td>
<td>24</td>
<td>17</td>
<td>41</td>
<td>8</td>
<td>2</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>R06</td>
<td>12</td>
<td>7</td>
<td>25</td>
<td>17</td>
<td>42</td>
<td>14</td>
<td>3</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>R07</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>11</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>R08</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>29</td>
<td>37</td>
<td>11</td>
<td>2</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>R09</td>
<td>7</td>
<td>1</td>
<td>9</td>
<td>12</td>
<td>21</td>
<td>15</td>
<td>4</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>R10</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>3</td>
<td>14</td>
<td>16</td>
<td>4</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>R11</td>
<td>7</td>
<td>2</td>
<td>28</td>
<td>18</td>
<td>46</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

* Those scores in brackets indicate the range of possible scores had all items been responded to.
3.2.2.1 Hospital Anxiety and Depression Scale (HADS)

Scores on the HADS indicate levels of anxiety and depression. The mean anxiety score was 7.73 (N = 11, s.d. = 3.349, range 2 to 15, median = 7). Taking a cut-off of 11, whereby higher scores indicate likely presence of clinically significant anxiety, two participants (R04, R06) fall into this category. With a lower cut-off of 8, two more participants (R03, R05) fall in the range of likely presence of clinically significant anxiety. Thus, at Time One, 18.18% of the sample score above a cut-off of 11, and 63.64% score below the cut-off of 8 suggesting ‘non-caseness’ for anxiety.

On the depression sub-scale, participant R03 did not respond to one item, and the depression score for this participant is an estimate. Using this estimate, the group mean depression score was 5.59 (N = 11, s.d. = 4.236, range 1 to 14, median = 6). With a cut-off of 11 and above, which can be used to indicate probable presence of a depressive disorder, only one participant (R04) can be classified as demonstrating a significant level of depression. With a lower cut-off of 8, two more participants (R03, R10) fall in the range of likely presence of clinically significant depression. Thus, at Time One, 9.09% of the sample score above a cut-off of 11, and 72.73% score below the cut-off of 8 suggesting ‘non-caseness’ for depression.

Scores on the anxiety and depression sub-scales are not significantly correlated (Spearman’s rho = 0.499, N = 11, p = 0.118). Levels of anxiety correlate significantly

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2 See section 2.4.1 for discussion of these cut-off points.
3 Taking the mean of this participant’s responses to the depression items on the HADS and substituting this for the missing value we can estimate a depression score for this participant.
4 For the rationale for the use of this statistic see section 2.6.
with time since injury (Spearman’s rho = 0.803, N=11, p = 0.003). Levels of depression do not correlate highly with time since injury (Spearman’s rho = 0.431, N=11, p = 0.186).

Across all participants two HADS items were endorsed more at the distress end than the non-distress end. These were: ‘I feel as if I am slowed down’ (2 endorsed ‘Nearly all the time’, 4 endorsed ‘Very often’, 5 endorsed ‘Sometimes’ and 0 endorsed ‘Not at all’) and ‘I feel very restless as if I have to be on the move’ (2 endorsed ‘Very much indeed’, 5 endorsed ‘Quite a lot’, 3 endorsed ‘Not very much’, and 1 endorsed ‘Not at all’). Both items can be seen as being particularly implicated in injuries that restrict movement. In addition, for the item ‘Worrying thoughts go through my mind’, 45.45% of participants endorsed ‘A lot of the time’ or ‘A great deal of the time’. Several participants commented that they worried about practical considerations such as their housing situation or families.

3.2.2.2 Impact of Events Scale (IES)

Scores on the IES indicate levels of post-traumatic distress. Participant R03 did not respond to several items (two items on the avoidance sub-scale and one item on the intrusion sub-scale). With 20% of the total items missing for this case it was considered inappropriate to include this data in calculations of the group mean. The mean total IES score was 29.90 (N=10, s.d. = 14.625, range 11 to 48, median = 32). Taking a cut-off of 35 (cf. Neal et al., 1994) five participants (R04, R05, R06, R08, R11) (N=10) have total IES scores above 35 and can be classified as severe cases.
Chapter 3

RESULTS

(with Horowitz’s cut-off of 19, seven participants (N=10) show high symptom levels: R01, R03, R04, R05, R06, R08, R09, R11). Thus, 50.00% show severe levels (scores above 35) and 70.00% show high levels (scores above 19) of post-traumatic distress at Time One.

There is little distinction in mean scores on the intrusion and avoidance sub-scales; the mean intrusion score was 15.70 (N=10, s.d. = 10.339, range 2 to 30, median = 13.5), and the mean avoidance score was 14.20 (N=10, s.d. = 7.254, range 3 to 29, median = 14.5). However, among individual participants the mean magnitude of difference (ignoring sign) between the sub-scale scores was 8.50 (N=10, s.d. = 5.233, range 3 to 21, median = 8), with these two sub-scales demonstrating low correlation (Spearman’s rho = 0.518, N=10, p = 0.125).

There is a significant correlation between total IES scores and the number of days since injury (Spearman’s rho = 0.752, N=10, p = 0.012). It appears that intrusive symptoms in particular increase with time (Intrusion sub-scale: Spearman’s rho = 0.673, N=10, p = 0.033; Avoidance sub-scale: Spearman’s rho = 0.619, N=10, p = 0.057).

The most frequently endorsed item was an avoidance item: ‘My feelings about it were kind of numb’, where 72.73% of participants (N=11) felt this had been true ‘sometimes’ or ‘often’ during the past seven days. 70.00% felt that the item ‘I avoided letting myself get upset when I thought about it or was reminded of it’ had been true ‘sometimes’ or ‘often’ (N=10). The next most frequently endorsed items
were ‘I had waves of strong feelings about it’ (N=11) and ‘Other things kept making me think about it’ (N=11), where 63.64% felt that these had been true ‘sometimes’ or ‘often’.

3.2.2.3 Short-Form McGill Pain Questionnaire (SF-MPQ)

An indication of pain intensity and quality was given by the SF-MPQ. One participant (R03) failed to respond to 20% of the items on this measure and has therefore been excluded from calculations of the group mean. The mean total score was 14.30 (N=10, s.d. = 6.378, range 4 to 25, median = 15). The sub-scale scores are as follows:
- Sensory sub-scale: mean = 11.30, N=10, s.d. = 4.296, range 4 to 16, median = 12.5;
- Affective sub-scale: mean = 3.00, N=10, s.d. = 2.449, range 0 to 9, median = 2.5).

Pain was poorly correlated with time since injury (Spearman’s rho = -0.095, N=10, p = 0.793).

In examining the qualities of the pain experienced by the study population it is indicated that some qualities are generally present or absent in these types of injuries. All participants (N=11) experienced a ‘sharp’ pain. Total item scores across the group indicate the characteristics of the pain of these injuries: ‘tender’ (group score 19, N=11), ‘sharp’ (18, N=11), ‘aching’ (17, N=11), ‘tiring-exhausting’ (16, N=11), ‘shooting’ (15, N=11), and ‘throbbing’ (12, N=11). The qualities least endorsed were ‘gnawing’ (1, N=11), ‘punishing-cruel’ (3, N=10), and ‘splitting’ (4, N=10).

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5 These scores were calculated by totalling every participant’s scores (where intensity is scored as follows: ‘none’ = 0, ‘mild’ = 1, ‘moderate’ = 2, and ‘severe’ = 3) on each pain descriptor.
The present pain intensity (PPI) scores give an indication of the intensity of pain experienced at the time of the assessment. The mean score was 1.55 (N=11, s.d. = 0.688, range 1 to 3, median = 1). None of the participants reported 'no pain' at Time One. Six participants reported 'mild' pain, four reported 'discomforting' pain and one reported 'distressing' pain. The PPI was not significantly correlated with time since injury (Spearman’s rho = 0.000, N=11, p = 1.000). There was poor correlation between the total pain score and the PPI (Spearman’s rho = 0.251, N=10, p = 0.484). It should be noted that all participants had access to pain medication as part of their treatment programme.

3.2.2.4 Correlations between standardised measures

Correlations between measures were calculated using Spearman’s correlation coefficient for ranked data (Spearman’s rho). These results are shown in Table 3.2. Anxiety was significantly correlated with symptoms of post-traumatic distress, with both sub-scales and with total scores. Age was not found to be significantly correlated with any measures of distress.

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6 Several participants stated that their pain was higher when walking. For the purpose of the assessment participants were asked to rate their PPI when lying or sitting as they were during the assessment.
Table 3.2 Correlations (Spearman’s rho) between scores on standardised measures of distress at Time One.

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th>Depression</th>
<th>Intrusion</th>
<th>Avoidance</th>
<th>Total IES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>0.499</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>N 11</td>
<td>p = 0.118</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrusion</td>
<td>0.797</td>
<td>0.379</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>N 10</td>
<td>p = 0.006</td>
<td>N 10</td>
<td>p = 0.280</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*p = 0.006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>0.710</td>
<td>0.212</td>
<td>0.518</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>N 10</td>
<td>p = 0.021</td>
<td>N 10</td>
<td>p = 0.556</td>
<td>p = 0.125</td>
<td></td>
</tr>
<tr>
<td>*p = 0.021</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total IES</td>
<td>0.891</td>
<td>0.404</td>
<td>0.903</td>
<td>0.823</td>
<td>-</td>
</tr>
<tr>
<td>N 10</td>
<td>p = 0.001</td>
<td>N 10</td>
<td>*p = 0.000</td>
<td>*p = 0.003</td>
<td></td>
</tr>
<tr>
<td>*p = 0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Pain</td>
<td>0.253</td>
<td>0.560</td>
<td>0.061</td>
<td>-0.089</td>
<td>0.043</td>
</tr>
<tr>
<td>N 10</td>
<td>p = 0.482</td>
<td>N 10</td>
<td>p = 0.867</td>
<td>p = 0.807</td>
<td>p = 0.907</td>
</tr>
<tr>
<td>*p = 0.482</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* correlations where p < 0.05 are taken as significant.
3.2.3 Repertory Grid analysis

Repertory grids were analysed in the first instance by examining constructs and elements, and these will be discussed separately. The results of Principal Component Analysis of the grids will then be presented.

3.2.3.1 Constructs

The mean number of constructs generated by participants was 6.91 (N=11, s.d. = 1.375, range 4 to 9, median = 7). Many of the participants expressed tiredness during the process of eliciting constructs and this was then drawn to a close. The elicited constructs were examined by analysing content areas and inter-relatedness. These areas will be addressed in turn.

Content

The content of the elicited constructs was examined in order to identify salient values and characteristics by which the participants label themselves and others, and to indicate aspects of the meaning that injury held for individuals (as described in section 2.6). The classification employed in the present study was based on Landfield’s (1971) system, but modified to afford greater relevance to the population under study. Furthermore, in contrast to Landfield’s approach, both poles of each construct were classified together, two categories being applied if necessary to account for distinct themes. Categories applied in the present study were designed through identification of general themes by the investigator. An independent rater then attempted to classify the constructs according to these identified themes, and this process determined overlapping, redundant, and unclear categories and definitions. The final classification
system including category descriptions and instructions for classifiers is included as

Appendix J.

Three independent raters were asked to classify all the constructs generated by participants (see Appendix K). Where two or more raters agreed on a classification this was taken to reasonably represent the construct. Those constructs on which there was no agreement among the three classifiers were deemed unclassifiable. Two or more classifiers agreed on 93.51% of the constructs, with all three classifiers agreeing on 38.96% \(^7\). The frequencies with which elicited constructs met category criteria are shown in Table 3.3. It can be seen that the salience of physical attributes is high following physical trauma.

It is of interest to examine the content of elicited constructs further. Among the constructs classified as 'personal emotion', I determined that the majority (80.00%) contained themes of happiness and contentment, for example 'content, happy / unhappy with your lot' (R06); and 20.00% contained themes of hope or optimism, for example 'Feeling positive / putting things off' (R02). Two constructs classified as 'morality', included explicit references to religion (40.00% of 'morality' constructs).

Constructs classified as 'physical attributes' were of particular significance in the present study. I examined these further and identified constructs concerned primarily with health, with mobility, and with appearance. Six were concerned with general health (e.g. 'ill / healthy, lives life normally' (R06)), three with mobility (e.g. 'able to walk / not able to walk' (R04)), and only one with appearance ('normal, scar free,

\(^7\) The option of attributing more than one category to a construct can be seen to account, at least in part, to the low agreement between all three classifiers.
Table 3.3  Frequency with which construct categories were applied to elicited constructs.

<table>
<thead>
<tr>
<th>Category*</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal emotion</td>
<td>10</td>
</tr>
<tr>
<td>Physical attributes</td>
<td>10</td>
</tr>
<tr>
<td>Social interaction</td>
<td>10</td>
</tr>
<tr>
<td>Forcefulness</td>
<td>9</td>
</tr>
<tr>
<td>Tenderness</td>
<td>9</td>
</tr>
<tr>
<td>Self-opinion</td>
<td>9</td>
</tr>
<tr>
<td>Volition</td>
<td>8</td>
</tr>
<tr>
<td>Life stage</td>
<td>6</td>
</tr>
<tr>
<td>Morality</td>
<td>5</td>
</tr>
<tr>
<td>Wealth</td>
<td>5</td>
</tr>
<tr>
<td>Intellective</td>
<td>2</td>
</tr>
<tr>
<td>Unclassifiable</td>
<td>5</td>
</tr>
<tr>
<td>Two categories</td>
<td>11</td>
</tr>
</tbody>
</table>

* For definitions of the categories used and examples of constructs see Appendix x.
looks good / lacks confidence due to scarring' (R09)). Constructs classified as ‘physical attributes’ were commonly (6 out of 10) classified into two or more categories; most frequently occurring alongside ‘volition’ (four constructs, e.g. ‘sickly, tired / well, able to do things’ (R08)).

*Inter-relatedness*

The degree to which the constructs of each participant were inter-related was examined in order to provide an indication of cognitive complexity (Landfield, 1971)*. The degree of inter-relatedness can be determined by examination of construct correlations. As described in the previous chapter (see section 2.6), the intensity score is a measure of ‘tightness’ or ‘looseness’ of construing, and is calculated from the construct correlation coefficients. Higher intensity scores indicate ‘tighter’ construct systems. For example, participant R01 generated four constructs which were very highly correlated; all pairs correlated above 0.87. The intensity score for this participant was 0.94.

Across all participants at Time One, the mean intensity was 0.54 (N=11, s.d. = 0.165, range 0.37 to 0.94, median = 0.53). Taking those participants with intensity scores closer to 1.00 and those closer to 0.00 (i.e. taking 0.50 to represent a division between ‘tight’ and ‘loose’ construing), six participants (N=11) at Time One were classified as ‘tight’ construers (R01, R03, R06, R07, R10, and R11) and five were ‘loose’ construers.

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* Inter-relatedness as a measure of cognitive complexity is discussed in section 2.6 of the Method.
In section 3.3.3.1 of this chapter, a comparison with intensity scores at Time Two will be utilised to assess changes in the structural characteristics of participants' construct systems.

3.2.3.2 Elements

Inter-element distances

An examination of the distance of elements from one another gives an indication of perceived similarities and differences among self and other role descriptions. Inter-element distances are expressed as the ratio of the distance observed in the grid to the distance expected when drawn from a construct system at random (Slater, 1976, 1985). Inter-element distances are Euclidean distances, and are normed so that the expected (average) value is 1. Distances of less than 1 indicate an inter-element relationship that is closer than expected; conversely, distances of greater than 1 indicate inter-element relationships that are more distant than expected. Hewstone and colleagues (1981) assert that "inter-element distances within a range of 0.8 to 1.2 are neither similar nor dissimilar" (p.48).

Table 3.4 sets out the mean distances among the five elements describing the self (before injury, current, at discharge, in 5 years time, and ideal). The current self / ideal self distance is commonly taken as an indication of self-satisfaction or self-esteem (e.g. Hewstone et al., 1981; Ryle, 1976). The closer the current self is to the ideal, the more satisfied one is with oneself. The group mean current self / ideal self distance (1.01) indicates neither satisfaction nor dissatisfaction with the current self. An
Table 3.4 Group means and standard deviations (in brackets) of distances between self elements.

<table>
<thead>
<tr>
<th></th>
<th>Ideal self</th>
<th>Pre-injury self</th>
<th>Self at discharge</th>
<th>Future self</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N=11</td>
</tr>
<tr>
<td>Current self</td>
<td>1.01</td>
<td>0.82</td>
<td>0.44*</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>N=10</td>
<td>N=11</td>
<td>N=11</td>
<td>N=11</td>
</tr>
<tr>
<td></td>
<td>(s.d. 0.428)</td>
<td>(s.d. 0.492)</td>
<td>(s.d. 0.402)</td>
<td>(s.d. 0.471)</td>
</tr>
<tr>
<td>Ideal self</td>
<td></td>
<td>0.59*</td>
<td>0.80</td>
<td>0.52*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N=10</td>
<td>N=10</td>
<td>N=10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(s.d. 0.474)</td>
<td>(s.d. 0.390)</td>
<td>(s.d. 0.338)</td>
</tr>
<tr>
<td>Pre-injury self</td>
<td>-</td>
<td>0.61*</td>
<td>0.49*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N=11</td>
<td>N=11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(s.d. 0.385)</td>
<td>(s.d. 0.381)</td>
<td></td>
</tr>
<tr>
<td>Self at discharge</td>
<td></td>
<td>-</td>
<td>0.62*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N=11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(s.d. 0.372)</td>
<td></td>
</tr>
</tbody>
</table>

* Distances < 0.80 indicate perceived similarity.

(Elements at a distance between 0.8 and 1.2 are neither similar nor dissimilar; those > 1.2 are perceived as dissimilar.)
examination of the distances of individual participants (N=10) found that, at Time One, two participants (R01 and R05) showed high self-satisfaction (distances < 0.80), and three participants (R06, R09, and R10) showed low self-satisfaction (distances > 1.20). In contrast, eight participants (N=10) indicated high self-satisfaction prior to injury (pre-injury self / ideal self distance < 0.80), and one participant (R02) indicated low satisfaction with the pre-injury self (distance > 1.20).

The impact of the injury on self-esteem can be inferred by comparing satisfaction with the self before and after injury (i.e. comparing the pre-injury self / ideal self distance with the current self / ideal self distance). From the group mean at Time One it can be seen that one result of the injury has been to put more distance between the self and the ideal self than was so before the injury (i.e. current self / ideal self distance is greater than pre-injury self / ideal self distance). An examination of individual grids showed that this direction of movement was true for 70.0% of participants (N=10), with a mean change of 0.68 units (N=7, s.d. = 0.52, range 0.09 to 1.38, median = 0.63). For some however, the injury appears to have had the opposite effect of moving the self closer to the ideal (R02 and R07), or of having little discernible effect on sense of self (R01). The impact on the sense of self was shown to be high for four participants (R02, R06, R09, and R10) who showed distances greater than 1.20 between the current and pre-injury self. Five participants (R01, R03, R05, R07, and R11) showed current and pre-injury selves that were similar (distances < 0.80).

---

9 Participant R03 was unable to conceptualise an ideal self, and the completed grid for this participant did not include this element.
The correlations between inter-element distances indicating self-satisfaction (current self / ideal self distance), perceived impact of the injury on the self (current self / pre-injury self distance), and hope for the future (future self / ideal self distance) and levels of anxiety and depression were calculated, and are shown in Table 3.5. There were no significant correlations, indicating little association between aspects of the self-concept and psychological distress at Time One.

The impact of injury on sense of self was further assessed by comparing the inter-element distances of current and pre-injury selves from 'other' elements by Wilcoxon matched-pairs signed-ranks test. These results are shown in Table 3.6. Significant differences between the pre-injury and current selves, suggest that, at Time One, participants perceived their injury as having a large impact on their sense of self in relation to others. In particular, the injury appears to have had the effect of alienating the self from others, increasing the distance between the self and a typical person of the same age, someone they are close to, and an admired person, although the means do not indicate perceived dissimilarity of the current self with these elements, with the exception of a disliked person. Interestingly, the current self has also moved away from a person with a similar injury.

Table 3.7 shows the closest (<0.80) and most distant (>1.20) inter-element relationships across all patients, arranged in ascending order (cf. Large and Strong, 1997). As would be expected the elements furthest apart are 'ideal self' and 'a disliked person'. Of interest is the closeness of the elements 'current self' and 'self at discharge', which could imply either an expectation of an imminent discharge, or a
Table 3.5 - Correlation coefficients (Spearman’s rho) between inter-element distances and levels of anxiety and depression at Time One.

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current self / ideal self distance</td>
<td>-0.082</td>
<td>0.177</td>
</tr>
<tr>
<td></td>
<td>N=10</td>
<td>N=10</td>
</tr>
<tr>
<td></td>
<td>p = 0.823</td>
<td>p = 0.624</td>
</tr>
<tr>
<td>Current self / pre-injury self distance</td>
<td>0.177</td>
<td>0.266</td>
</tr>
<tr>
<td></td>
<td>N=11</td>
<td>N=11</td>
</tr>
<tr>
<td></td>
<td>p = 0.601</td>
<td>p = 0.430</td>
</tr>
<tr>
<td>Ideal self / future self distance</td>
<td>-0.220</td>
<td>-0.301</td>
</tr>
<tr>
<td></td>
<td>N=10</td>
<td>N=10</td>
</tr>
<tr>
<td></td>
<td>p = 0.541</td>
<td>p = 0.399</td>
</tr>
</tbody>
</table>
Chapter 3 RESULTS

Table 3.6 Comparison of inter-element distances between ‘current self’ and ‘other’ elements, and ‘pre-injury self’ and ‘other’ elements using Wilcoxon’s matched-pairs signed-ranks tests.

<table>
<thead>
<tr>
<th></th>
<th>Current self group mean</th>
<th>Pre-injury self group mean</th>
<th>z-score</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical person of same age</td>
<td>0.90 (s.d. 0.373)</td>
<td>0.71 (s.d. 0.405)</td>
<td>-2.141</td>
<td>*p = 0.032</td>
</tr>
<tr>
<td>Someone with a similar injury</td>
<td>0.99 (s.d. 0.442)</td>
<td>0.67 (s.d. 0.423)</td>
<td>-2.201</td>
<td>*p = 0.028</td>
</tr>
<tr>
<td>Someone close to them</td>
<td>0.86 (s.d. 0.362)</td>
<td>0.53 (s.d. 0.269)</td>
<td>-1.988</td>
<td>*p = 0.047</td>
</tr>
<tr>
<td>Someone they dislike</td>
<td>1.36 (s.d. 0.545)</td>
<td>1.31 (s.d. 0.504)</td>
<td>-0.866</td>
<td>p = 0.386</td>
</tr>
<tr>
<td>Someone they admire</td>
<td>1.04 (s.d. 0.415)</td>
<td>0.68 (s.d. 0.421)</td>
<td>-1.988</td>
<td>*p = 0.047</td>
</tr>
<tr>
<td>Someone they pity</td>
<td>0.88 (s.d. 0.330)</td>
<td>0.98 (s.d. 0.300)</td>
<td>-1.599</td>
<td>p = 0.110</td>
</tr>
</tbody>
</table>

* p values < 0.05 are taken to indicate significant differences.
Table 3.7 Mean inter-element relationships across all participants, arranged in ascending order (only the closest (<0.80) and most distant (>1.20) shown).

<table>
<thead>
<tr>
<th>Mean</th>
<th>S.D.</th>
<th>Element relationships</th>
<th>More related elements</th>
<th>Mean</th>
<th>S.D.</th>
<th>Element relationships</th>
<th>More distant elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.44</td>
<td>0.40</td>
<td>Current self / At discharge</td>
<td>1.25</td>
<td>0.46</td>
<td>Disliked - Pitied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.49</td>
<td>0.38</td>
<td>Pre-injury / Future self</td>
<td>1.27</td>
<td>0.52</td>
<td>At discharge - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.52</td>
<td>0.34</td>
<td>Ideal self **/ Future self</td>
<td>1.31</td>
<td>0.50</td>
<td>Pre-injury self - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.52</td>
<td>0.41</td>
<td>Future self / Admired</td>
<td>1.36</td>
<td>0.54</td>
<td>Current self - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.53</td>
<td>0.27</td>
<td>Pre-injury self / Close to</td>
<td>1.37</td>
<td>0.41</td>
<td>Disliked - Close to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.56</td>
<td>0.35</td>
<td>Ideal self **/ Admired</td>
<td>1.40</td>
<td>0.40</td>
<td>Similar injury* - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.57</td>
<td>0.34</td>
<td>Future self / Close to</td>
<td>1.40</td>
<td>0.47</td>
<td>Admired - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.59</td>
<td>0.36</td>
<td>Ideal self **/ Close to</td>
<td>1.41</td>
<td>0.40</td>
<td>Future self - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.59</td>
<td>0.47</td>
<td>Pre-injury / Ideal self **</td>
<td>1.52</td>
<td>0.41</td>
<td>Ideal self ** - Disliked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.61</td>
<td>0.38</td>
<td>Pre-injury / At discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.62</td>
<td>0.37</td>
<td>At discharge / Future self</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.64</td>
<td>0.35</td>
<td>Admired / Close to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.67</td>
<td>0.26</td>
<td>At discharge / Close to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.67</td>
<td>0.42</td>
<td>Pre-injury / Similar injury*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.68</td>
<td>0.42</td>
<td>Pre-injury / Admired</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.71</td>
<td>0.41</td>
<td>Pre-injury / Typical person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.74</td>
<td>0.57</td>
<td>Future self / Similar injury*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* N=8  **N=10
degree of pessimism that nothing much will change in the foreseeable future. The
closeness of the future self ('self in 5 years time') and the ideal self (and pre-injury
self, an admired person, someone close to them), indicates that participants do not
anticipate a prolonged negative impact of injury.

3.2.3.3 Principal Component Analysis

Principal component analysis (PCA) was used to examine patterns within the
repertory grids\textsuperscript{10}. Missing data in grids causes difficulties with analysis. The output
data produced may be misleading, and it has been recommended that missing data is
removed from the analysis (e.g. Tschudi, 1998). The grids of two participants
contained missing data, and this was controlled by the removal of an element (R02 at
Time One and Time Two) and a construct (R04 at Time Two). Grid plots were
generated\textsuperscript{11} for each participant by drawing the first two components orthogonally
(i.e. at $90^\circ$) to each other, and plotting elements and constructs using the loadings of
each data point on each factor as co-ordinates, to pictorially represent the
relationships between elements and constructs (Beail, 1985).

Eigenvalues indicate the amount of variation accounted for by each component, and
eigenvalues of greater than 1 were taken to indicate significant components\textsuperscript{12}. One
participant (R01) had only one component with an eigenvalue greater than 1,
suggesting a narrow construct system. Six participants had two components with

\textsuperscript{10} PCA is described in section 2.6.
\textsuperscript{11} The Flexigrid 6 computer package (Tschudi, 1998) was used to analyse the grid data and produce
grid plots with VARIMAX rotation (see section 2.6).
\textsuperscript{12} See section 2.6.
eigenvalues greater than 1, and four had three components with eigenvalues greater than 1. This finding indicates that, for the majority, the two-dimensional plots adequately represent their construct systems at Time One. However, because two-dimensional plots account for less than 100% of the variance they should not be taken as perfect representations of the raw grid. The group mean of the amount of variance accounted for by the first two principal components was 79.65% (N=11, s.d. = 12.70, range 66.56% to 99.31%, median = 80.96%).

The grid plots (with VARIMAX rotation) are presented here in order to examine structures and patterns within the construct systems of participants at Time One. Each plot will be described briefly with reference to the constructs used to define different aspects of the self and the perceived relation to or alienation from others.

- **Participant R01**

  Figure 3.1 shows the grid plot for participant R01 at Time One. The central cluster of self elements with an admired person, indicate perceived stability in a sense of self which is unchanging over time or due to injury. The grouping of the four constructs suggests a narrow view of the world. In addition, high self-satisfaction is indicated by: the closeness of the current and ideal self elements; the location of the cluster in the quadrant which represents being happy, cheerful, friendly and understanding; and the large relative distance of self elements from a disliked person and a pitied person.
**Figure 3.1** - Rotated Grid Plot at Time One for Participant R01

![Rotated Grid Plot](image)

**Key for elements**

A - Current self  
B - Pre-injury self  
C - Ideal self  
D - Self at discharge from hospital  
E - Self in 5 years time  
F - A typical person of the same age  
G - A person with a similar injury  
H - An admired person  
I - A disliked person  
J - Someone they are close to  
K - A pitied person
• **Participant R02** (see Figure 3.2)

The first and second components account for a low percentage of the total variability, suggesting fairly loose construing. The current self, self at discharge and future self are centrally placed on the first component which distinguishes 'sticking to your guns' or being 'driven', from being 'content to float along', although all these self components have moved substantially towards the ideal self (away from the pre-injury self) on this component, in the direction of being 'driven'. This indicates increased self-satisfaction following injury. In addition, the current and future selves are placed closer to the construct poles of 'feeling positive' and 'optimistic about the future' than the pre-injury self. This move appears to be associated with the experience of immobility. A striking anomaly in this grid is the closeness of the ideal self and a disliked person. The central position (low loadings on both components) of the construct 'everything going right quickly / lost career suddenly' indicates that this is not a highly relevant construct in the system.

• **Participant R03** (see Figure 3.3)

Poor self-satisfaction can be inferred from the closeness of current self to a disliked person and the distance from an admired person. Pre-injury self is also close to a disliked person suggesting poor self-esteem even prior to injury, although the impact of injury appears to have been to move the self closer to the construct poles of 'stressed', 'frustrated' and 'can’t do anything' on the first component than prior to injury. The future self, however, is located alongside the admired person at the opposite poles of these constructs being 'free to do what one wants', 'close to

---

13 Participant R03 was unable to conceptualise an ideal self element.
Figure 3.2 - Rotated Grid Plot at Time One for Participant R02

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self at discharge
E - Self in 5 years time
F - A typical person of the same age
(G) - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person
**Figure 3.3** - Rotated Grid Plot at Time One for Participant R03

**Key for elements**

- **A** - Current self
- **B** - Pre-injury self
- **C** - Ideal self
- **D** - Self on discharge from hospital
- **E** - Self in 5 years time
- **F** - A typical person of the same age
- **G** - A person with a similar injury
- **H** - An admired person
- **I** - A disliked person
- **J** - Someone they are close to
- **K** - A pitied person
goals' and 'relaxed', suggesting optimism for the future despite the injury. All self
elements are represented by the construct poles of 'observant' and 'aware, careful'
on the second component, although these characteristics have increased in the
participant since the injury. The current self is perceived as unlike a person with a
similar injury.

- **Participant R04 (see Figure 3.4)**

The first two principal components both account for a fairly low percentage of the
total variability in the grid, suggesting fairly loose construing. The current self is
quite far and in a different quadrant to both the pre-injury and ideal selves. The
current self is perceived as similar to a person with a similar injury, sharing a
quadrant with a pitied person and a disliked person. This indicates decreased self-
satisfaction following injury, and a move towards the construct poles of 'can’t have
a decent conversation', 'cocky', 'looks down on people', 'boring' and 'not so
good company'. These traits appear to be associated with not being able to walk,
emphasising the impact of the injury in this more negative sense of self. However,
there is optimism for the future in returning to a state similar to that of the pre-
injury self in terms of having fun, liking to joke, being good company and going to
church on the second component. A typical person of the same age as participant
R04 is seen as unlike any other element.

- **Participant R05 (see Figure 3.5)**

The first two principal components of R05 account for a fairly low percentage of
the total variability in the grid, suggestive of fairly loose construing. The current
**Chapter 3**

**RESULTS**

**Figure 3.4** - Rotated Grid Plot at Time One for Participant R04

![Rotated Grid Plot](image)

**Key for elements**

- **A** - Current self
- **B** - Pre-injury
- **C** - Ideal self
- **D** - Self at discharge from hospital
- **E** - Self in 5 years time
- **F** - A typical person of the same age
- **G** - A person with a similar injury
- **H** - An admired person
- **I** - A disliked person
- **J** - Someone they are close to
- **K** - A pitied person
Figure 3.5 - Rotated Grid Plot at Time One for Participant R05

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self at discharge from hospital
E - Self in 5 years time
F - A typical person of the same age
G - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person
self is closer to the ideal self than was so prior to injury, and is clustered with the ideal, self at discharge, future self and a typical person of his age. This movement towards the ideal is largely relative to the constructs ‘grateful for what you’ve got’, ‘determined’, and ‘respect for self’. The proximity of the current self to the ideal self, and the location of this cluster in the quadrant representing more positive qualities, implies a high degree of self-esteem or self-satisfaction at Time One. The pre-injury self is also represented by the construct poles ‘happy-go-lucky’ and ‘has a laugh’ on the second component, but is more into drugs and clubbing than after injury and the ideal self. The current self is unlike a person with a similar injury on the first component which distinguishes respecting oneself and being grateful and determined, from having no willpower, taking things for granted and being ‘into drugs’. The placement of an admired person close to a disliked person appears to be something of an anomaly. The central position of the construct ‘active / boring’ indicates that this construct holds little relevance within the construct system.

- **Participant R06 (see Figure 3.6)**

The grid plot of R06 demonstrates the large impact injury has had on sense of self (as indicated by the distance between the current and pre-injury selves), particularly in terms of health, independence, and contentment (the first component). However, the self at discharge is closer to both the pre-injury and ideal selves, and the self in 5 years time is clustered with the pre-injury self, an admired person, and someone they are close to, in the same quadrant as the ideal self. This movement of the self

---

14 Inter-element distances indicate that the current self is more distant from the ideal, than was the case prior to injury. This discrepancy demonstrates that the grid plots should not be taken as perfect representations of the grid data, but display the movement of elements in relation to constructs.
Figure 3.6 - Rotated Grid Plot at Time One for Participant R06

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self at discharge from hospital
E - Self in 5 years time
F - A typical person of the same age
(G - A person with a similar injury)
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person
in the future, indicates that the impact of the injury is anticipated to reduce considerably over time. Both a typical person of the same age and a disliked person are alienated from the other elements and hold qualities that define the second component in terms of lack of achievement and lack of consideration for others.

**Participant R07 (see Figure 3.7)**

The first component accounts for a large proportion of the variance and loads highly for the constructs ‘compassion / indifference’, ‘fairly healthy, at peace / failing health, insecurity’ and ‘cares about people / isolation, rejection, self-pity’. The injury appears to have had little impact on the sense of self, indicated by the closeness of the current and pre-injury selves. The self is represented by fairly negative qualities, shared by a typical person of the same age and a disliked person, and is in the opposite quadrant to the ideal self and an admired person, which are represented as caring, religious believers, polite, helpful, with a sense of humour and hope for the future. The self in 5 years time is represented by the second component as ‘depressed’, but has moved towards the ideal in terms of the first component. The grid indicates a negative view of the self which has not been highly affected by injury.

**Participant R08 (see Figure 3.8)**

The impact of injury has been to move the self further away from the ideal self than was so before injury, and identify the self with a person with a similar injury in terms of being sickly, tired and dependent on others (the second component). This move is anticipated to be fairly short-lived as indicated by the proximity of the self
Figure 3.7 - Rotated Grid Plot at Time One for Participant R07

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self at discharge
E - Self in 5 years time
F - A typical person of the same age
(G - A person with a similar injury)
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person
Figure 3.8 - Rotated Grid Plot at Time One for Participant R08

Component 1 - 47%

- F: Lives an ordinary life, does whatever they want
- I: Plenty of money
- Materialistic view of life
- Two-faced
- Weak, self-important
- Not looking on the bright side
- Sickly, tired
- Sickly, tired

Component 2 - 20%

- Well, able to do things
- H
- Looks on the bright side, thinks positive
- Strength of character
- Likes to have a laugh
- K
- Enjoys simple pleasures
- Genuine
- J
- Dependent on others
- Poor

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self at discharge from hospital
E - Self in 5 years time
F - A typical person of the same age
G - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person

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on discharge and in 5 years with the pre-injury self. These elements are represented by the construct poles ‘enjoys their family’, ‘genuine’, ‘enjoys simple pleasures’, likes to have a laugh’ and ‘poor’ on the first component. The opposite pole of this construct is represented strongly by a disliked person, which, along with a typical person, is quite alienated from other elements.

- **Participant R09 (see Figure 3.9)**

The first two components do not account for a high percentage of the total variance, indicating fairly loose construing. The current self appears quite alienated from other elements, and encapsulates being moody, feeling vulnerable to comments, lacking confidence due to scarring, and facing a painstakingly long recovery (first component). The injury has had a big impact on sense of self, but the self at discharge is anticipated to move closer to the pre-injury and ideal selves. The future self is closer to the ideal, being more wealthy, chilled, supportive and a good friend (on the second component) than was the pre-injury self. The disliked person is unlike any self element, and loads at an extreme position on the second component, encapsulating the construct poles ‘spiteful’, ‘backstabber’, ‘think they’re ‘it’’.

- **Participant R10 (see Figure 3.10)**

The injury appears to have had the impact of alienating the self from others and pre-injury self, particularly in terms of being restricted in one’s movements and being timid and solitary (the second component). The current self is the only element to be significantly defined on this component, with other elements being
Figure 3.9 - Rotated Grid Plot at Time One for Participant R09

Key for elements

A - Current self  
B - Pre-injury self  
C - Ideal self  
D - Self at discharge from hospital  
E - Self in 5 years time  
F - A typical person of the same age  
G - A person with a similar injury  
H - An admired person  
I - A disliked person  
J - Someone they are close to  
K - A pitied person
Figure 3.10 - Rotated Grid Plot at Time One for Participant R10

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self at discharge from hospital
E - Self in 5 years time
F - A typical person of the same age
G - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person
differentiated largely in terms of the constructs ‘not a good friend / a good friend’, ‘obnoxious / confident’, ‘boring / fun to be with’, ‘an idiot / can chat about sensible things’. The pre-injury and ideal selves are clustered with the future self, a person with a similar injury, an admired person and someone they are close to, in a fairly central position on the grid. The self at discharge is in close proximity to this cluster, indicating that the effect of injury is not anticipated to be long-lasting.

- **Participant R11** (see Figure 3.11)

  All the self elements, except for the ideal, are in the quadrant defined as giving, helpful, happy-go-lucky, easy-going and carefree, but not able to do things. The current self is further from the ideal than the pre-injury self, and closer to someone with a similar injury and a pitied person. The impact of injury is not anticipated to persist in 5 years. A disliked person is alienated from other elements and represents the extreme pole of the first component.

A comparison with grid plots generated at Time Two will be described in section 3.3.3.3, to explore changes in construing over time as participants adjust to living with their injuries.

### 3.3 Assessment at Time Two (follow-up)

In this section I describe the results from the same participants collected via post or telephone contact, at a period of around three months after the initial assessment for
**Figure 3.11** - Rotated Grid Plot at Time One for Participant R11

**Key for elements**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Current self</td>
</tr>
<tr>
<td>B</td>
<td>Pre-injury</td>
</tr>
<tr>
<td>C</td>
<td>Ideal self</td>
</tr>
<tr>
<td>D</td>
<td>Self at discharge from hospital</td>
</tr>
<tr>
<td>E</td>
<td>Self in 5 years time</td>
</tr>
<tr>
<td>F</td>
<td>A typical person of the same age</td>
</tr>
<tr>
<td>G</td>
<td>A person with a similar injury</td>
</tr>
<tr>
<td>H</td>
<td>An admired person</td>
</tr>
<tr>
<td>I</td>
<td>A disliked person</td>
</tr>
<tr>
<td>J</td>
<td>Someone they are close to</td>
</tr>
<tr>
<td>K</td>
<td>A pitied person</td>
</tr>
</tbody>
</table>
the study. These results will be presented in the same way as above, and comparisons will be made with the findings at Time One.

3.3.1 Description of the sample
At the time of writing five participants had completed follow-up assessments\textsuperscript{15}. Completed assessments at Time Two were received at a mean of 137.60 days (19.66 weeks) after assessment at Time One (N=5, s.d. = 43.627, range 96 to 192\textsuperscript{16} days, median = 124 days); a mean of 158.80 days (22.69 weeks) post-injury (N=5, s.d. = 35.878, range 116 to 199 days, median = 163 days).

3.3.2 Standardised measures of distress at Time Two
Participants' scores on the standardised measures (HADS, IES, and SF-MPQ) at Time Two are given in Table 3.8, and are described below in comparison with those at Time One.

3.3.2.1 Hospital Anxiety and Depression Scale (HADS)
At Time Two, the mean score on the anxiety sub-scale of the HADS was 5.40 (N=5, s.d. = 2.608, range 2 to 9, median = 6). No participants (N=5) scored above the cut-off of 11 (one participant (R02) scored above the lower cut-off of 8 indicating presence of clinical levels of anxiety). Thus, at Time Two, 80.00\% scored below the

---
\textsuperscript{15} Two participants had been lost to follow-up due to a change of home address, one participant had refused to participate in the second assessment when contacted at Time Two. The remaining three participants were not due to be followed up by the time of writing.

\textsuperscript{16} The delay in receiving follow-up data was due to the postal method of collecting assessments at Time Two. Several participants returned the assessments after a number of written or telephone prompts.
Table 3.8 Summary of scores on standardised measures of distress at Time Two.

<table>
<thead>
<tr>
<th></th>
<th>HADS Anxiety</th>
<th>HADS Depression</th>
<th>Impact of Events Scale</th>
<th>S-F McGill Pain Questionnaire</th>
<th>PPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>R02</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>R03*</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R04</td>
<td>6</td>
<td>6</td>
<td>21</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>R05</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>R06</td>
<td>6</td>
<td>6.5</td>
<td>25</td>
<td>9</td>
<td>0.5</td>
</tr>
<tr>
<td>R07*</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R08*</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R09**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R10**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R11**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* These participants were lost to follow-up.
** These participants were not due for follow-up at the time of writing.
lower cut-off of 8 indicating an absence of clinically significant levels of anxiety (compared to 63.64% at Time One).

Levels of anxiety among the group had decreased since the assessment at Time One, when the mean anxiety score was 7.73 (N=11). Among the five participants for whom data was available at both Time One and Time Two, four participants showed reduced levels of anxiety at Time Two, but levels of anxiety had increased over time for one participant (R02 - an increase of 3 points). The differences between scores for these five participants at Time One and Time Two were analysed by Wilcoxon’s matched-pairs signed-ranks test, and the results are shown in Table 3.9. Levels of anxiety were not found to be significantly different at Time One and at Time Two.

At Time Two, the group mean on the depression sub-scale was 5.10 (N=5, s.d. = 2.510, range 2 to 8, median = 6). No participants showed levels of distress above the cut-off of 11 (one participant (R02) scored the lower cut-off of 8, indicating presence of clinical levels of depression). Thus, at Time Two, 80.00% scored below the lower cut-off of 8 indicating an absence of clinically significant levels of depression (compared to 72.73% at Time One).

The mean depression score at Time One (N=11) was 5.59, indicating a slight decrease in levels of depression among the group at Time Two. Among the five participants for whom data was available at both Time One and Time Two, three participants showed

---

17 The rationale for the use of this test is given in section 2.6.

18 Participant R06 endorsed two responses on one depression item (‘I feel cheerful’), and the item has been scored by taking the middle point.
Table 3.9 - Changes in scores on standardised measures of distress between Time One and Time Two, for those participants (N=5) for whom data was available at both assessments. Means and standard deviations (in brackets) are given.

<table>
<thead>
<tr>
<th></th>
<th>Time One</th>
<th>Time Two</th>
<th>z - score</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>HADS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>9.60</td>
<td>5.40</td>
<td>-1.753</td>
<td>0.080</td>
</tr>
<tr>
<td></td>
<td>(3.782)</td>
<td>(2.608)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>6.40</td>
<td>5.10</td>
<td>-0.730</td>
<td>0.465</td>
</tr>
<tr>
<td></td>
<td>(4.722)</td>
<td>(2.510)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrusion</td>
<td>19.40</td>
<td>13.00</td>
<td>-1.826</td>
<td>0.068</td>
</tr>
<tr>
<td></td>
<td>(10.945)</td>
<td>(9.823)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>14.60</td>
<td>13.80</td>
<td>-0.674</td>
<td>0.500</td>
</tr>
<tr>
<td></td>
<td>(3.782)</td>
<td>(5.215)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IES Total</td>
<td>34.00</td>
<td>26.80</td>
<td>-2.023</td>
<td>*0.043</td>
</tr>
<tr>
<td></td>
<td>(14.509)</td>
<td>(13.554)</td>
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</tr>
<tr>
<td>SF-MPQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Pain</td>
<td>15.60</td>
<td>11.00</td>
<td>-2.023</td>
<td>*0.043</td>
</tr>
<tr>
<td></td>
<td>(6.465)</td>
<td>(5.292)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPI</td>
<td>1.60</td>
<td>0.70</td>
<td>-1.826</td>
<td>0.068</td>
</tr>
<tr>
<td></td>
<td>(0.894)</td>
<td>(0.447)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* those values where p < 0.05 indicate significant differences between Time One and Time Two, calculated by Wilcoxon's matched-pairs signed-ranks test.
reduced levels of depression at Time Two, one participant’s (R05) score was unchanged at Time Two, and one participant (R02) showed an increase (of 5 points) in level of depression. The differences between scores for these five participants at Time One and Time Two were not found to be significant by Wilcoxon’s matched-pairs signed-ranks test (Table 3.9).

Levels of anxiety and depression correlated more highly at Time Two (Spearman’s rho = 0.872, N=5, p = 0.054) than at Time One (Spearman’s rho = 0.499). Neither anxiety nor depression were significantly correlated with time since injury (Spearman’s rho = 0.051, N=5, p = 0.935 for anxiety; Spearman’s rho = 0.200, N=5, p = 0.747 for depression).

At Time Two, the item endorsed most frequently towards the distressed end was ‘I feel as if I am slowed down’, with all participants (N=5) experiencing this at some time in the last few days, and 60.00% experiencing this ‘nearly all the time’ compared to 18.18% at Time One (N=11). This item was one of two at Time One to be endorsed more frequently towards the distressed end. The second item (‘I feel very restless as if I have to be on the move’), was experienced by participants less frequently at Time Two, with 40.00% experiencing this ‘quite a lot’ or ‘very much indeed’, compared to 63.63% at Time One (N=11). Thus, it appears that the greatest cause of distress across the group was connected with motion and this persisted across time.
3.3.2.2 *Impact of Events Scale (IES*)

The mean total IES score was 26.80 (N=5, s.d. = 13.554, range 7 to 41, median = 30). This was slightly less than at Time One where it was 29.90, although the standard deviation remains high. Examining changes over time for each of the five participants assessed at Time Two, we can see that all five show decreased levels of post-traumatic distress at Time Two (a mean difference of 7.20 points, s.d. = 4.494). This was shown to be a significant change (p = 0.043) by Wilcoxon’s matched-pairs signed-ranks test (see Table 3.9). Two participants (R04 and R06) remained above the cut-off of 35 at Time Two. One participant (R05) who scored above the cut-off at Time One scored below the cut-off at Time Two. Thus, 40.00% of participants (N=5) demonstrated severe levels of post-traumatic distress (total IES scores above 35) at Time Two, compared to 50.00% at Time One; 80.00% showed high levels of post-traumatic distress (total IES scores above 19) at Time Two, compared to 70.00% at Time One. The results would seem to indicate relative stability over time in the proportion of participants experiencing post-traumatic distress, although individual participants showed significant reductions in reported symptoms over time.

As was the case at Time One, intrusion and avoidance scores were similar (Intrusion sub-scale: mean = 13.00, N=5, s.d. = 9.823, range 1 to 25, median = 10; Avoidance sub-scale: mean = 13.80, N=5, s.d. = 5.215, range 6 to 20, median = 15). However, as at Time One, these scores were poorly correlated (Spearman’ rho = 0.700, N=5, p = 0.188), with individual participants showing a mean sub-scale discrepancy of magnitude 6.80 (s.d. = 2.588, range 4 to 10, median = 6). Individual scores on the
sub-scales were not shown to be significantly different at Time One and Time Two (see Table 3.9).

Scores on the IES (total scores and Intrusion sub-scale scores) were significantly correlated with time since injury (Spearman’s rho = -0.900, N=5, p=0.037 for IES total score; Spearman’s rho = -0.900, N=5, p=0.037 for intrusion sub-scale). However, whereas at Time One time elapsed since injury was positively correlated with scores (total IES and intrusion sub-scale), these correlations were negative at Time Two. This result indicates that symptoms of post-traumatic distress may increase within the first month after lower limb trauma, and levels then recede over time.

Of the most frequently endorsed items at Time Two, one ('I avoided letting myself get upset when I thought about it or was reminded of it') continued to be perceived as true for 80.00% of participants 'sometimes' or 'often' during the past seven days (compared to 70.00% (N=10) at Time One). The other items frequently perceived as true at Time Two were 'I tried to remove it from memory' and 'Pictures about it popped into my mind'. Only one participant (N=5) felt the item 'My feelings about it were kind of numb' had been true 'sometimes' or 'often' during the past seven days, compared to 72.73% of participants (N=11) at Time One.
3.3.2.3 Short-Form McGill Pain Questionnaire (SF-MPQ)

Levels of pain intensity were indicated by the mean total pain score on the SF-MPQ, which, at Time Two, was 11.00 (N=5, standard deviation = 5.292, range from 5 to 19, median = 9). This had reduced since Time One when it was 14.3. For all participants at Time Two (N=5) total pain scores had reduced over time (by a mean of 4.60 points, s.d. = 2.608, range 1 to 8, median = 4). This reduction was found to be significant by Wilcoxon’s matched-pairs signed ranks test (see Table 3.9). Mean scores on both sub-scales were lower at Time Two (Sensory sub-scale: mean = 9.00, N=5, s.d. = 4.472, range 4 to 16, median = 8 (mean at Time One was 11.30); Affective sub-scale: mean = 2.00, N=5, s.d. = 1.000, range 1 to 3, median = 2 (mean at Time One was 3.00)). Pain intensity remained poorly correlated with time since injury (Spearman’s rho = -0.359, N=5, p = 0.553), although as might be expected this is a negative correlation, indicating that subjective levels of pain decrease over time.

The quality of the pain had changed somewhat since Time One. Only 60.00% experienced ‘sharp’ pain (compared to 100.00% at Time One). Total item scores across the group indicate that some characteristics have remained prominent: ‘aching’ (8, N=5), ‘shooting’ (8, N=5), ‘tender’ (6, N=5), and ‘tiring-exhausting’ (6, N=5). The same qualities at both Time One and Time Two were least endorsed by the group: ‘splitting’, ‘gnawing’, and ‘punishing-cruel’; in addition, at Time Two the qualities ‘hot-burning’ and ‘sickening’ showed the lowest total item scores.

---

19 These scores were calculated by totalling every participant’s scores (where intensity is scored as follows: ‘none’ = 0, ‘mild’ = 1, ‘moderate’ = 2, and ‘severe’ = 3) on each pain descriptor.
The present pain intensity (PPI) score\(^{20}\) had reduced to a mean of 0.700 (N=5, s.d. = 0.447, range 0 to 1, median 1), compared to 1.55 at Time One. All participants (N=5) rated their current subjective level of pain as either 'mild' or 'no pain'. These ratings had stayed the same for one participant, and had decreased for four participants (this was not found to be a significant change, see Table 3.9). The PPI was not significantly correlated with time since injury (Spearman's rho = -0.112, N=5, p = 0.858); the direction of correlation indicates a decrease in overall pain experienced over time. The correlation between the total pain score and PPI was Spearman's rho = 0.740 (N=5, p = 0.102), compared to 0.251 (N=10, p = 0.484) at Time One.

### 3.3.2.4 Correlations between standardised measures of distress

Table 3.10 displays the correlations between the standardised measures at Time Two. Levels of anxiety (as measured by the HADS) were no longer significantly correlated with levels of post-traumatic distress (as measured by the IES), as they were at Time One. Indeed, in contrast to significant positive correlations at Time One, levels of anxiety and post-traumatic distress (IES total score, and intrusion and avoidance subscales) are negatively correlated (although not reaching significance) at Time Two. None of the measures significantly correlated with any other measure at Time Two. As at Time One, age was not significantly correlated with any measures of distress.

\(^{20}\) Several participants gave two PPI ratings at Time Two, indicating higher pain intensity when walking. PPI ratings when not walking were used in these results. Participant R06 endorsed both no pain and mild pain when responding to Present Pain Intensity (PPI), and has been scored as 0.5, the mid-point of these positions.
Table 3.10 Correlations (Spearman’s rho) between scores on standardised measures at Time Two.

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th>Depression</th>
<th>Intrusion</th>
<th>Avoidance</th>
<th>Total IES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depression</strong></td>
<td>0.872</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N=5)</td>
<td>p = 0.054</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intrusion</strong></td>
<td>-0.051</td>
<td>-0.100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N=5)</td>
<td>p = 0.935</td>
<td>(N=5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Avoidance</strong></td>
<td>-0.359</td>
<td>-0.600</td>
<td>0.700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N=5)</td>
<td>p = 0.553</td>
<td>(N=5)</td>
<td>(N=5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total IES</strong></td>
<td>-0.051</td>
<td>-0.100</td>
<td>1.000</td>
<td>0.700</td>
<td></td>
</tr>
<tr>
<td>(N=5)</td>
<td>p = 0.935</td>
<td>(N=5)</td>
<td>(N=5)</td>
<td>(N=5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Pain</strong></td>
<td>0.763</td>
<td>0.462</td>
<td>0.103</td>
<td>-0.154</td>
<td>0.103</td>
</tr>
<tr>
<td>(N=5)</td>
<td>p = 0.133</td>
<td>(N=5)</td>
<td>(N=5)</td>
<td>(N=5)</td>
<td>(N=5)</td>
</tr>
</tbody>
</table>

* correlations where p < 0.05 are taken as significant.
3.3.3 Repertory Grid analysis

3.3.3.1 Constructs

Participants were asked to rate their elements against the same constructs they had generated at Time One; therefore content areas (see section 3.2.3.1) remained unchanged at follow-up. In this section I shall examine any changes in the interrelatedness of construct dimensions, to explore the role of construing in the process of adjustment.

*Inter-relatedness*

Correlations among constructs were used in the calculation of intensity scores. At Time Two the mean intensity was 0.60 (N=5, s.d. = 0.181, range 0.47 to 0.91, median = 0.54), which indicates a tendency towards ‘tighter’ construing than at Time One (where the mean intensity was 0.54). Three participants (R01, R04 and R06) were classified as ‘tight’ construers (intensity scores closer to 1.00 i.e. > 0.50) at Time Two, that is 60.00% compared to 54.55% at Time One. Two participants were therefore classified as ‘loose’ construers at Time Two.

Intensity scores at across Time One and Time Two are shown in Table 3.11. There was little change in tightness and looseness of construing (mean change of magnitude 0.07), with the greatest change apparent in the construing of participant R04 whose construct system tightened up quite considerably (from 0.41 to 0.54). This change was not shown to be significant by Wilcoxon’s matched-pairs signed-ranks test (z = -1.214, N=5, p = 0.225).

---

21 See section 2.6 for an explanation of this measure of inter-relatedness.
Table 3.11  Change in intensity scores at Time One and Time Two.

<table>
<thead>
<tr>
<th></th>
<th>Time One</th>
<th>Time Two</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01</td>
<td>0.94</td>
<td>0.91</td>
<td>-0.03</td>
</tr>
<tr>
<td>R02</td>
<td>0.38</td>
<td>0.47</td>
<td>+0.09</td>
</tr>
<tr>
<td>R04</td>
<td>0.41</td>
<td>0.54</td>
<td>+0.13</td>
</tr>
<tr>
<td>R05</td>
<td>0.41</td>
<td>0.48</td>
<td>+0.07</td>
</tr>
<tr>
<td>R06</td>
<td>0.61</td>
<td>0.60</td>
<td>-0.01</td>
</tr>
</tbody>
</table>
3.3.3.2 Elements

Participants were asked to comment on whether the people they had assigned to role descriptions at Time One, still fitted these descriptions at Time Two. None of the participants commented that these had altered.

Inter-element distances

Inter-element distances among the five self elements were calculated and the mean distances among the participants at Time Two are shown in Table 3.12. The mean current self / ideal self distance was 0.77 (compared to 1.01 at Time One) indicating improved self-esteem or self-satisfaction. The inter-element distances of individual participants (N=5) showed that the current self / ideal self distance of two participants had remained stable across time, and three participants had moved closer to their ideal over time. At Time Two the current self (group mean) was perceived as similar to all the other self elements (distances < 0.80).

Comparing the pre-injury self with the current self gives an indication of the persisting impact of lower limb trauma at Time Two. None of the participants showed an inter-element distance between these two elements which was above 1.20; three participants (R01, R02, and R05) showed distances of less than 0.80, indicating perceived similarity between the current and pre-injury self. A comparison of the pre-injury self / ideal self distance with the current self / ideal self distance found that the self was seen as being closer to the ideal self before the injury. This result shows that
Table 3.12 Group means and standard deviations (in brackets) of distances between self elements at Time Two

<table>
<thead>
<tr>
<th></th>
<th>Ideal self</th>
<th>Pre-injury self</th>
<th>Self on admission</th>
<th>Future self</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current self</strong></td>
<td>0.77*</td>
<td>0.70*</td>
<td>0.79*</td>
<td>0.53*</td>
</tr>
<tr>
<td></td>
<td>N=5</td>
<td>N=5</td>
<td>N=5</td>
<td>N=5</td>
</tr>
<tr>
<td></td>
<td>(s.d. 0.511)</td>
<td>(s.d. 0.445)</td>
<td>(s.d. 0.623)</td>
<td>(s.d. 0.431)</td>
</tr>
<tr>
<td><strong>Ideal self</strong></td>
<td>-</td>
<td>0.48*</td>
<td>1.06</td>
<td>0.41*</td>
</tr>
<tr>
<td></td>
<td>N=5</td>
<td>N=5</td>
<td>N=5</td>
<td>N=5</td>
</tr>
<tr>
<td></td>
<td>(s.d. 0.362)</td>
<td>(s.d. 0.716)</td>
<td>(s.d. 0.335)</td>
<td></td>
</tr>
<tr>
<td><strong>Pre-injury self</strong></td>
<td>-</td>
<td>-</td>
<td>0.90</td>
<td>0.33*</td>
</tr>
<tr>
<td></td>
<td>N=5</td>
<td></td>
<td>N=5</td>
<td>N=5</td>
</tr>
<tr>
<td></td>
<td>(s.d. 0.658)</td>
<td></td>
<td>(s.d. 0.326)</td>
<td></td>
</tr>
<tr>
<td><strong>Self on admission</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>N=5</td>
<td></td>
<td></td>
<td>N=5</td>
</tr>
<tr>
<td></td>
<td>(s.d. 0.659)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Distances < 0.80 indicate perceived similarity.

(Elements at a distance between 0.8 and 1.2 are neither similar nor dissimilar; those > 1.2 are perceived as dissimilar.)
despite the perceived similarity of current self and ideal self at Time Two, the impact of the injury in lowering self-esteem persists at several months post-injury.

Examining the correlations between the aspects of the self-concept and levels of anxiety and depression, revealed a significant positive correlation between hope for the future (as indicated by future self / ideal self distance) and anxiety (Table 3.13). This indicates that the greater the perceived distance between the self in 5 years time and the ideal perception of oneself, the greater the anxiety experienced. Self satisfaction (current self / ideal self distance) and perceived impact of the injury on the self (current self / pre-injury self distance) were not found to be significantly correlated with psychological distress at Time Two (see Table 3.13).

An examination of individual grids (N=5), however, showed a rather mixed picture. One participant (R01) showed no change between the pre-injury self / ideal self distance and the current self / ideal self distance. Two participants (R02 and R05) showed selves that were closer to their ideal at Time Two than prior to injury (mean magnitude of change 0.06). Two participants (R04 and R06) showed greater distances between self and ideal self at Time Two than prior to injury (mean magnitude of change 0.77).

Table 3.14 shows the results of Wilcoxon’s matched-pairs signed-ranks tests comparing the inter-element distances of the current and pre-injury selves from ‘other’ elements. Although the differences between the current and pre-injury selves in

---

22 Self / ideal self distance prior to injury was a retrospective measure.
Table 3.13 - Correlation coefficients (Spearman’s rho) between inter-element distances and levels of anxiety and depression at Time Two.

<table>
<thead>
<tr>
<th>Distance</th>
<th>Anxiety</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current self / ideal self distance</td>
<td>0.667</td>
<td>0.600</td>
</tr>
<tr>
<td>N=5</td>
<td>p = 0.219</td>
<td>p = 0.285</td>
</tr>
<tr>
<td>Current self / pre-injury self distance</td>
<td>0.667</td>
<td>0.600</td>
</tr>
<tr>
<td>N=5</td>
<td>p = 0.219</td>
<td>p = 0.285</td>
</tr>
<tr>
<td>Ideal self / future self distance</td>
<td>0.975</td>
<td>0.800</td>
</tr>
<tr>
<td>N=5</td>
<td>*p = 0.005</td>
<td>p = 0.104</td>
</tr>
</tbody>
</table>

* Correlations where p < 0.05 are taken as significant.
Table 3.14 Comparison of inter-element distances between 'current self' and 'other' elements, and 'pre-injury self' and 'other' elements using Wilcoxon’s matched-pairs signed-ranks tests.

<table>
<thead>
<tr>
<th></th>
<th>Current self group mean</th>
<th>Pre-injury self group mean</th>
<th>z-score</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical person of same age</td>
<td>0.72</td>
<td>0.62</td>
<td>-1.095</td>
<td>0.273</td>
</tr>
<tr>
<td></td>
<td>N=5 (s.d. 0.182)</td>
<td>N=5 (s.d. 0.363)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone with a similar injury</td>
<td>0.94</td>
<td>0.96</td>
<td>-0.447</td>
<td>0.655</td>
</tr>
<tr>
<td></td>
<td>N=3 (s.d. 0.359)</td>
<td>N=3 (s.d. 0.275)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone close to them</td>
<td>0.64</td>
<td>0.49</td>
<td>-0.730</td>
<td>0.465</td>
</tr>
<tr>
<td></td>
<td>N=5 (s.d. 0.431)</td>
<td>N=5 (s.d. 0.353)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone they dislike</td>
<td>1.32</td>
<td>1.31</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>N=5 (s.d. 0.680)</td>
<td>N=5 (s.d. 0.734)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone they admire</td>
<td>0.79</td>
<td>0.56</td>
<td>-0.730</td>
<td>0.465</td>
</tr>
<tr>
<td></td>
<td>N=5 (s.d. 0.388)</td>
<td>N=5 (s.d. 0.404)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone they pity</td>
<td>0.70</td>
<td>0.88</td>
<td>-1.095</td>
<td>0.273</td>
</tr>
<tr>
<td></td>
<td>N=5 (s.d. 0.300)</td>
<td>N=5 (s.d. 0.431)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p values < 0.05 are taken to indicate significant differences.
relation to the other elements are not significant, the self appears to be increasingly alienated from a typical person of the same age, someone they are close to, and an admired person following injury. This result reflects that at Time One, indicating that this consequence of injury persists to some degree over time, while the lack of significant differences indicates some return to previous identifications with others.

The closest and most distant inter-element relationships across the participants at Time Two are shown in Table 3.15. As at Time One, the closeness of the future self to self before injury and ideal self continues to show that participants do not anticipate the negative impact of injury in terms of self-satisfaction to persist at 5 years post-injury.

3.3.3.3 Principal component analysis

The grid plots (with VARIMAX rotation) at Time Two are described here with particular attention to changes in the construct system since Time One.

- Participant R01

Figure 3.12 shows the grid plot for R01 at Time Two. With comparison to the plot at Time One (see Figure 3.1) it is evident that the components have exchanged their order of importance, with more of the total variance now accounted for by the constructs ‘understanding / doesn’t understand’ and ‘friendly / unfriendly’. The self elements are still clustered centrally, although the element ‘someone they are close to’ has replaced the admired person in this cluster. A
Table 3.15 Mean inter-element relationships across all participants (N=5) at Time Two, arranged in ascending order (only the closest (<0.80) and most distant (>1.20) shown).

<table>
<thead>
<tr>
<th>Mean</th>
<th>S.D.</th>
<th>Element relationships</th>
<th>More related elements</th>
<th>0.72</th>
<th>0.18</th>
<th>Current self / Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33</td>
<td>0.33</td>
<td>Pre-injury / Future self</td>
<td>0.74</td>
<td>0.29</td>
<td></td>
<td>Future self / Typical</td>
</tr>
<tr>
<td>0.41</td>
<td>0.34</td>
<td>Ideal self / Future self</td>
<td>0.74</td>
<td>0.36</td>
<td></td>
<td>Admired / Pitied person</td>
</tr>
<tr>
<td>0.45</td>
<td>0.33</td>
<td>Future self / Close to</td>
<td>0.77</td>
<td>0.51</td>
<td></td>
<td>Current / Ideal self</td>
</tr>
<tr>
<td>0.48</td>
<td>0.36</td>
<td>Pre-injury / Ideal self</td>
<td>0.78</td>
<td>0.36</td>
<td></td>
<td>Ideal self / Typical person</td>
</tr>
<tr>
<td>0.48</td>
<td>0.37</td>
<td>Ideal self / Close to</td>
<td>0.79</td>
<td>0.39</td>
<td></td>
<td>Current self / Admired</td>
</tr>
<tr>
<td>0.49</td>
<td>0.35</td>
<td>Pre-injury self / Close to</td>
<td>0.79</td>
<td>0.62</td>
<td></td>
<td>Current / On admission</td>
</tr>
<tr>
<td>0.52</td>
<td>0.24</td>
<td>Future self / Admired</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.52</td>
<td>0.35</td>
<td>Ideal self / Admired</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.53</td>
<td>0.43</td>
<td>Current / Future self</td>
<td>1.22</td>
<td>0.57</td>
<td></td>
<td>Typical / Disliked</td>
</tr>
<tr>
<td>0.56</td>
<td>0.39</td>
<td>Admired / Close to</td>
<td>1.31</td>
<td>0.73</td>
<td></td>
<td>Pre-injury self / Disliked</td>
</tr>
<tr>
<td>0.56</td>
<td>0.40</td>
<td>Pre-injury / Admired</td>
<td>1.32</td>
<td>0.68</td>
<td></td>
<td>Current self / Disliked</td>
</tr>
<tr>
<td>0.62</td>
<td>0.36</td>
<td>Pre-injury/Typical person</td>
<td>1.32</td>
<td>0.69</td>
<td></td>
<td>Future self / Disliked</td>
</tr>
<tr>
<td>0.64</td>
<td>0.43</td>
<td>Current self / Close to</td>
<td>1.37</td>
<td>0.73</td>
<td></td>
<td>Ideal self / Disliked</td>
</tr>
<tr>
<td>0.67</td>
<td>0.32</td>
<td>Typical person / Close to</td>
<td>1.40</td>
<td>0.46</td>
<td></td>
<td>Similar injury* / Disliked</td>
</tr>
<tr>
<td>0.70</td>
<td>0.30</td>
<td>Current self/Pitied person</td>
<td>1.40</td>
<td>0.62</td>
<td></td>
<td>Disliked / Close to</td>
</tr>
<tr>
<td>0.70</td>
<td>0.45</td>
<td>Current / Pre-injury self</td>
<td>1.59</td>
<td>0.50</td>
<td></td>
<td>On admission / Disliked</td>
</tr>
</tbody>
</table>

* N=3
Figure 3.12 - Rotated Grid Plot at Time Two for Participant R01

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self on admission to hospital
E - Self in 5 years time
F - A typical person of the same age
G - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person
disliked person remains alienated from other elements and represented by the extremes of the more negative construct poles. A pitied person is perceived as more similar to the self than at Time One. It appears that little has changed in the construct system.

• **Participant R02** (see Figure 3.13)

Some significant changes in the construct system are apparent in comparing the grids of R02 at Time One (see Figure 3.2) and at Time Two. Most notably the construct ‘knowledge of being immobile / no such knowledge’ is associated with the opposite construct poles of ‘plain-speaking / two-faced’, ‘optimistic about the future / best days behind them’ and ‘feeling positive / putting things off’ at Time Two than at Time One. The construct ‘lost career suddenly / everything going right quickly’, which was previously shown to be largely irrelevant in the construct system due to its central position, loads highly on the first component at Time Two. The first component accounts for a larger proportion of the variance at Time Two (50%, compared to 37% at Time One). In terms of the movement of elements, the ideal self has made a substantial change, and is no longer close to the disliked person as at Time One. The ideal self loads highly on the second component, being represented by the construct pole ‘no knowledge of being immobile’ and this indicates the importance of the effects of injury for R02 at Time Two. The distance between current self and pre-injury self has reduced, and the current self remains close to the self in 5 years time in the quadrant represented by the construct poles ‘content to float along’, ‘ageing lad’, ‘putting things off’, ‘two-
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Figure 3.13 - Rotated Grid Plot at Time Two for Participant R02

**Key for elements**

A - Current self  
B - Pre-injury self  
C - Ideal self  
D - Self on admission to hospital  
E - Self in 5 years time  
F - A typical person of the same age  
(G) - A person with a similar injury  
H - An admired person  
I - A disliked person  
J - Someone they are close to  
K - A pitied person
faced’, and ‘knowledge of being immobile’. The self on admission was perceived to be in a much more extreme position on the second component than the current self.

- **Participant R04** (see Figure 3.14)

  The pattern of constructs has remained fairly stable over time, although the first component accounts for a much greater percentage of the total variance at Time Two (53%, compared to 34% at Time One. See Figure 3.4). In addition, the construct ‘able to walk / not able to walk’, which did not load highly on either component at Time One, differentiates the second component at Time Two. The current self remains alienated from the other self elements. The increased distance apparent in the grid plot may be explained to the changed location of the construct pole ‘not able to walk’. The pre-injury and ideal selves are largely defined in the same terms as at Time One, namely ‘educated’, ‘good-natured’, ‘does good turns’, ‘has fun in the pub’, ‘goes to church’ and ‘able to walk’. The self in 5 years remains near the pre-injury self, indicating retained optimism for future recovery. A surprising result at Time Two is the position of the self on admission, which is closer to the pre-injury and ideal selves than current self and represented by the construct pole ‘able to walk’.

- **Participant R05** (see Figure 3.15)

  The principal components have exchanged positions of significance since Time One (see Figure 3.5), although the pattern of construing has generally remained stable. The current self remains close to the ideal and the future self, clustered centrally but defined (as at Time One) as grateful for what they’ve got, determined, happy-
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Figure 3.14 - Rotated Grid Plot at Time Two for Participant R04

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self on admission to hospital
E - Self in 5 years time
F - A typical person of the same age
G - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person

1 Missing values on one construct (likes to joke/very serious) in the grid at Time Two, and the construct was excluded from the analysis in order to maximise accuracy (see section X for the rationale for exclusion).
Figure 3.15 - Rotated Grid Plot at Time Two for Participant R05

Key for elements

A - Current self
B - Pre-injury self
C - Ideal self
D - Self on admission to hospital
E - Self in 5 years time
F - A typical person of the same age
G - A person with a similar injury
H - An admired person
I - A disliked person
J - Someone they are close to
K - A pitied person

Grateful for what you've got
♦ Respect for self
♦ Rich
♦ Determined
♦ Has a laugh
♦ Goes to the library
♦ Boring
♦ Happy-go-lucky
♦ C
♦ A
♦ J
♦ H
♦ K
♦ F
♦ Active
♦ Goes out clubbing
♦ Skint
♦ In drugs
♦ Takes things for granted
♦ Dull
♦ Dull
♦ Dull
♦ No willpower

Component 1 - 45%
Component 2 - 31%
go-lucky, and having a laugh. An apparent anomaly at Time Two is the close proximity of both the disliked person and the pitied person to the admired person, the person they are close to and the cluster of current, ideal and future selves. The self on admission is determined as being dull and boring with no willpower, in contrast to the current self. It appears that self-satisfaction remains high at Time Two, and the impact of the injury has been to promote (desired) qualities of determination and gratefulness in R05.

- **Participant R06** (see Figure 3.16)

The construct system of R06 shows high stability over time, although the differentiation between the first two principal components has reduced (accounting for 51% and 39% of the variance, compared to 61% and 30% respectively at Time One. See Figure 3.6). At Time Two the current self has moved towards the pre-injury self on the first component, that is the current self is less ill, reliant on others, and unhappy with their lot than at Time One. This is supported by the placement of self on admission closer to these construct poles than the current self at Time Two. However, it can be seen that R06 has not moved towards achievement, caring for others, and being where they want to be as anticipated (inferred from the location of self at discharge and in 5 years) at Time One.

3.4 **Illustrative case studies**

With the aim of illustrating some of the differences in the response to severe lower limb trauma, three participants have been selected and the results of their assessments
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**Figure 3.16** - Rotated Grid Plot at Time Two for Participant R06

![Rotated Grid Plot](image)

**Key for elements**

- **A** - Current self
- **B** - Pre-injury self
- **C** - Ideal self
- **D** - Self on admission to hospital
- **E** - Self in 5 years time
- **F** - A typical person of the same age
- **(G)** - A person with a similar injury
- **H** - An admired person
- **I** - A disliked person
- **J** - Someone they are close to
- **K** - A pitied person
at Time One and Time Two are described as illustrative case studies. The interested reader is directed to Appendix L. The cases have been selected to give some insight into differences in levels of subjective distress, differences in patterns of construing, and differences in the adjustment process as indicated by changes over time.
DISCUSSION

4.1 Overview
The final chapter discusses the results of the study, and aims to draw together the present findings with previous research and theory in this field. This section will aim to answer the research questions which were presented in section 1.9 of the Introduction. Implications of the study findings for service provision and for future research will be discussed in relation to a critique of the present study.

4.2 Impact of injury on the sense of self
The impact of sustaining a lower limb trauma was shown to not be universally negative nor universally positive. This finding supports the indication from previous research described in Chapter 1, of the importance of assessing adjustment to injury in a more phenomenological manner. The use of repertory grids provided an opportunity to explore the impact of injury on the self-concept. Individual differences were apparent among the participants in the impact of lower limb trauma on the sense of self.

Self concept was defined in the introduction as the cognitive aspects of self-perception, encompassing self-esteem and self-satisfaction, and perceptions of acceptance by others (Brantley and Clifford, 1979. See section 1.5.1). Psychological stage models propose that in order for adaptation to an altered body to occur, changes are expected in body image, self-concept and identity. The present study showed that, for the majority of participants at Time One, the injury had had a
substantial effect on self-satisfaction as evidenced by larger current self / ideal self distance compared to pre-injury self / ideal self distance. In addition, only 20% of participants showed high self-satisfaction or self-esteem\(^1\) following the injury, compared to 80% prior to the injury. Although, the pre-injury self is a retrospective element, it provides us with an insight into participants’ subjective perceptions of the impact of injury. Participants, in general, perceived themselves as having been, prior to injury, close to how they would ideally like to be.

For some, however, the injury appeared to impact in such a way as to bring them closer to their ideal selves. In two cases, this appeared to be explained by a process of construing the current self in terms of positive qualities; for example, participant R02 felt himself to be more driven, and more positive and optimistic following his injury (see Figure 3.2), and participant R05 deemed himself more determined and grateful for what he had post-injury (see Figure 3.5). These two participants can be seen to be ‘finding meaning in their suffering’ (Janoff-Bulman, 1992); looking for positive consequences of their injuries (see section 1.7). Defining the self in terms of positive qualities can be seen as a coping strategy which enables these individuals to maximise self-worth.

Other participants demonstrated poor self-esteem both prior to and following injury. Although participant R07 moved closer to the ideal self following injury, this participant appeared to construe himself negatively both before and after injury, and somewhat more negatively prior to injury (see Figure 3.7). An examination of the

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\(^1\) High self-satisfaction or self-esteem was taken as a self / ideal self distance < 0.80.
element ratings in the grid of R07 revealed identical ratings for the current self and pre-injury self on all constructs except 'religious believers / non-believers' for which the current self rated more towards the 'religious believer' pole, and thus closer to the ideal self. R07 explained the influence of his religious belief in terms of “believers appear to recover and sustain hardships quicker and better”. This belief could be seen as a coping strategy promoting hope for one's own recovery. Despite the negative self-concept indicated by R07's grid, this participant demonstrated minimal depression. Indeed, there appeared to be little association between aspects of the self as measured by inter-element distances and levels of psychological distress as screened for by standardised measures (see Tables 3.5 and 3.13). This finding suggests that multiple factors contribute to psychological morbidity (for example hope for the future, pre-existing personality factors, perception of personal resources etc. See section 1.6), and emphasises the need to consider adjustment in a broad context.

For some participants there was little discernible effect on sense of self, as evidenced by the perceived similarity between the current and pre-injury selves. Participant R01 retained the same perception of self, as discussed in case study I (see Appendix L). This trend might be interpreted as exhibiting denial, which serves to maintain old assumptions about self and the world unchanged (Janoff-Bulman, 1992). The limited constructs generated by participant R01 at Time One² may be interpreted as reflecting a restriction of self-defining constructs to those which remain constant despite serious injury.

² Participant R01 generated four highly inter-related constructs at Time One.
In general, among the five participants followed-up over several months following injury, self-esteem or satisfaction appeared to improve, although to a greater degree in some participants than in others. A variety of coping strategies appear to have been employed in an attempt to maintain or re-establish previously held assumptions of self-worth. At Time Two, mean inter-element distances continued to show the current self located further from the ideal than prior to injury (Table 3.12), indicating that the impact on the sense of self persists over several months, and despite some improvement in self-satisfaction do not return to pre-injury status.

Participants generally showed optimism for their sense of self in the future, as demonstrated by the closeness of the future self / ideal self distance at both Time One and Time Two. The anticipation that any negative impact of the injury in terms of self-esteem or self-satisfaction would not persist at 5 years, could be a protective and effective coping style, or a defensive mechanism, which if not fulfilled might be anticipated to result in psychological distress. The finding of a significant positive correlation between future self / ideal self distance and levels of anxiety at Time Two (see Table 3.13) supports the latter premise in its implication that greater anxiety is experienced if initial recovery is not achieved as anticipated and perceptions of future recovery become less hopeful. A longer-term prospective study might reveal a role for unrealistic expectations for the future in levels of psychological morbidity or disability at several years post-injury.

Thus, one impact of a traumatic injury appears to be to shift the self away from the ideal image of oneself. However, an examination of inter-element distances at Time
One and Time Two (Tables 3.7 and 3.15 respectively) indicates that, on the whole, individuals are able to retain a fairly positive sense of self and hope for the future despite sustaining a severe traumatic injury, as indicated by: a) the distance between the current self and the disliked person being among the most distant elements (along with pre-injury self and disliked person); and b) the future self positioned close to both the ideal self and the admired person.

The use of repertory grids within the present study has demonstrated an important role for the self-concept in adjustment to lower limb trauma. It may be inferred from the study findings that when the sense of self is jeopardised by change, difficulties in adapting to disability can be expected. Different coping strategies serve to minimise changes to the self-concept, although these may not always be sustainable over time.

4.3 **Personal meaning of trauma and its influence on self-satisfaction**

Individual differences in response to similar injuries, emphasise the importance of examining personal interpretations and meaning of trauma:

"Two people can have what seems to the outsider to be almost identical experiences, and yet behave very differently, because they construe the events differently" (Fransella, 1981b p.156)

As discussed in Chapter 1, previous research has suggested that it is critical to consider patients' interpretation of good outcomes of reconstructive surgery, for example whether function is valued over appearance. In addition, psychological

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3 This proposition is a reiteration of Kelly’s (1955) Individuality Corollary within Personal Construct Theory.
models have focused on personal values and the conceptualisation of the self in the process of adjustment.

Something of the meaning of the physical trauma for the participants in the present study could be inferred from the constructs elicited. Only one participant produced a construct concerned with appearance. It may be that the predominance of men in the sample accounts for this; in conforming to gender role stereotypes women may invest more of their identity in body image and therefore disfigurement may cause more of a problem. The wide age range of the participants also meant that different issues and pre-occupations were being faced by individuals at different life stages. Appearance was important to the youngest participant in the study, who felt that being scarred would decrease his confidence and make him feel vulnerable to comments made by others. This anticipation of the social stigma of disfigurement may be particularly prevalent in late adolescence and early adulthood, when conforming to group norms may influence social acceptance to a greater extent than in later adulthood (e.g. Bernstein, 1990).

All the participants who produced constructs concerned with mobility (N=3) were employed in manual labour prior to injury, and it would have been of interest to examine the impact of injury on their ability to continue in this line of work. The use of constructs concerning mobility implies that this was a key concern for these participants compared to others for whom injury did not present significant occupational implications. The prominence of physical attributes in construct content (see Table 3.3) indicates the value that participants placed on their bodies and their
preoccupation with the body after recent injury. This finding shows some support for
the psychological literature which asserts a need to adapt one’s body image in
adjusting to severe injury (e.g. Kleeman, 1977. See section 1.5.2).

Other salient issues for participants at Time One were personal emotion and social
interaction (see Table 3.3). Personal emotion was expressed predominantly in terms
of contentment and optimism. Although levels of anxiety and depression were
generally low as measured by the HADS, the emotional experience of sustaining
lower limb trauma may be more accurately reflected in terms of contentment with
oneself and one’s situation in the first few weeks following injury, compared to
contentment with life prior to injury. The ability to experience hope following trauma
has been proposed by Janoff-Bulman (1992) to be important for adjustment (see
section 1.7). If individuals are able to conceive of their situation improving in the
future, this optimism may act as a coping strategy in the promotion of recovery.

The salience of social interaction at this time may reflect a need to maintain a sense of
stability within self-definition at this time of change, and perhaps individuals perceive
social roles as one factor which remains unchanged after injury (see case study 1 in
Appendix L). Alternatively, if individuals perceive their social roles as threatened by
physical trauma the salience of social relationships may increase at this time. Volition
also appeared to be an important issue for participants (see Table 3.3), and the link
with physical attributes highlights the impact of injury in terms of perceived limitations
and restrictions of oneself. This finding seems to support the finding of Parkes (1972)
among amputees that it was not so much what had physically been lost that was missed, but rather the consequences in terms of what one was able to do⁴.

The meaning of the trauma for participants may also be inferred by examining perceived changes in the placement of self elements in relation to constructs. Those participants showing poor self-esteem (large current self / ideal self inter-element distance) had a tendency to distinguish themselves from others in terms of ill health, reliance on others, restricted mobility etc. Those participants who showed sustained satisfaction with themselves tended to define themselves in terms of a positive outlook, and determination, or viewed the injury as having minimal impact in terms of how they perceived themselves. As suggested by Shontz (1991) among others, those mechanisms which serve to retain a positive sense of self following traumatic life events can act as mediators to adjustment, presenting opportunities to re-categorise oneself (see section 1.6). In support of this, the case study of participant R02 (case study 2 - Appendix L) exemplifies the strategy of construing the injury in a positive light, which highlighted for him the possibilities of trying something new.

4.4 Early processes of adjustment to severe lower limb trauma

Psychological theory proposes elaborations on the process of adjustment. It is hypothesised that one’s cognitions, perceptions, and belief systems change over time to incorporate changed circumstances following significant events such as a physical trauma (see section 1.4). Within the present study, adjustment was taken as a

⁴ This study was described in section 1.3.2.
dynamic, heterogeneous process of coming to terms with an event and adapting to the multiple demands of change including change in the areas of occupation, lifestyle, social relationships, mood and cognitive functioning.

Scores on standardised measures of distress were taken to represent perceptions of psychological well-being, and, while the measures used are not diagnostic tools, they were used in the present study to screen for signs of psychological distress and pain. As such, they give some indication of adjustment, while acknowledging the limitations of standardised instruments. Within the first few weeks after sustaining a severe lower limb injury, low levels of anxiety and depression were evident and the majority of participants did not reach clinical ‘caseness’; only four of the participants in the current study (N=11) scored above the cut-off (of 8) at Time One on the anxiety sub-scale, and only three on the depression sub-scale. In contrast, there were high levels of traumatic stress (which were correlated with anxiety). The prevalence of intrusive and avoidant symptoms at Time One, and the decrease in symptoms at several months post-injury (Time Two), indicate support for the adaptive nature of such symptoms proposed by Janoff-Bulman (1992. See section 1.7). It may be that intrusive symptoms act as a way of integrating traumatic experiences, whereas denial and emotional numbing act as protective mechanisms. The low correlation of pain intensity and time since injury at Time One, was perhaps surprising, although might be explained as due to differences in the use of pain medication as well as in subjective perceptions or definitions of pain intensity. That greater pain was experienced when attempting to mobilise might be expected to impact on motivation for rehabilitation.
At between three and six months post-injury, levels of anxiety and depression remained low (and had decreased to some extent), with the majority of participants’ scores continuing to represent ‘non-caseness’. Only one participant showed increased levels of both anxiety and depression at Time Two\(^5\). Levels of traumatic distress had reduced significantly at several months post-injury, although a large proportion of participants continued to show high levels of avoidant and intrusive symptoms (which were no longer associated with anxiety). We might infer that the reduction in symptoms over time reduces anxiety about the persistence of such symptoms. Significant negative correlations between both intrusive symptoms and total IES scores and time since injury demonstrated a trend for the continued decline in traumatic stress symptoms over time. Emotional numbing was no longer prevalent at Time Two, but avoidance of upset remained high, implying some retention of protective strategies (cf. Janoff-Bulman, 1992).

In summary, initial symptoms of anxiety and depression following a severe lower limb trauma tended to resolve in the months following injury without specific psychological intervention. In contrast, symptoms of post-traumatic distress tended to persist over several months at levels indicating clinical concern. Levels of pain also persisted over several months post-injury, but at follow-up were generally considered not to be distressing. The qualities of pain experienced remained fairly stable over time.

\(^5\) The adjustment of this participant is described as case study 2 in Appendix L.
Stage models propose some underlying universality to the process of adjustment (section 1.4.2). The findings of the present study show that all symptoms of psychological distress screened for in the present study had reduced by several months from their levels within a few weeks of injury, although only the reduction in total IES scores was shown to be significant. Despite this general trend of reducing symptoms over time, levels of anxiety were significantly positively correlated with the number of days since injury at Time One, indicating an initial increase in symptoms. This finding might implicate the role of shock, proposed by stage models to occur early in the adjustment process (see section 1.4.2), in minimising anxiety in the early stages following physical trauma. The prevalence of worry regarding participants' practical situations, such as jobs or housing (a very real concern, as at least three participants did not return to their previous homes on discharge from hospital^6, suggests that anxiety may initially increase with physical recovery to some degree, as patients are faced with persistent limitations and the realities of life after discharge.

We can consider the adjustment of the participants at Time Two in terms of Weiss's (1988) return to 'effective functioning' (see section 1.4.3). In considering return to pre-injury status (Weiss, 1988), none of the participants (N=5) considered themselves markedly dissimilar to their pre-injury self at Time Two (no current self / pre-injury self inter-element distances above 1.20), although only three could be classified as perceiving themselves as similar to their pre-injury selves at Time Two (current self / pre-injury self inter-element distances below 0.80). The present study did not

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^6 This information was not collected formally, and it may be that more participants lost their home as a consequence of injury than I was aware of in the present study. It was necessary for these participants to change accommodation primarily for reasons of restricted mobility.
investigate return to pre-injury status in terms of function or ability to work or to pursue prior recreational interests. In considering freedom from pain and psychological distress (Weiss, 1988), all participants reported no pain or mild pain (Present Pain Intensity ratings) at Time Two, only one participant indicated clinically significant levels of anxiety and depression, and two presented clinically significant levels of post-traumatic distress at Time Two. The two participants with IES scores above the cut-off at Time Two, showed the greatest discrepancy between current self and pre-injury self at Time Two. It could be inferred that the presence of distressing symptoms emphasised the impact the injury had had, and thus exaggerated the distinction between the present and prior to injury. Levels of depression might be considered to indicate both participants' ability to experience pleasure (Weiss, 1988), and hope for future (Weiss, 1988). The low levels of depression at both Time One and Time Two suggest that these were not major difficulties for the participants. In addition, hope for the future was evident in the close proximity of the future self to the ideal self within participants' repertory grids at both Time One and Time Two. The present study, did not include methods of examining the remaining two indicators of 'effective functioning' as determined by Weiss (1988) which are energy in everyday life and ability to function in social roles. However, applying Weiss's criteria of recovery it can be seen that, on the whole, participants were demonstrating good adjustment at a period of several months post-injury.

But what can be inferred from participants' own values regarding how well adjusted they consider themselves to be following severe lower limb trauma? Examination of inter-element distances at Time two indicated that over time the self moved closer to
the ideal self, and somewhat closer to the pre-injury self. Thus, despite a substantial, largely negative impact on the self-concept following lower limb trauma, participants tended to perceive themselves as attaining more (personally) desirable characteristics over a period of several months since injury. In general, participants anticipated a significant degree of adjustment to have been achieved by 5 years post-injury.

The study has shown a role for changes within the construct system itself in adjustment following lower limb injury. Approximately half the sample at Time One showed a 'tight' construct system, and half showed a 'loose' construct system as indicated by intensity scores. By Time Two tighter construing was evident among the participants. This was the effect for three of five participants followed-up; the three with the loosest construct systems at Time One. Loose construing represents a state of disintegration. Although it cannot be determined whether the loose construing at Time One was a response to the trauma or a pre-existing pattern of construing personality, there is some evidence from research that invalidation of a construct system may lead to a loosening of construing (Rehm, 1971; Bannister, 1963, 1965). In addition, from psychological theories of cognitive responses to threatening events we could postulate that a physical trauma challenges previously held constructs, leading to "a state of upheaval and disintegration" in the conceptual system (Janoff-Bulman, 1992 p.64). Such a constitution might become evident as loose construing.

The study findings postulate a role for the inter-relatedness of the construct system in subsequent adjustment. For example, for participant R01 the holding of a tight construct system which did not allow for changed circumstances may have enabled
him to maintain a stable sense of self, construing himself in terms which would be unaffected by physical trauma (case study 1 - Appendix L). Winter (1992) noted that the tightening of construct system may be employed as a defensive strategy against feelings of anxiety in the face of potential threat. However, he goes on to warn that "persistent use of tight constructions would only be a viable strategy, however, if the individual lived in an unchanging world" (p.90), so that any significant change is likely to cause problems.

As discussed in section 2.4.4, research has generally shown construct systems to demonstrate stability over time. However, it has been recognised that there are times when greater instability in construing might be expected (Winter, 1992). The study found that among the participants followed up at Time Two, all three participants with loose construct systems at Time One (as indicated by intensity scores below 0.50) showed tighter construing at Time Two. While maintaining caution in the generalisability of findings from such a small sample, and acknowledging that the difference was not found to be significant by Wilcoxon matched-pairs signed-ranks test, this trend in tightening of construing over time may indicate something of the adjustment process of these individuals. For example, for participant R02 (case study 2 - Appendix L) it may be that the physical trauma challenged the stability in his conceptual world, and this lack of stability presented itself in somewhat disordered thinking. The process of tightening up the system at six months post-injury, might therefore represent an attempt to restore a sense of stability. While speculative, such a hypothesis could be seen to concur with the process of rebuilding one’s ‘assumptive world’ following the shattering of assumptions associated with a traumatic experience
(e.g. Janoff-Bulman, 1992; Taylor, 1983). In this way, tightening may be a way of defending against the anxiety of disintegration.

4.5 Comparison with previous research studies

In making inferences from the findings of the study about the impact of lower limb trauma and the early processes of adjustment to injury, it is important to examine how representative of this population the study sample is. Some indication of representativeness can be inferred by comparing the study sample with the populations described within other research studies, for example those presented in section 1.3.1 of the Introduction. In terms of the mechanism by which lower limb injuries were sustained, the majority of injuries among participants were caused by falls or slips and road traffic accidents (see Figure 2.4) (among those who did not partake in the study, all had sustained injuries in road traffic accidents). The prevalence of lower limb injuries caused by falls appears to be higher than average within the present study, with the majority of participants in other studies in this field sustaining injuries in road traffic accidents (e.g. Georgiadis et al., 1993; MacKenzie et al., 1993; Dagum et al., 1999). The role of alcohol in accidents resulting in these injuries (three of the four participants who sustained injuries by falling, and the one participant who had been assaulted, had been drinking alcohol prior to their accident) has been found in other studies. Fernstein and Dolan (1991) found a high percentage of drinkers in their sample of lower limb injuries, with 25% admitting to drinking

7 The prevalence of injuries caused by accidents involving motorcycles within other studies has been noted. Within the present study none of the participants or refusers had suffered a motorcycle accident.
immediately prior to injury. Similarly, Richmond and colleagues (1998) found 40.2% of patients suffering physical trauma in their study tested positive for either drugs or alcohol at the time of the injury. Comparison with previous studies indicates that the small sample in the present study demonstrate similarities with, but should not be taken as wholly representative of, the population of patients with lower limb trauma with regards to the mechanism of injury.

With regard to demographic variables such as gender, ethnic origin, and occupation, it can be seen that the sample is fairly representative. The majority were male, white, and working prior to injury, as in other studies looking at this population (e.g. MacKenzie et al., 1993; Landsman et al., 1990). The mean age of participants was, however, somewhat higher than that in previous studies (although several studies excluded older patients). More of the participants held manual occupations than held non-manual occupations, which appears to reflect distributions in other studies of this patient group (e.g. Feinstein and Dolan, 1991). Only one injury (sustained in a fall) appeared to have been work-related, although this information was not recorded as part of the study but rather inferred from the mechanism of injury.

Physical function was not assessed within the present study. It is difficult to compare the severity of disability as a result of lower limb trauma among the study participants with the wider population who have sustained similar injuries. Some indication of severity was given by Gustilo-Anderson classifications. The participants in the study

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8 These investigators found that weekly alcohol consumption above the group median, in addition to higher initial scores on the IES, was predictive of later development of post-traumatic stress disorder at 6 months.

9 This classification system is described in section 1.2.2.
conducted by Dagum and colleagues (1999) presented a prevalence of 89.13% Type IIIB fractures among the reconstructive surgery group, compared to 10.87% Type IIIC fractures. A similar distribution was apparent in the study by Georgiadis and colleagues (1993), with the reconstructive group consisting of 81.48% Type IIIB fractures, compared to 18.52% Type IIIC fractures. This proportion contrasted with that of the group who had undergone early amputation where 83.33% of participants had sustained Type IIIC fractures (Georgiadis et al., 1993)\(^\text{10}\). Therefore, the distribution within the present study of 90.91% Type IIIB fractures and 9.09% Type IIIC fractures can be seen to reflect the population of patients with lower limb trauma shown in other studies. It may be inferred that the lack of early amputations performed within the hospital during the study period is explained in part by the relative rarity of Type IIIC fractures.

In terms of psychological morbidity at the time of injury, the findings of the present study appear to reflect those of patients following traumatic injury in the study by Michaels and colleagues (1998, 1999). These researchers found one third of patients showed psychosocial disturbance (measured using the Brief Symptom Inventory) at the time of injury, and 51% had IES scores above 30. In comparison, the present study showed around one third of participants to indicate clinical levels of depression and anxiety (using the HADS), and 45.45% (N=11) to show IES scores above 30 at Time One. In contrast, Feinstein and Dolan (1991) reported two thirds of their patients with lower limb fractures showed psychiatric 'caseness' at one week post-injury.

\(^{10}\) Dagum and colleagues (1999) do not give the injury classifications for the primary amputation group.
Pain scores in the present study can be compared with other clinical populations from research. All participants experienced some pain at Time One, and the group mean of 14.3 (standard deviation 6.4) on the SF-MPQ, is comparable with the mean of a group of patients with post-surgical pain (N=27) (without analgesic drugs) reported as 15.4 (standard deviation 9.6) (Melzack, 1987). In addition, the high level of agreement among the study participants regarding the qualities of pain experienced, indicate that patients with lower limb injuries experience similar types of pain. The poor correlation of the PPI and the total pain score has been noted in previous research (Melzack, 1975), and emphasises the subjectivity of pain experience. For example, McDowell and Newell (1996) noted that individual and cultural factors including personality and upbringing could be influential in response to pain. The PPI could, however, be considered a useful device in assessing subjective perceptions of change over time in overall pain intensity. For example, the majority of participants (80%) showed a reduction in PPI scores at Time Two from scores at Time One. None of the participants in the study described pain intensity as ‘horrible’ or ‘excruciating’ at the time of the assessments.

The findings of the study indicate levels of anxiety and depression outside the range of positive well-being for a minority of patients only. From the reduction in psychological distress over the time period of the study, one might hypothesise that levels of distress would continue to decrease with time. This hypothesis would support the findings of Dagum and colleagues (1999) who found subjective mental health status to reflect general population norms at four to six years post-injury. Other
studies, however, showed a greater persistence of emotional disturbance over time (e.g. Georgiadis et al., 1993; Landsman et al., 1990; MacKenzie et al., 1993). These discrepancies may be explained by differences in the use of measures and time since injury intervals. It may be that while hope for the future remains high within the first six months following injury, when disability persists over several years the realisation of enduring limitations and changes causes increased distress. Prospective, longitudinal studies would provide some insight into fluctuating well-being.

Although the area of interest in the present study was patients undergoing reconstructive surgery following lower limb trauma, it is of interest to draw on the amputation literature in order to explore similarities and differences in adjustment between these populations. However, the prospective nature of the present study means that direct comparisons with other studies which have explored limb injury from a retrospective position of several years, are made with caution. Furthermore, a consequence of assessing participants after a recent injury was tiredness at the time of assessment, which, within the present study, resulted in relatively few constructs being elicited in comparison to other repertory grid studies. The small number of constructs made it impossible to determine the articulation of the construct systems as described by Makhlouf-Norris and Norris (1972) and employed in Fisher’s (1985) study of amputees (see section 1.3.2). However, despite differences in methodology, it is of interest to compare across groups. Fisher’s amputees held rigid, inflexible construct systems (monolithic), and while the articulation of participants construct systems could not be determined within the present study, intensity scores provide an
indication of rigidity in construct systems. It can be seen that at Time One, only half the sample demonstrated ‘tight’ or rigid construct systems. However, the tendency to ‘tighten up’ construing (indicated by higher intensity scores on average at Time Two) postulated as playing a role in the adjustment process (section 4.4), could be seen to be supported by Fisher’s findings of the prevalence of rigid constructs systems at several years post-injury. In addition, all of Fisher’s amputees showed self-alienation and low self-esteem at several years post-injury. The findings of the present study, also show a high proportion of participants with low self-esteem following injury, although this appeared to improve over several months post-injury. Furthermore, Fisher (1985) linked unsuccessful rehabilitation with holding a lower self-opinion prior to injury. For two participants, low self-esteem post-injury was associated with low self-opinion prior to injury, but the majority of participants held fairly high opinions of the pre-injury self (indicated by pre-injury self / ideal self distances). The present study is unable to ascertain whether self-esteem is associated with rehabilitation success.

In terms of treatment options, the implication of studies comparing the outcomes of amputations and reconstructive surgery, such as that by Georgiadis and colleagues (1993) that reconstructive surgery may not be the treatment of choice, does not appear to be supported by the findings of the present study. In general, participants appeared to be adjusting well at several months post-injury. However, the present study did not assess function or treatment complications, other than through the

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11 Makhlouf-Norris and colleagues (1970), however, found no significant differences in intensity scores between groups with articulated and non-articulated organisations, suggesting that caution should be taken in making direct comparisons of this kind.
subjective perception of the impact of these variables, and the potential for the requirement of further surgical procedures for these participants in the future should be acknowledged.

4.6 Implications for rehabilitation and service provision

Greater awareness of the processes involved in the early stages of adjustment to severe lower limb trauma, including greater understanding of the importance of individual differences, may enable us to anticipate difficulties and to implement interventions to promote positive adjustment. An exploration of the way in which people construe themselves can be seen to promote insight into how a severe injury may impact on their lives. The present study raises awareness of some of the psychological challenges faced by patients undergoing reconstructive surgery following injury, which suggest interventions to aid the short-term management of these patients and their long-term adjustment. For example, while the adaptive nature of intrusive symptoms has been postulated (e.g. Janoff-Bulman, 1992), those symptoms of traumatic stress which patients find disturbing or distressing might be resolved through the implementation of cognitive strategies. Furthermore, the prevalence of worries about practical considerations such as housing, points to a need for better co-ordination of social services and health from this early stage of recovery. Similarly, concerns about returning to work, especially pertinent to those in manual occupations (who may be more at risk of injury in the first place), might be addressed by exploring realistic options in order to reduce uncertainty and associated anxiety.
In general, levels of psychological distress abated over time without psychological intervention in the present study. In itself, lower limb trauma was not shown to engender persistent high levels of psychological morbidity. The impact on the self-concept, however, appeared to be considerable, and it might be expected that persistent low self-esteem or satisfaction with the injured self would lead to poor overall adjustment. It would therefore appear important to recognise what meaning the trauma holds and what issues are salient for an individual who has sustained a severe injury. For example, therapeutic intervention strategies aimed at redefining the self in terms other than physical attributes or previously-held social or occupational roles which can no longer be filled, could aid longer-term adjustment.

The study findings highlight the risk that lower limb trauma presents to self-esteem. It may be that within the services offered to patients with these injuries, a greater awareness of these potential obstacles to adjustment would enable medical staff to identify difficulties and promote a positive self-image from early on. The importance of conceptualising these patients within a bio-psycho-social model, which addresses the whole context of an individual's world, has been indicated in the present study. Thus, the injury itself and physical rehabilitation, the psychological response to injury and the meaning that it holds for individuals, and the social context of housing, social support, and occupation, will all influence the adjustment process and need to be considered in planning treatment and ongoing rehabilitation. It may be that psychologists can play a role, not only in identifying potential difficulties faced by

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12 It could be argued that the process of assessment, and the use of repertory grids in particular, was a form of intervention, increasing participants' insight into their own concerns, values and coping strategies.
patients and offering intervention, but also in informing medical and surgical staff of the wider issues faced by patients to encourage a holistic approach to the treatment of severe injuries.

4.7 Critique of the present study and implications for future research

In considering the application of the study’s findings a number of limitations are acknowledged. While the benefits of a prospective design include greater understanding of early adaptation to injury, and a more reliable indication of changes over time (without recall bias), there were perhaps some disadvantages to attempting to assess patients’ responses so soon after injury. The sequelae of traumatic injury, such as shock, impaired attention and distress may interfere with accurate assessment, and it may have been the case that those patients who did not participate in the study had higher levels of distress or shock than those who agreed to participate, thus resulting in a response bias. In addition, the prospective nature of the design resulted in a rather small sample, which restricts the generalisability of the study findings to a wider population. However, it is important to note the richness of the data obtained from the sample in its more phenomenological approach. Large and Strong (1997), in their repertory grid study examining coping with chronic pain, assert that “it is the variety, range and meaning of constructs that are of interest, not the potential to generalise” (p.250).

The disadvantages of standardised measures were discussed in sections 1.3.1 and 1.8 of the Introduction. The use of standardised measures of subjective distress is also,
therefore, a limitation of this study. However, measures were selected for the study with these considerations in mind, and aimed to maximise the applicability to the study population, for example, the HADS was designed for use with a hospital population with physical symptoms. Even so, the relevance of some items may have been questionable considering the frequency of endorsement of items concerning movement e.g. ‘I feel restless as if I have to be on the move’, ‘I feel as if I am slowed down’\textsuperscript{13}. The IES was originally tested on a population of which around half had suffered a personal injury as a result of road accidents, violence, illness or surgery, and it has frequently been used to assess populations similar to the present sample (e.g. Michaels et al., 1999, 1998; Richmond et al., 1998; Feinstein and Dolan, 1991; Landsman et al., 1990). The use of the SF-MPQ was prompted by the need for a short subjective measure to allow for limited concentration while assessing the quality of pain in addition to intensity. The SF-MPQ has been used in studies of hospital populations undergoing surgical procedures (e.g. Melzack, 1987).

Distribution-free (non-parametric) tests were used to analyse the study results as they do not rely on the assumption that the population from which the sample is drawn has a normal distribution, and are less affected by extreme scores. However, these tests may have lower power than parametric tests, and are less likely, therefore, to lead to a rejection of the null hypothesis than the corresponding parametric test analysing the same data (Howell, 1992). Conversely, the employment of multiple tests in the analysis of the study results has the effect of increasing the Type 1 error rate, thereby increasing the likelihood of obtaining false positive results and the likelihood of

\textsuperscript{13} Caution should therefore be taken in interpreting these responses as symptoms of anxiety or depression.
rejecting the null hypothesis. It may be argued that the higher Type 1 error rate compensates in part for the loss of power in using distribution-free tests.

The potential for pre-morbid personality factors contributing to accidents and physical injuries, must be recognised. Research has suggested that pre-existing personality factors may contribute to the risk of sustaining particular injuries (e.g. Thompson et al., 1983). Such research points to an inherent psychological vulnerability to accidental injury:

"Accidents do not randomly distribute across the population. There is some self-selection. Alcohol and substance abusers are more prone to accidents for obvious reasons. Depressed individuals are also at greater risk as some 'accidents' are veiled suicide attempts. Other psychological conditions such as anxiety and eating disorders can increase the probability of accidents through impaired concentration." (Pertschuk, 1990 p.249)

Those people more likely to sustain injuries of this type are those engaging in risky behaviour. The role of alcohol has been discussed above (section 4.5). The findings of the study may, therefore, be influenced by pre-injury characteristics. The inclusion of the 'pre-injury self' element was an attempt to explore this issue in some way, although it is recognised that this is a retrospective measure.

The Method chapter (section 2.4.4) highlighted the difficulty in assessing the reliability and validity of the repertory grid technique. The form of repertory grid used within the present study can be seen to be valid with regard to the influence of external events (such as physical injury) on the construct system (comparing pre-injury and current selves). The validity of a grid has been proposed to be apparent through its utility (Kelly, 1955; Fransella and Bannister, 1977). Utility is evident in the
study findings, in that our understanding of the early processes of adjustment in this population is increased, in particular enabling exploration of changes in the experience of self over time and discrepancies between the self and ideal self which tend to be associated with physical impairment and imposed restrictions. The use of elicited constructs, rather than constructs supplied by the investigator\(^ {14} \), assured the personal relevance of constructs, which is considered to increase reliability and construct validity (Heinemann, 1995).

There were some aspects of the assessment procedure employed in the present study that could be improved upon. The assessment of several participants at Time One took place on shared wards with curtains drawn around the bed. This was far from ideal in terms of assuring patient confidentiality, and may have resulted in some constraints on participants' ability to answer as openly as they would have done otherwise, although none of the participants commented upon this. Similarly, interruptions from medical staff and visitors may have affected participants' sense of privacy, and interrupted trains of thought. The assessment at Time Two may have been better conducted in a face-to-face interview, although it is not necessary to complete repertory girds via interview, and all participants were familiar with the technique of rating elements from the assessment at Time One. However, one consequence of postal responding was a reduction in the consistency of the timing of assessments, which in the present study resulted in assessments at Time Two being received at a range of three to six months.

\(^ {14} \) Supplied constructs would have allowed some comparison across participants which has advantages in examining similarities and differences, although it imposes assumptions and would have added to the length of the assessment in the present study which was undesirable.
Further revisions to the study which would be suggested include the selection of elements employed to investigate aspects of the self and relations with others. The exchange of the element 'self at discharge' at Time One with 'self on admission' at Time Two was intended to investigate the accuracy of participants' perception and anticipation of themselves at the different times of grid completion. However, the timing of initial assessments and relatively short hospital admissions meant that, for several participants, the self at discharge was largely indistinguishable from the current self at the first assessment. The inter-element distances between current self and self at discharge reflect this. In addition, for those participants assessed at several weeks post-injury, the element 'self on admission' could not be taken as an accurate representation of the self at Time One. In addition, the element 'someone with a similar injury' was found to be difficult for some participants to conceptualise, leading to low numbers employing this element (e.g. only three participants at Time Two). Moreover, the person chosen to represent this element to different participants varied widely in the severity of injury and their stage of recovery. While it was useful to consider the impact of participants' awareness of positive or negative 'role models' of injured people, the differences preclude generalising this element across participants (i.e. we cannot assume that this element holds similar meaning for all participants). In a similar way, the element 'a typical person of my age' was included in order to assess perceived self-alienation or the impact of injury on one's social roles, although it was clear that this element held very different meanings for participants. At Time One, for example, the majority of participants did not consider themselves to be similar to their
‘typical person’ prior to injury, and this element was often construed in terms of negative characteristics.

Information collected on marital status was intended to provide an indication of the degree of support in the home. However it was evident that a more accurate indicator would have been to ask whether people lived alone or with others. Some of the participants who were described themselves as ‘single’ were living with supportive others. In addition, it would have been of interest to assess degree of function or disability at Time Two, and whether participants had been able to return to work, in order to explore the effect of such variables on the sense of self and levels of distress.

The present study draws on the literature which has examined adjustment to amputation to provide some indication of similarities and differences between patients in adjusting to different treatment options. However, the inclusion of a comparison group within the study would have allowed more accurate investigation of the relative benefits and disadvantages of these procedures. The original concept had been to broaden the study in this way and investigate differences in the adjustment process between individuals undergoing reconstructive surgery and those undergoing amputation, but the low numbers of early amputations performed within the hospital during the study period prevented the application of this design. However, given the prospective phenomenological nature of the study, the absence of a comparative group does not detract from the significance of these findings. The present study contributes to the literature in its exploration of psychological adjustment to reconstructive surgery which is a relatively overlooked area of research.
The findings of the study indicate some areas for future research. The influence of previous coping strategies and attributional style could be seen to play a large role in participants’ interpretation of injury, and go some way to explain individual differences in the terms in which the self is defined following injury, for example whether the self is perceived as ill and restricted, or grateful and determined. Further research might explore coping styles, such as one’s appraisal of personal resources, and the way in which these influence the self-concept following severe injury. Similarly, attributions for the injury or accident, were not investigated formally within the present study\textsuperscript{15}, but comments made by participants spontaneously, for example “it was a hundred per cent my fault”, suggested the salience of issues of blame or responsibility, which might be investigated further. In addition, the inclusion of measures of functional recovery would broaden our understanding of the impact of ability or physical limitations on the self-concept, and in this way promote insight into the adjustment process.

Future research might include further follow-up assessments, to extend the investigation of adjustment to severe lower limb trauma in the longer-term. The prospective nature of the study would enable examination of whether trends are maintained over time and which styles of construing promote or impede adjustment in the long-term. Furthermore the long-term implications of coping strategies such as denial or optimism could be assessed within a longitudinal study.

\textsuperscript{15} The length of the assessment was limited within the study by virtue of the physical and cognitive fatigue experienced by participants following recent trauma and surgery.
4.8 Conclusions

The study described within this thesis has explored how the self-concept is affected following severe lower limb trauma, and the way in which changes in self-concept promote or impede adjustment. The repertory grid has been shown to be a useful technique in exploring adjustment following accidental injury.

In addressing the research questions presented in section 1.9 of the Introduction, the following conclusions can be drawn. Injury has an impact on the self-concept as indicated by perceived differences between the self since injury and prior to injury. Individual differences are apparent in whether this impact of injury on the self-concept is positively or negatively construed, and the perceived impact can be seen to be influenced by the interpretation of the trauma and the way in which the self is defined. Lower limb trauma appears to threaten self-satisfaction initially, increasing the distance between the self and the ideal self, although satisfaction with the injured self improves over several months following physical trauma. The self-concept tends to change over time in such a way as to promote (or maintain) a positive self image (cf. Janoff-Bulman, 1992), which is reflected in reduced distress at Time Two as measured by standardised measures of anxiety, depression, post-traumatic symptoms of intrusion and avoidance, and pain.

Changes are also apparent within the construct system itself, with adjustment within the first few months following severe lower limb injury demonstrating a trend towards tighter construing. The study findings raise the question of whether the experience of
physical trauma can disrupt an individual’s conceptual world (through the invalidation of the construct system) in such a way as to produce a loosening of construing. The psychological literature on responding to trauma is drawn upon in supporting the hypothesis that tightening of the construct system may act as a way of defending against the anxiety of instability or the disintegration of one’s conceptual world that is threatened by severe physical injury.

The study has demonstrated the importance of acknowledging individual differences in response to severe lower limb trauma, and has emphasised the dynamic nature of coping in the adjustment process. Longer-term investigations may reveal which coping styles sustain positive adjustment over several years following injury. Certain psychological difficulties such as poor self-esteem, can be identified in the early stages of adjustment, and therapeutic interventions aimed at promoting a positive and sustainable self-concept may potentiate rehabilitation and long-term adaptation. The study has highlighted the importance of considering multiple factors which mediate adjustment to lower limb injury, and has indicated a need for working within a biopsychosocial context and adopting a holistic approach to care in treating this population.
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REFERENCES


REFERENCES


REFERENCES


REFERENCES


REFERENCES


The Hospital Anxiety and Depression Scale

ID: ___________________ Date: ___/___/___

This questionnaire will help you to let us know how you are. Read each item and underline the response which comes closest to how you have felt in the last few days. Don’t take too long over your replies, your immediate reaction will probably be more accurate than a long thought out response.

I feel tense or ‘wound up’
- Most of the time
- A lot of the time
- From time to time, occasionally
- Not at all

I still enjoy the things I used to enjoy
- Definitely as much
- Not quite so much
- Only a little
- Hardly at all

I get a sort of frightened feeling as if something awful is about to happen
- Very definitely and quite badly
- Yes, but not too badly
- A little, but it doesn’t worry me
- Not at all

I can laugh and see the funny side of things
- As much as I always could
- Not quite so much now
- Definitely not so much now
- Not at all

Worrying thoughts go through my mind
- A great deal of the time
- A lot of the time
- From time to time but not too often
- Only occasionally

I feel cheerful
- Not at all
- Not often
- Sometimes
- Most of the time

I can sit at ease and feel relaxed
- Definitely
- Usually
- Not often
- Not at all

I feel as if I am slowed down
- Nearly all the time
- Very often
- Sometimes
- Not at all

I get a sort of frightened feeling like ‘butterflies’ in the stomach
- Not at all
- Occasionally
- Quite often
- Very often

I have lost interest in my appearance
- Definitely
- I don’t take so much care as I should
- I may not take quite as much care
- I take just as much care as ever

I feel very restless as if I have to be on the move
- Very much indeed
- Quite a lot
- Not very much
- Not at all

I look forward with enjoyment to things
- As much as I ever did
- Rather less than I used to
- Definitely less than I used to
- Hardly at all

I get sudden feelings of panic
- Very often indeed
- Quite often
- Not very often
- Not at all

I can enjoy a good book or radio or TV programme
- Often
- Sometimes
- Not often
- Very seldom
APPENDIX B

Impact of Events Scale

ID: ___________________________  Date: ___/___/____

Below is a list of comments made by people after stressful life events. Please check each item, indicating how frequently these comments were true for you with respect to your accident *during the past 7 days*. If they did not occur during that time, please mark the 'not at all' column.

<table>
<thead>
<tr>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
</tr>
<tr>
<td>1. I thought about it when I didn’t mean to.</td>
</tr>
<tr>
<td>2. I avoided letting myself get upset when I thought about it or was reminded of it.</td>
</tr>
<tr>
<td>3. I tried to remove it from memory.</td>
</tr>
<tr>
<td>4. I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind.</td>
</tr>
<tr>
<td>5. I had waves of strong feelings about it.</td>
</tr>
<tr>
<td>6. I had dreams about it.</td>
</tr>
<tr>
<td>7. I stayed away from reminders of it.</td>
</tr>
<tr>
<td>8. I felt as if it hadn’t happened or it wasn’t real.</td>
</tr>
<tr>
<td>9. I tried not to talk about it.</td>
</tr>
<tr>
<td>10. Pictures about it popped into my mind.</td>
</tr>
<tr>
<td>11. Other things kept making me think about it.</td>
</tr>
<tr>
<td>12. I was aware that I still had a lot of feelings about it, but I didn’t deal with them.</td>
</tr>
<tr>
<td>13. I tried not to think about it.</td>
</tr>
<tr>
<td>14. Any reminder brought back feelings about it.</td>
</tr>
<tr>
<td>15. My feelings about it were kind of numb.</td>
</tr>
</tbody>
</table>
The Short-form McGill Pain Questionnaire


ID: _______________ Date: __/__/___

Below is a list of words which describe pain. For each description please rate the intensity that best describes the pain you experience.

<table>
<thead>
<tr>
<th>Word</th>
<th>NONE</th>
<th>MILD</th>
<th>MODERATE</th>
<th>SEVERE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THROBBING</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SHOOTING</td>
<td></td>
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<tr>
<td>STABBING</td>
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<tr>
<td>SHARP</td>
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<tr>
<td>CRAMPING</td>
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<tr>
<td>GNAWING</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>HOT-BURNING</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ACHING</td>
<td></td>
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<tr>
<td>HEAVY</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TENDER</td>
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<td></td>
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<td></td>
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<tr>
<td>SPLITTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TIRED-EXHAUSTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SICKENING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEARFUL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUNISHING-CRUPEL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Present Pain Intensity**

Please mark one box:

0 NO PAIN
1 MILD
2 DISCOMFORTING
3 DISTRESSING
4 HORRIBLE
5 EXCRUTIATING
Ms Alison Brown
Clinical Psychologist in Training,
Sub-department of Clinical Health Psychology,
University College London,
Gower Street,
London WC1E 6BT

Dear Ms Brown,

RREC 2421 - Psychological adjustment following severe lower limb trauma: A repertory grid study.

Thank you for your recent submission. I am pleased to inform you that this study has been considered and approved by Chairman’s Action.

Please note the following conditions which form part of this approval:

[1] **This approval is for one year only.** For projects with an expected duration of more than one year, a letter from the principal investigator will be required in order to further extend consent. This will enable the Committee to maintain a full record of research.

[2] Any changes to the protocol must be notified to the Committee. Such changes may not be implemented without the Committee’s approval.

[3] The Committee should be notified immediately of any serious adverse events that are believed to be study related or if the entire study is terminated prematurely.

[4] You are responsible for consulting with colleagues and/or other groups who may be involved or affected by the research, e.g., extra work for laboratories. Approval by the Committee for your project does not remove your responsibility to negotiate such factors with your colleagues.

[5] You must ensure that nursing and other staff are made aware that research in progress on patients with whom they are concerned has been approved by the Committee.
Pharmacy must be told about any drugs and all drug trials, and must be given the responsibility of receiving and dispensing any trial drug.

The Committee must be advised when a project is concluded and should be sent one copy of any publication arising from your study, or a summary if there is to be no publication.

All documents relating to the study, including Consent Forms for each patient (if applicable), must be stored securely and in such a way that they are readily identifiable and accessible. The Committee will be conducting random checks on the conduct of studies, and these will include inspection of documents.

May I take this opportunity to wish you well in your research. If any doubts or problems of an unexpected nature arise, please feel free to contact me at any time.

Yours sincerely

C G Mackworth-Young MA MD FRCP
Chairman - RREC

<table>
<thead>
<tr>
<th>Seen and Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission</td>
</tr>
<tr>
<td>Protocol</td>
</tr>
<tr>
<td>Information Sheet</td>
</tr>
<tr>
<td>Consent Form</td>
</tr>
<tr>
<td>Questionnaires</td>
</tr>
<tr>
<td>Letter of Indemnity</td>
</tr>
<tr>
<td>DDX/CTX</td>
</tr>
</tbody>
</table>
Participant information sheet

ADJUSTING TO LEG INJURY STUDY

You are being invited to take part in a research study. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully, and ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
This study aims to look at the impact of serious leg injury on people's lives. We know that those who have been injured in this way face a long period in hospital, surgery, and a long period of rehabilitation.

We would like to understand what the main problems are for those who have been injured. We also need to know in what ways we can improve our clinical service to make sure that the right sort of help is available when it is most needed. There are decisions to be made about the best type of treatment for each individual, and the more we know the better we can make those decisions.

Why have I been chosen?
We are approaching everyone with a severe leg injury admitted to the ward, and we would be grateful if you would agree to take part in this study. However, it is entirely up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep, and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and you do not have to give a reason. Not participating will not affect the standard of care you receive in any way.
What will happen to me if I take part?
Within three weeks of your arrival on the ward you will spend 1-2 hours talking with the researcher in a private space on the ward. You will be asked to complete some questionnaires, and will be asked, within a structured interview, your views at this time. These are not tests and there are no right or wrong answers.

Interviews will be tape-recorded to ensure that your views are accurately reported.

Those taking part will be approached again after three months. You will be asked to complete the same questionnaires and answer the same questions once more. This will enable us to understand how people’s views may change over time.

What is the procedure being tested?
We are looking at ways in which people view themselves and the world we live in, and how these are affected by serious injury and during the process of recovery.

What are the possible disadvantages and risks of taking part?
In most cases the process of talking through the difficulties you’ve experienced and thinking about the stage you are presently at is a helpful process. However, a few people may find talking in this way distressing. If it is distressing for you, or for another reason you would like to talk to someone, you can be referred to see a psychologist or counsellor at Charing Cross.

If you wish to complain about any aspect of the way you have been approached or treated during the course of this study, the normal NHS complaints procedures may be available to you.

What are the possible benefits of taking part?
There is no intended clinical benefit, although we hope that the experience will be of personal interest to you, and will allow you to express any fears or concerns you may have. The information we collect from this study may help us to treat future patients with similar injuries undergoing hospital treatment better.
Will my taking part in the study be kept confidential?
All the information collected about you as part of the study will be kept strictly confidential and will be kept apart from your medical records. Any information about you which leaves the hospital, including audio-recordings of interviews, will have your name and address removed so that you cannot be recognised from it.

The hospital staff involved in your treatment will be notified of your participation in the study, but they will not have access to the information you give us which remains confidential.

What will happen to the results?
When the study is complete all the information from everyone who has taken part will be put together and written up. This information will be used to improve the service for other patients in the future. No individuals will be identified in any reports or publications.

The study has been reviewed by Riverside Research Ethics Committee.

Further information
If you would like further information please contact:
   Alison Brown
   Clinical Psychologist in training
   Sub-Department of Clinical Health Psychology,
   University College London,
   Gower Street,
   London WC1E 6BT
   Tel: (020) 7679 5950

If you decide to take part you will be given a copy of this information sheet and a signed consent form to keep. If you do not want to take part, it will have no effect on your treatment at Charing Cross. In the same way, you are free to drop out of the study at any time.

Thank you for your time.
May 2000 version 3
RESEARCH CONSENT FORM

Title of Project: ADJUSTING TO LEG INJURY

(The patient/volunteer should complete the whole of this sheet him/herself)

Have you read the Information Sheet? Yes No

Have you had the opportunity to ask questions and discuss the study? Yes No

Have you received satisfactory answers to all of your questions? Yes No

Have you received enough information about the study? Yes No

Who have you spoken to? (write name)

Do you understand that you are free to withdraw from the study, at any time, without having to give a reason, and without affecting the quality of your present or future medical care? Yes No

Do you agree to take part in this study? Yes No

I understand that the Local Ethics Committee may review this form as part of a monitoring process.

NAME IN BLOCK LETTERS:

Signature: Date:

SIGNATURE OF PERSON OBTAINING CONSENT

Signature: Date:
REPERTORY GRID

The first time you completed this task you thought of the names of some
people you knew who fitted certain descriptions. These are set out below:

- Someone I am close to - [NAME]
- Someone I dislike - [NAME]
- A typical man of my age - [NAME]
- Someone with a similar injury - [NAME]
- Someone I admire - [NAME]
- Someone I pity - [NAME]

We will use these same people, but if you feel any of them no longer fits their
description please explain why below:

In addition, there are several ways of describing yourself:

- Me now i.e. how I see myself at the moment.
- Me before my injury i.e. how I think I was before I was injured.
- My ideal me i.e. how I would ideally like to be.
- Me on admission i.e. how I was when first admitted to hospital with
  my injury.
- Me in 5 years time i.e. how I see myself being in 5 years.

On the next page I have set out the characteristics that you told me about in
the interview. For each one, please think where you would put each person or
description of yourself on the scale from 1 to 7, and write the number next to
the name.

For example:

<table>
<thead>
<tr>
<th>Confident</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Insecure</th>
</tr>
</thead>
</table>

If I thought that at the moment I was neither very confident nor very
insecure, but rather more confident than insecure then I would put a
'3' in the 'Me now' box. If I felt that ideally I would like to be very
confident then I would put a '1' in the 'My ideal me' box, as shown
below:

Me now 3
My ideal me 1
Please rate each person using the 7-point scale by putting a number in every box:

<table>
<thead>
<tr>
<th>Friendly</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Unfriendly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>[NAME]</td>
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<tr>
<td>Me in 5 years time</td>
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<td></td>
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<td></td>
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<tr>
<td>My ideal me</td>
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<tr>
<td>Me before my injury</td>
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<td>Me on admission</td>
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</table>

<table>
<thead>
<tr>
<th>Understanding</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Doesn’t understand</th>
</tr>
</thead>
<tbody>
<tr>
<td>[NAME]</td>
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<tr>
<td>Me now</td>
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<tr>
<td>My ideal me</td>
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<td>Me on admission</td>
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<tr>
<td>Me in 5 years time</td>
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<td></td>
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<tr>
<td>Me before my injury</td>
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<tr>
<td>etc.</td>
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</tr>
</tbody>
</table>

If you wish to make any comments on your answers or on the task itself please do so in the space below:

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

Now return the questionnaire in the envelope provided.
Many thanks for your help.
Dear

Thank you for agreeing to take part in the study looking at how people come to terms with a serious leg injury. When I saw you at Charing Cross Hospital to complete the first part of the study, I asked if I may contact you again in 3 months time. It is now around 3 months since I saw you on the ward, and I would be very grateful if you could spend 15 - 20 minutes completing the questionnaires once more. Each questionnaire has short instructions at the beginning. Please take some time to read through these before filling in your responses.

It is important for us to try to understand the different kinds of experiences that people have after an injury like yours. Your participation is valuable to us in making sure we provide the right services at the right time to people with leg injuries. Once again your responses will be kept confidential.

If you have any questions about the questionnaires, or you would prefer to complete the questionnaires with me over the telephone, then please feel free to telephone on 020 8924 6301 and ask for Alison Brown. If I am unavailable please leave your telephone number and I will return your call.

When you have completed the questionnaires please return them in the SAE enclosed, or send to: Alison Brown
Sub-Department of Clinical Health Psychology
University College London
Gower Street
London WC1E 6BT

With many thanks.

Yours sincerely,

Alison Brown
Clinical Psychologist in Training
Instructions for classifiers

Before classifying the constructs please familiarise yourself with the descriptions and examples given below. Consider each construct as a whole (i.e. both poles), and select the category which you consider the best fit for the idea contained within the construct. Where more than one distinct idea is represented within one construct, select categories for each of the descriptive elements.

Categories:

a) **Volition**: Any statement denoting freedom, independence and ability to do as one pleases or the opposite. For example, independent, able, autonomous; or restricted, dependent, handicapped, confined.

b) **Personal emotion**: Any statement denoting contentment, happiness, hope, or the opposite. For example, content, cheerful, happy, optimistic; or unhappy, pessimistic, dissatisfied, anxious.

c) **Morality**: Any statement denoting religious or moral values, or lack thereof. For example, honest, responsible, sincere, trustworthy; or greedy, disloyal.

d) **Tenderness**: Any statement denoting susceptibility to softer feelings toward others, or the opposite. For example, loving, compassionate, gentle, helpful, considerate; or callous, cold, rude, insensitive.

e) **Forcefulness**: Any statement denoting energy, overt expressiveness, persistence, intensity, or the opposite. For example, aggressive, ambitious, creative, extrovert, sense of humour, impulsive, notice everything, obstinate; or easygoing, lazy, relaxed, passive.

f) **Social interaction**: Any statement in which face-to-face, ongoing, continuing interaction (or lack of) with others is indicated. For example, talkative, friendly, popular, sociable, fun to be with; or withdrawn, aloof, homebody.

g) **Wealth**: Any statement wherein references are made to wealth or lack thereof. For example, rich, well off; or poor, destitute, frugal.

h) **Physical attributes**: Any statement denoting physical well-being, health, appearance or physical ability (which may be either more objective or more subjective). For example, fit, attractive, healthy; or ill, unable to walk, disfigured, ugly.

i) **Life stage**: Any statement denoting position in life, achievement, proximity to goals. For example, achieved goals, successful; or just starting out, a failure.

j) **Self-opinion**: Any statement denoting self-importance, either constructive or destructive. For example, self-respecting, proud, self-confident; or arrogant, conceited, pompous.

k) **Intellective**: Any statement denoting intelligence or intellectual pursuits, or the opposite. For example, intelligent, wise, knowledgeable; or stupid, naïve, uneducated.
### Constructs

<table>
<thead>
<tr>
<th>Pole 1</th>
<th>Pole 2</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>friendly</td>
<td>unfriendly</td>
<td></td>
</tr>
<tr>
<td>understanding</td>
<td>doesn’t understand</td>
<td></td>
</tr>
<tr>
<td>cheerful</td>
<td>miserable</td>
<td></td>
</tr>
<tr>
<td>happy, not worried</td>
<td>unhappy</td>
<td></td>
</tr>
<tr>
<td>plain-speaking</td>
<td>two-faced</td>
<td></td>
</tr>
<tr>
<td>stick to your guns, driven</td>
<td>content to float along</td>
<td></td>
</tr>
<tr>
<td>knowledge of being immobile</td>
<td>no knowledge of being immobile</td>
<td></td>
</tr>
<tr>
<td>an ageing lad</td>
<td>immersed in domesticity</td>
<td></td>
</tr>
<tr>
<td>best days behind them</td>
<td>still feel optimistic about the future</td>
<td></td>
</tr>
<tr>
<td>feeling positive</td>
<td>putting things off</td>
<td></td>
</tr>
<tr>
<td>lost their careers suddenly</td>
<td>everything going right quickly</td>
<td></td>
</tr>
<tr>
<td>aware, careful</td>
<td>spontaneous</td>
<td></td>
</tr>
<tr>
<td>can be entertaining</td>
<td>observant</td>
<td></td>
</tr>
<tr>
<td>devious, abuse of power</td>
<td>responsible</td>
<td></td>
</tr>
<tr>
<td>frustrated</td>
<td>free to do what wants</td>
<td></td>
</tr>
<tr>
<td>can’t do anything</td>
<td>close to goals</td>
<td></td>
</tr>
<tr>
<td>relaxed</td>
<td>stressed</td>
<td></td>
</tr>
<tr>
<td>good-natured</td>
<td>cocky</td>
<td></td>
</tr>
<tr>
<td>go to church</td>
<td>don’t go to church</td>
<td></td>
</tr>
<tr>
<td>like to joke</td>
<td>very serious</td>
<td></td>
</tr>
<tr>
<td>having fun in the pub</td>
<td>not so good company</td>
<td></td>
</tr>
<tr>
<td>doing good turns</td>
<td>look down on people</td>
<td></td>
</tr>
<tr>
<td>able to walk</td>
<td>not able to walk</td>
<td></td>
</tr>
<tr>
<td>good company</td>
<td>boring</td>
<td></td>
</tr>
<tr>
<td>educated</td>
<td>can’t have a decent conversation</td>
<td></td>
</tr>
<tr>
<td>have a laugh at things</td>
<td>dull</td>
<td></td>
</tr>
<tr>
<td>active</td>
<td>boring</td>
<td></td>
</tr>
<tr>
<td>determined</td>
<td>no willpower</td>
<td></td>
</tr>
<tr>
<td>goes out clubbing</td>
<td>goes to the library</td>
<td></td>
</tr>
<tr>
<td>into drugs</td>
<td>respect for self</td>
<td></td>
</tr>
<tr>
<td>rich, fair bit of money</td>
<td>skint</td>
<td></td>
</tr>
<tr>
<td>happy-go-lucky</td>
<td>dull</td>
<td></td>
</tr>
<tr>
<td>grateful for what you’ve got</td>
<td>taking things for granted</td>
<td></td>
</tr>
<tr>
<td>lack of consideration for others</td>
<td>caring for others</td>
<td></td>
</tr>
<tr>
<td>ill</td>
<td>healthy, lives life normally</td>
<td></td>
</tr>
<tr>
<td>content, happy</td>
<td>unhappy with your lot</td>
<td></td>
</tr>
<tr>
<td>achieved a lot</td>
<td>not achieved what you want</td>
<td></td>
</tr>
<tr>
<td>fit, healthy, independent</td>
<td>have to rely on others</td>
<td></td>
</tr>
<tr>
<td>being where I want to be</td>
<td>not where I want to be</td>
<td></td>
</tr>
<tr>
<td>compassion</td>
<td>indifference</td>
<td></td>
</tr>
<tr>
<td>personality, sense of humour</td>
<td>self-centred arrogance</td>
<td></td>
</tr>
<tr>
<td>good manners, politeness, helpful to others</td>
<td>uncooperative, unhelpful, selfish attitude</td>
<td></td>
</tr>
<tr>
<td>fairly healthy, at peace</td>
<td>failing health, insecurity, loneliness, rejection</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>people who care about people</td>
<td>isolation, rejection, self-pity</td>
<td></td>
</tr>
<tr>
<td>a little depressed</td>
<td>laughter and merriness</td>
<td></td>
</tr>
<tr>
<td>reducing living period</td>
<td>reports from experts on health, giving hope for the future (hopeful health reports)</td>
<td></td>
</tr>
<tr>
<td>believers appear to recover and sustain hardships quicker &amp; better</td>
<td>non-believers (religious)</td>
<td></td>
</tr>
<tr>
<td>plenty of money</td>
<td>poor</td>
<td></td>
</tr>
<tr>
<td>likes material things</td>
<td>enjoys simple pleasures</td>
<td></td>
</tr>
<tr>
<td>likes to have a good laugh</td>
<td>serious</td>
<td></td>
</tr>
<tr>
<td>enjoys their family</td>
<td>materialistic view of life</td>
<td></td>
</tr>
<tr>
<td>sickly, tired</td>
<td>well, able to do things</td>
<td></td>
</tr>
<tr>
<td>not looking on the bright side</td>
<td>looks on the bright side, thinks positive</td>
<td></td>
</tr>
<tr>
<td>strength of character</td>
<td>weak, self-important</td>
<td></td>
</tr>
<tr>
<td>two-faced</td>
<td>genuine</td>
<td></td>
</tr>
<tr>
<td>dependent on others</td>
<td>lives an ordinary life, does whatever they want</td>
<td></td>
</tr>
<tr>
<td>think they’re ‘it’</td>
<td>chilled</td>
<td></td>
</tr>
<tr>
<td>normal, scar free, look good</td>
<td>lack confidence due to scarring / disfigurement</td>
<td></td>
</tr>
<tr>
<td>go out, have a laugh, enjoy self</td>
<td>moody, have a moan</td>
<td></td>
</tr>
<tr>
<td>wealthy, live a life of luxury</td>
<td>struggling to have enough money</td>
<td></td>
</tr>
<tr>
<td>free, live a normal life</td>
<td>painstakingly long recovery</td>
<td></td>
</tr>
<tr>
<td>good close friend</td>
<td>backstabber</td>
<td></td>
</tr>
<tr>
<td>feel vulnerable to comments</td>
<td>confident</td>
<td></td>
</tr>
<tr>
<td>supportive</td>
<td>spiteful</td>
<td></td>
</tr>
<tr>
<td>boring</td>
<td>good laugh, fun to be with</td>
<td></td>
</tr>
<tr>
<td>an idiot, acts likes a fool</td>
<td>not an idiot, can chat about sensible things</td>
<td></td>
</tr>
<tr>
<td>can’t get out, can’t move around, restricted</td>
<td>free to go out and about and meet friends</td>
<td></td>
</tr>
<tr>
<td>a good friend</td>
<td>not a good friend</td>
<td></td>
</tr>
<tr>
<td>able to meet people</td>
<td>timid, solitary</td>
<td></td>
</tr>
<tr>
<td>obnoxious, think they’re ‘it’</td>
<td>confident in what they do</td>
<td></td>
</tr>
<tr>
<td>obsessed with money</td>
<td>happy-go-lucky</td>
<td></td>
</tr>
<tr>
<td>giving</td>
<td>cunning</td>
<td></td>
</tr>
<tr>
<td>likes a drink, likes a laugh</td>
<td>doesn’t drink, a family person</td>
<td></td>
</tr>
<tr>
<td>life is threatened</td>
<td>happy and thankful</td>
<td></td>
</tr>
<tr>
<td>steady</td>
<td>easy-going, carefree</td>
<td></td>
</tr>
<tr>
<td>not able to do things</td>
<td>able to do things</td>
<td></td>
</tr>
<tr>
<td>helpful</td>
<td>all for self</td>
<td></td>
</tr>
</tbody>
</table>
Illustrative Case Studies

Three of the participants assessed at Time One and Time Two are described in order to illustrate some of the findings. The participants have been selected to give some insight into differences in levels of subjective distress, differences in patterns of construing, and differences in the adjustment process as indicated by changes over time. The case studies should not be taken as representative of the group as a whole.

Case study 1

Participant R01 was a man in his 60s employed as a technician, who had suffered a Type IIIB open fracture of the tibia and fibula following an accident where he had been struck by a heavy object. He sustained no other injuries. He was treated with a distally based fasciocutaneous flap and external fixator, and spent a total of 38 days in hospital. The first assessment took place 12 days post-injury. Follow-up data was received at 26 weeks post-injury.

Table L shows R01’s scores on the standardised measures of distress. At Time One, R01 showed fairly average scores (compared to the group means) on both the HADS and the IES, but below average scores on the SF-MPQ. At Time Two, anxiety and depression had reduced. The greatest change in item endorsement was the HADS anxiety item ‘I get sudden feelings of panic’ (scored as 3 - ‘very often indeed’ at Time One, and 0 - ‘not at all’ at Time Two). Intrusive symptoms had also decreased since Time One, while symptoms of avoidance had increased slightly. His total pain score had also decreased over time and remained well below the group mean. Scores did not indicate likely presence of psychological distress at either assessment.
Table L - Illustrative cases: Participants' scores on standardised measures of distress

<table>
<thead>
<tr>
<th></th>
<th>R01 Time One</th>
<th>Time Two</th>
<th>R02 Time One</th>
<th>Time Two</th>
<th>R06 Time One</th>
<th>Time Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>7</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Depression</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>6.5</td>
</tr>
<tr>
<td>Intrusion</td>
<td>16</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Avoidance</td>
<td>11</td>
<td>12</td>
<td>10</td>
<td>6</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Total IES</td>
<td>27</td>
<td>20</td>
<td>12</td>
<td>7</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>Total pain</td>
<td>9</td>
<td>5</td>
<td>17</td>
<td>13</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>PPI</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>
R01's repertory grids demonstrated a monolithic\(^1\) construct system which remained constant over time. He generated only four distinct constructs and was extremely repetitive in the elicitation process, requiring some prompting to find different ways of distinguishing between people. The four constructs generated were highly correlated (all four pairs correlated above 0.87 at Time One and above 0.86 at Time Two). They were nevertheless classified as covering three categories: personal emotion, social interaction, and tenderness. The rotated grid plot for R01 at Time One is shown in Figure 3.1. The close correlation of the constructs is clear in their spread between the principal components. At Time One, the first principal component differentiated cheerful, happy, and not worried from miserable and unhappy; the second principal component differentiated friendly and understanding from unfriendly and not understanding. At Time Two these had swapped around (see Figure 3.12). These two components, however, were not highly differentiated at either assessment, with no construct loading higher than 0.866 at Time One, or 0.864 at Time Two on either component. Taken together these two components accounted for 99.31% of the total variance at Time One, and 98.45% at Time Two (the first component accounting for 95.42% at Time One and 93.37% at Time Two). These results indicate relatively little change over time, and a rigid or 'tight' system of construing, reflected also in intensity scores (0.94 at Time One, and 0.91 at Time Two). This participant's way of characterising himself and others was very narrow and inflexible; in effect, he holds one over-arching construct in construing interpersonal relationships. This pattern implies that a person who is defined as unhappy they must also be unfriendly and not

\(^1\) Monolithic construct systems show only one principal cluster of related constructs, so that any one construct implies the others (Makhlouf-Norris and Norris, 1972). See section 1.3.2.
understanding. In an inflexible system such as shown by R01, any significant change or challenge to the constructs and perceptions of self or others held in one area of the system would have substantial implications for the rest of the system. The tightness of construing may be a defensive strategy to maintain familiarity in the world, and a positive self-concept, despite the physical trauma suffered. This was reflected in his interaction with the investigator, where he portrayed a very positive attitude and claimed "there won't be any change in my life because of what happened". His knowledge of a positive role model of someone with a similar injury, who was described as "walking perfectly now", may have served to reinforce the idea held by R01 that injury would have minimal impact on his life.

The maintenance of positive self-regard was evident in his conversation at Time One, for example, "this [admired] person is happy all the time like me", and in identical ratings among the self elements on the constructs. In addition, extreme ratings were used to distinguish the self from the disliked person, who was construed as different from everybody else and showed the highest inter-element distances from all other elements (range 1.89 to 2.34 at Time One, and 1.89 to 2.31 at Time Two). The grid plots show the self elements clustered together near the centre but in the quadrant representing the positive qualities of happiness, friendliness and understanding. The disliked person is notably distant in the opposite quadrant.

At Time Two, the position of elements relative to each other and to the constructs in the plot remained largely unchanged from Time One. The tightness of the construct system may serve a function as a defensive strategy, creating stability in the self-
concept and the construct system over time. Janoff-Bulman (e.g. 1992) recognises the utility of maintaining a world view and a high self-regard in coping with trauma. For participant R01, this strategy appears to have been successful, and he was able to maintain his positive sense of self throughout the six months following lower limb injury, showing no clinically significant levels of psychological distress.

Case study 2

Participant R02 was a man in his 40s, working as a labourer prior to his injury. He suffered a fall from a height, which resulted in a Type IIIB open fracture of the tibia and fibula, and no other injuries. He was treated with a local flap and an external fixator. He had two hospital admissions between Time One and Time Two, and had spent a total of 18 days in hospital. He was initially assessed at 7 days post-injury, and follow-up data was received at 28 weeks post-injury.

On initial assessment R02 appeared very positive, stating that he felt this was an opportunity to reassess his life:

"I would have just carried on and carried on and not really done anything ... so as far as being positive is concerned I’m much better off now than last week ... It’s forced my hand a bit”.

At the same time, he anticipated being “a bit disabled” for another six months or a year. R02 was able to think of a famous sportsman to fit the element role ‘someone with a similar injury’, but struggled to rate this element on several constructs on both occasions (two constructs at Time One, and four at Time Two). To combat the
difficulties posed by missing data in grids (see section 3.2.3.3), the element ‘someone with a similar injury’ was excluded from the analysis of R02’s repertory grid.

Scores on the subjective measures of distress are given in Table L. On the HADS, participant R02’s scores at Time One were below the cut-off of 8, and below the group mean. However, at Time Two depression had increased quite considerably (by 5 points), and anxiety had increased to some degree (3 points), producing scores that were on or above the cut-off of 8 and indicating the likely presence of distress. The greatest change was an increase of worrying thoughts (experienced ‘only occasionally’ at Time One, and ‘a great deal of the time’ at Time Two), and a decreased interest in his appearance (scored as 0 - ‘I take just as much care as ever’ at Time One, and 2 - ‘I don’t take as much care as I should’ at Time Two). Intrusive symptoms were particularly low compared to the group average on both occasions. Avoidance symptoms were somewhat lower than the group mean, and reduced over time. The item ‘My feelings about it were kind of numb’ on the avoidance sub-scale, which was endorsed as being true ‘often’ in the past seven days at Time One, was true ‘not at all’ at Time Two. The total pain experienced had reduced at Time Two, but was quite high compared to the group mean at both assessments.

R02 generated seven constructs, covering the themes of forcefulness, physical attributes, life stage and personal emotion. In general, he showed high differentiation between the elements on these constructs. One construct ‘knowledge of immobility / no such knowledge’ was highly differentiated on both occasions (accounting for 32.10% of the variance at Time One, and 32.52% at Time Two), with the majority of
elements placed at either extreme. This indicates greater ease in differentiating people on a more concrete construct regarding experience of immobility, than on constructs concerned with personality traits or life stage, which could be more interpretative.

Few of the constructs were highly correlated on either occasion. Intensity scores indicated that R02 held a loose construct system; at Time One the intensity score was 0.37, tightening up a little by the Time Two to 0.47. Without knowing the relative tightness or looseness of the construct system prior to injury, we can only speculate on what the loose pattern of construing following injury infers about the adjustment of this participant. It may be that the perception of the injury as opening up new opportunities, emphasised the lack of stability in R02’s world following physical trauma, which presented itself in somewhat disordered thinking. Alternatively, it might be because of the availability of a more differentiated or complex system of dimensions for perceiving the self and others, that R02 was able to consider the potential benefits of sustaining a severe injury. The process of tightening up the system at six months post-injury, might represent an attempt to restore a sense of stability.

Inter-element distances showed that current and ideal selves were perceived as neither similar nor dissimilar on either assessment occasion (1.01 at Time One, 0.92 at Time Two). However, at Time One, the current self was considered to be distinct from the pre-injury self (a distance of 1.25), indicating that injury had a large subjective impact on the sense of self; whereas this distance had reduced quite considerably by Time Two (a distance of 0.73), indicating that the perceived impact of injury had lessened
over time. Interestingly, at Time One, the pre-injury self was highly differentiated from the ideal self (an inter-element distance of 1.47, the second greatest distance), indicating high self-dissatisfaction prior to injury and a self that was closer to the ideal (at a distance of 1.01) following the injury than before. This finding would appear to support the positive comments made by R02 at the time of the first assessment. At Time Two, the pre-injury self was not perceived as either similar or dissimilar to the ideal self (an inter-element distance of 1.00), although the current self remained closer to the ideal (an inter-element distance of 0.92). These distances suggest that some perception of the positive impact of injury was maintained over time.

PCA revealed three components at Time One and two components at Time Two with eigenvalues greater than one, which also reflects a tightening up of the construct system over time. The rotated grid plots (see Figures 3.2 and 3.13) demonstrate the changes in the structure of the system over time, as shown by fairly poor consistency in the first two components. The first component differentiated being driven, being immersed in domesticity and feeling positive from being content to float along, being an ‘ageing lad’ and putting things off, at both Time One and Time Two. However, at Time Two the construct ‘lost career suddenly / everything going right quickly’ was also highly represented in this component, whereas it loaded very low on both of the first two components at Time One. This construct may have represented the third component with an eigenvalue above 1.00 at Time One. The second principal component was less stable. At Time One, plain-speaking was associated with having a knowledge of immobility, and being two-faced was associated with having no knowledge of immobility. At Time Two, however, being two-faced accompanied
knowledge of immobility, and being plain-speaking accompanied no knowledge of immobility. The current self loaded highly on this second component at Time One, but less so at Time Two, suggesting that R02 no longer characterised himself with high regard to immobility.

At Time One the current self was represented by constructs indicating that he felt positive and optimistic about the future, despite his knowledge of immobility. Although similar to his future self, R02 perceived himself to be more driven and domesticated at present than in 5 years time, and much more so at present than before his injury (his pre-injury self being located at the extreme ‘putting things off, content to float along, ageing lad’ pole of the first component). The grid plot at Time Two showed a shift in both pre-injury and current self elements on the first component, bringing them closer together, with the current self being less driven and positive. Surprisingly at Time One, a disliked person and ideal self were huddled close together (although the inter-element distance across all the constructs was 1.01, suggesting neither similarity nor dissimilarity), and were located in the same quadrant as a pitied person. This rather confusing picture may reflect the looseness of the construct system at Time One, as the positioning of these elements within this quadrant represents both desirable (e.g. ‘driven’, ‘everything going right quickly’, ‘no knowledge of being immobile’) and undesirable constructs (e.g. ‘two-faced’, best days behind them).

These findings indicate that within the first six months of adjusting to severe lower limb injury, participant R02 experienced many changes in his sense of self and in his
way of construing the world. It may be that the high expectations he demonstrated at first, anticipating a largely positive impact of the injury in terms of presenting him with new opportunities, had not been met or maintained by six months. For example, the self, which was initially perceived as distinct from the pre-injury self, was actually quite similar to pre-injury self at Time Two. The impact of injury in terms of becoming more driven, domesticated, positive, and optimistic about the future, were not sustained at Time Two. The higher levels of depression and anxiety shown at six months post-injury may reflect the loss of these characteristics or anticipated opportunities. At Time One optimism was associated with immobility, but by Time Two immobility was associated rather with one’s best days being behind them. This may have been due to persistent high levels of pain, or other physical limitations which prevented R02 from pursuing his interests.

Case study 3

Participant R06 was a student in his twenties, who suffered a sporting injury resulting in a Type IIIB fracture of the tibia and fibula. His injury was treated initially with intramedullary nailing, but the injury was complicated by compartment syndrome necessitating removal of the nail and a free flap and external fixator. He spent a total of 34 days in hospital. He was first assessed at 28 days post-injury, and follow-up data was received at 18 weeks post-injury.

On initial assessment he presented as quite angry about the accident, the element ‘a disliked person’ was “the person who caused my injury”. He displayed frustration at
his current position: “Right now I don’t feel very independent, because I’m constantly relying on other people to do things for me”. However, he showed some positivity about the future and things “getting back to normal”:

“At discharge I won’t be anywhere near the person I was before my injury, or the person I will be in five years time. At the time of discharge I’ll be restricted in what I can do, and also won’t feel as happy about myself I’d say as I will in five years time when my leg’s had a chance to look normal again and I’ve had a chance to assess the impact it will have in my life… Me in five years and me before my injury, my life will be fairly much the same I would think.”

He was able to name famous sportsmen who had sustained similar injuries, but was unable to think about any of these as an element, and this element was therefore excluded from the grid.

Table L shows R06’s scores on the standardised measures of distress. At Time One, all scores (except for the PPI) were above the group mean, and in particular R06 demonstrated likely presence of clinically significant anxiety (HADS) and high levels of intrusive symptoms (IES), indicating severe levels of post-traumatic distress. By Time Two, his anxiety score had reduced considerably (closer to the group mean and no longer clinically significant), with the greatest change in the item ‘I feel very restless as if I have to be on the move’ which changed from ‘quite a lot’ at Time One to ‘not at all’ at Time Two. Scores on the IES remained generally constant over time, and remained above the cut-off of 35 at Time Two. The greatest change in IES item endorsement was the avoidance item ‘My feelings about it were kind of numb’ which
was experienced as true 'sometimes' at Time One, but 'not at all' at Time Two. Depression remained unchanged and at a level which did not indicate clinical significance. His total pain score was much reduced and below the group mean at Time Two.

R06 generated six constructs, covering the categories of physical attributes, life stage, volition, personal emotion and tenderness. At Time One the greatest differentiation in element ratings was apparent in the construct ‘ill / healthy, normal life’, accounting for 25.15% of the variance. At Time Two, the greatest differentiation was ‘fit, healthy, independent / has to rely on others’, accounting for 24.92% of the variance. We can infer that R06 finds it easier to differentiate people in terms of health and illness, than in terms of other less concrete characteristics.

Intensity scores indicated a fairly tight system which did not vary over time (0.61 at Time One, and 0.60 at Time Two). Similarly, PCA revealed two components with eigenvalues greater than one at both assessments, which together accounted for 90.96% of the total variance at Time One and 89.91% at Time Two (the first accounting for 62.75% at Time One, and 62.22% at Time Two). The first principal component was fairly stable over time, distinguishing health, independence, contentment and happiness from illness, a need to rely on others, and not being happy with your lot. At Time One the construct ‘where you want to be / not where you want to be’ was incorporated in this first component, but at Time Two it did not load highly on either component suggesting that it held less relevance within the construct system (cf. Ryle, 1976). The self elements loaded highly on this component indicating
high personal relevance which was maintained over time (at Time One: current self 1.639, self at discharge 1.165, ideal self -1.036, and pre-injury self -0.970; at Time Two: current self 1.065, pre-injury self -0.951, self on admission 1.334). A pitied person\(^2\) also loaded highly on this first component at both Time One and Time Two (1.566 and 1.334 respectively). Interestingly, the loadings of both the ideal self and the future self on the first component dropped (from -1.036 at Time One to -0.824 at Time Two for the ideal self; and from -0.678 at Time One to -0.204 at Time Two for the self in 5 years time), suggesting that the ideal and future selves were less characterised by health and illness at Time Two.

The second principal component distinguished having achieved a lot and caring for others from not having achieved what you want and lacking consideration. A typical man, a disliked person and the ideal self were loaded highly on this component on both occasions (at Time One: 2.025, 1.788, -1.067 respectively; at Time Two: 2.245, 0.961, and -0.995 respectively), indicating that these were the prominent characteristics differentiated between these elements.

R06’s current self / ideal self discrepancy was 1.53 at Time One; the largest inter-element distance, indicating low self-esteem or high self-dissatisfaction. The representation of the current self by the construct poles ‘unhappy with your lot’ and ‘not where you want to be’ supports this indication. Current and pre-injury selves were also distant (1.40), as were current and future selves (1.25). These distances

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\(^2\) At Time Two R06 commented that the word ‘pity’ did not seem quite right to describe the person chosen to represent this element, stating that he feels sorry for what the person had endured in terms of extensive medical treatment.
imply a large perceived impact of the injury on the self-concept. At Time Two, the current self / ideal self discrepancy remained high at 1.31, indicating persistent dissatisfaction with the self, with a small shift towards the ideal. At Time Two this was no longer the largest inter-element distance (six other pairs were larger). There were also smaller distances between current and pre-injury selves (1.19) and between current and future selves (1.00) at Time Two.

The rotated grid plots (Figures 3.6 and 3.16) illustrate the characterisation of the current self and self at discharge in terms of illness, reliance on others and dissatisfaction with his situation, in contrast to the other self elements. At Time Two the self was closer to the pre-injury and ideal selves on this first component, but had moved away in terms of the second component, being closer to the construct poles 'not achieved what you want', and 'lacks consideration for others'. Despite this move, R06 continues to perceive the self in 5 years time as close to the ideal self indicating maintained optimism for the future.

High levels of anxiety and depression in the first weeks following the physical trauma may be seen to be due, at least in part, to the substantial impact on the self-concept, and the salience within the construct system of physical attributes and volition which were effected by lower limb injury. The perception of improvement over time in terms of health and independence (which may be associated with the reduction in pain), and the maintenance of hope for the future, imply a positive process of adjustment. It may be that the persistence of symptoms of post-traumatic distress (as shown by scores on the IES) has contributed to the continued low satisfaction with self.