The Relationship between Perceived Personality Change in Severe Head Injury and Dyadic Adjustment

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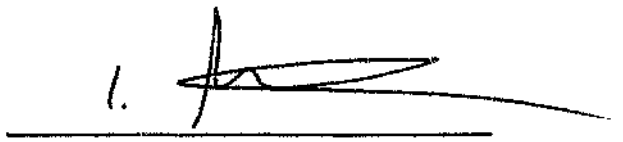
Declaration

I declare that this research report is my own, unaided work. It is being submitted for the degree of Masters of Arts (Clinical Psychology) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.



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This research report is dedicated to all the survivors of severe head injury, including the spouses and the ex-spouses of head-injured persons.

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INTRODUCTION

This study investigates the relation of the personality change of a severely head-injured patient to the close and intimate marital relationship with his spouse, both variables as being perceived by the spouse. Personality change is one of the most prominent symptoms of severe head injury, and one of the most difficult to deal with. When the severely head-injured patient returns home, this personality change has an effect on the intimate relationship with his partner or spouse. The stress or burden experienced by the partner of the head-injured patient seems to be more the result of behavioural and cognitive symptoms, than of the physical symptoms of the patient (Lezak, 1987; Oddy, Humphrey, & Uttley, 1978a; Thomsen, 1984; Walker, 1972).

The impact of head injury on the partner has to some extent been neglected, and thus the partners have been categorised as "overlooked victims" (Zeigler, 1987, p. 50). It has been stated that the most important effect the head injury has is on the marital relationship of the patient, as well as on relationships with other family members (Livingston, Brooks, & Bond, 1985b). The literature on the partners of severely head-injured patients addresses the reactions of the partner to the head injury by means of anecdotal and observational material, as well as unstructured interviews (Brooks, Campsie, Snymington, Beattie, & McKinlay, 1986; Livingston, Brooks, & Bond, 1985a; Walker, 1972; Zeigler, 1987). However, the anecdotal reports and unstructured interviews with relatives have as yet not been supported sufficiently by any empirical analysis. In this study, the aim will be to assess systematically how the spouse's perception of personality change in a severely head-injured patient relates to the close and intimate relationship with his spouse, as perceived by the spouse.

In the first chapter, severe head injury and its effect on marital relationships will be explored. This will lead to an analysis of the burden, the mourning process, and the often mentioned 'denial' the spouse experiences in relation to the head-injured patient. Given the importance of such personality change in severe head injury, these changes will be set out in the second chapter, with particular emphasis on the cognitive, behavioural, and psychiatric sequelae, as these are the sequelae that are experienced by

the spouses as being the most distressing deficits (Lezak, 1986, 1988; McKinlay, Brooks, Bond, Martinage, & Marshall, 1981; Thomsen, 1974). In the third chapter, a theoretical justification will be presented concering the choice and use of the NEO-Five Factor Inventory (NEO-FFI) (Costa & McCrae, 1991), and the Dyadic Adjustment Scale (DAS) (Spanier, 1976) in this study. The fourth chapter will deal with the the selection of subjects, the feasibility of the study, and the procedure. In the fifth chapter, the scoring and the analysis of the results will be discussed. Chapter Six presents the discussion of the results, followed by the conclusion.

CHAPTER ONE

THE SPOUSES OF HEAD-INJURED HUSBANDS

"Research is just beginning to examine the effects of traumatic brain injury on the marital status" (Liss & Willer, 1990, p. 313). The effects of severe head injury on the relationship with the spouse are significant. To establish the nature and quality of the effects of severe head injury, it might be useful first to outline very briefly what is actually meant when marriage as a close and intimate relationship is referred to. Marriage, according to Jackson (1972), has four main characteristics in addition to the sexual aspects. Firstly, despite the fact that some individuals may be driven to marriage, marriage amongst white South Africans is usually a voluntary relationship. Secondly, marriage is intended to be life-long. Thirdly, marriage is mainly an exclusive relationship, in which both partners are dependent on each other and are relatively independent of others and their families of origin. Lastly, marriage is considered to be goal-orientated with shared tasks and assignments. Regardless of the selected roles, marriage is a negotiated relationship between interacting individuals.

With this in mind, it has been stated that the biggest problem for the spouses of head-injured husbands is the personality changes of their husbands, their husband's lack of insight into their disability, and the role performance changes in companionship, child rearing and financial support (Liss & Willer, 1990). One of the first to investigate the spouse's and relative's reaction to head injury were Panting and Merry (1972), who note that almost two-thirds of the relatives of 31 patients at a rehabilitation centre required some treatment with tranquillisers or sleeping tablets. Without a doubt, severe head injury evoked tremendous stress. They claim that the parents of the patients were more resilient to the stress of head injury than the spouses. In the same study, more than half of the relatives felt that the support provided was inadequate. The main complaint was insufficient information made available to relatives and spouses about the prognosis and resulting difficulties likely to be encountered in the course of recovery.

However, no quantitative data is presented to confirm such a claim. In another study by Thomsen (1974), the statements of 50 relatives of severely injured Danes, 12 to 70

months post-injury were analysed on the basis of an unstructured interview. Thomsen concluded that mental deficits were more distressing for the relatives than the physical deficits. The personality changes of the patients were considered to be the most difficult stressor to deal with in everyday life. Also, Thomsen confirmed the results of Panting and Merry (1972) about greater stress being experienced by spouses of head-injured patients than parents of head-injured persons. In a 10 to 15 year follow up study, Thomsen (1984) again confirmed the above results.

Mauss-Clum and Ryan (1981) investigated the responses of the mothers and wives of 30 post-acute head-injured patients. 90% of mothers and wives reported personality change in their children and husbands. Nearly half of the wives agreed with the statement: "I'm married but I don't have a husband", and one third said that they were "married to a stranger". The wives expressed their sense of frustration, and how they felt trapped in their caretaker role. A quarter of the mothers and wives reported having suffered verbal abuse from the head-injured patient, while one fifth stated that they had been threatened with physical violence. Compared to the mothers, the wives are more prone to report depression, anger, guilt, and a decreased time for themselves, as well as a greater social isolation. This difference between mothers and wives might be the result of the patient's age, the injury type, as well as the severity of the injury (Camplair, Kreutzer, & Doherty, 1990).

Also, wives of older men with severe head injury are more likely to stay with their husbands, while younger, more recently married couples tend to separate (Bond, 1984). Some spouses may stay in a relationship solely because they are concerned about the future of their head-injured partners (Jacobs, 1990). In a 15 year follow-up study of the nine couples married at the time of the head injury, only two couples had remained together (Thomsen, 1989). In another follow-up study of ten patients that were married pre-injury, three separated and another three divorced from their partners after seven years (Panting & Merry, 1972). Although both studies have small samples, the evidence does suggest that severe head injury poses a threat to the longevity of a marriage. Jacobs (1990) claims that marital separation and divorce are higher among family members of individuals with severe head injury, when compared to the general population. Changes

in the marital status were particularly evident after the first year post-injury, which is when most of the formal rehabilitation and supportive services come to an end (Liss & Willer, 1990). Numerous other studies have established that marital relationships tend to be less stable and secure after severe head injury, than the parent-child relationship (Livingston et al, 1985a; Oddy et al, 1978a; Panting & Merry, 1972; Rosenbaum & Najenson, 1976; Thomsen, 1974). Three possible explanations for this have been put forward. Firstly, married patients tend to be older than other head-injured persons. Given the inverse relationship between age and the recovery speed of the head injured, such patients are usually more severely handicapped, thereby increasing the stress level in the relationship. Secondly, the burden has to be carried by the spouse or partner alone, while with parents, the burden can be shared. Such a view of course presupposes a non-sexist division of roles in the family. Even if this is not apparent, the emotional support of the one parent to another is significant in that it lowers the stress experienced. Thirdly, parents may more easily accept the higher level of dependency and childishness, for it reflects an earlier phase in the child-parent relationship (Camplair et al, 1990).

The spouse or partner on the other hand has actually lost a partner, and therefore the spouse system within the family is changed into a dependent child-parent relationship (Oddy, Humphrey, & Utterly, 1978b). The specific stressors in the relation to severe head injury are not so much the neurophysical deficits, but rather the mental, emotional and behavioural disturbances, often resulting in a personality change. Pathological laughter has been found to be particularly embarrassing (Thomsen, 1974), as well as the high level of irritability and explosive and violent behaviour (Brooks, 1984b). Also, the psychiatric and psychosocial deficits usually persist longer than most physical deficits, and therefore play a more prominent role in the long-term recovery (Bond & Brooks, 1976).

Zeigler (1987) states that the impact of brain injury on the spouse is devastating. She quotes a statement from a spouse, who describes her situation as follows: "I'm a married widow. It's like caring for a child. I used to have a husband and seven children, now I have eight children" (Zeigler, 1987, p. 51). Problems unique to the spouse begin when the head-injured patient returns home, and there is the recognition that the deficits may be permanent. The personality changes makes spouses feel they are "living with a stranger"

(Zeigler, 1987, p. 51). The healthy spouse not only mourns the specific loss that her partner has experienced in the way of neuropsychological deficits, but also her own loss of a partner. Unlike a widow, who has visibly lost her husband, the spouse of a head-injured person cannot openly mourn the "death" of the person. The parents-in-law, relatives and friends usually misunderstand the spouse's grieving, on social, cultural or religious grounds. Feelings of guilt and of being trapped are common, and not surprisingly social isolation of the spouse can occur. These spouses often live in "social limbo" (Beaver, 1987, p. 1), because they do not have a partner to share many social activities that are couple-orientated, and yet at the same time, they are not free to select a new partner (Lezak, 1988). Hence Zeigler describes the spouses of severely head-injured persons as the "overlooked victims" (Zeigler, 1987, p. 51), for they are equally powerfully affected by the head injury.

According to Zeigler (1987), the end of the mourning process for the spouses usually takes two forms. The spouse separates from her head-injured husband, or chooses to stay in the role of the caretaker. Many young spouses prefer to separate and divorce their head-injured husbands, so that they can continue a meaningful life for themselves and their children. Other spouses remain, grieve the loss of their partner, and assume the role of the caretaker. An emotional re-orientation, which means that the spouse does not feel guilty, can bring some emotional relief. Often a certain degree of emotional detachment occurs, allowing the spouse to work and continue social and leisure activities on her own. This is not without its problems, for the head-injured husband, remembering the equal partnership before the accident, might become resentful of being parented, and this can bring about a reaction of anger.

In a study by Thomsen (1990), it has been found that spouses who have been married for a longer time, having also gone through other crises, tend not to leave their head-injured husbands, while the tendency amongst younger spouses is to divorce their head-injured husbands. Also, mothers of head-injured patients are more able to tolerate personality change than spouses, who find the child-like dependence exceptionally stressful (Rosenbaum & Najenson, 1976). Furthermore, the role changes in the marriage and the guilt associated with the accident puts a strain on the marital relationship

(Thomsen, 1974). In the case of a head-injured husband, a wife loses the comfort, support and resources from a previous partner, since after the head injury, he becomes dependent, childlike, and disruptive. "Although marriage is initially entered into voluntarily, many wives of men with traumatic brain injury feel trapped" (Kreutzer, Zasler, Camplair, & Leininger, 1990, p. 258). Thoughts of divorce occur more frequently as the permanent changes of the head injured husband become more apparent in the latter stages of recovery (Kreutzer et al, 1990). Social pressure and guilt are powerful feelings that often keep a wife from separating from her head-injured husband, despite an unsatisfactory relationship (Lezak, 1978). To retain some satisfaction and stability in the marriage, the wife's acceptance of the permanent changes following head injury is essential. For example, the wife must take over both maternal and paternal roles with respect to her children (Kreutzer et al, 1990).

In an important study concerning marital relationships and brain damage, Rosenbaum and Najenson (1976) examined the reports of spouses concerning their depression and changes in family life after the brain injury. They used a small sample of ten wives of head-injured husbands, and compared them to an equal-sized group of wives of spinal chord paraplegics. The comparison also included a control group. After one year, the wives of head-injured patients were markedly more depressed. The change of family life was investigated, and it was found that the wives of the brain-injured patients reported drastic life changes owing to the severe head injury. These life changes were characterised by significant symptoms of depression. The interpersonal relations in the families with a head-injured person were tense, adding further stress to an already difficult situation.

Although the wives of paraplegics also noted a change in sexual activities, this was due to spinal injuries, whereas the changes in the sexual relationship in the head injury marriages were the result of interpersonal distress. The wives reported that they did not desire to have any sexual contact with their head-injured husbands, for besides the insensitivities of their partner, they felt that their husbands were different, and no longer the person they had married. As the head-injured husband presented with a reduced cognitive and psychosocial capacity, the wife took over more and more family matters

within and without the home. Another finding worth mentioning is that the severity of the depressed mood of the spouses of head-injured patients correlated highly with the degree of reduced marital sharing in the care of the children, as well as the wife's perception of the childlike dependency of their head-injured husband (Rosenbaum & Najenson, 1976).

A mutually satisfying sexual relationship is a fundamental part of a marriage (Jackson, 1972). Sexual satisfaction is related to self-esteem, emotions and social skills, and therefore contributes to the marriage. Not surprisingly, sexual relationships have physical, emotional and psychological components. The physical effects of his injury, such as back-pain or headaches may make it difficult for the head-injured partner to enjoy sexual activities. In terms of physiological effects, spasticity and incontinence can be major problems (Kreutzer et al, 1990). The reports of male head-injured patients include problems of attaining or maintaining an erection, as well as premature ejaculation. Sexual dysfunctions are partly the result of physiological changes because of the traumatic brain injury (Lezak, 1978). The physical deficits after head injury can lead to difficulties in sexual functioning, and can lead to depression, loss of self-esteem and frustration. (Parker, 1990). However, true libidinal changes need to be separated from inappropriate sexually disinhibited behaviour, because such behaviour does not exclude the above mentioned sexual dysfunctions. Apart from the physiological deficits affecting sexuality, a psychological component of sexual dysfunction needs to be recognised (Kreutzer & Zasler, 1989; Parker, 1990). Severely head-injured partners have at times been perceived as making inappropriate sexual advances, or lacking in control of sexual impulses (Liss & Willer, 1990). At one year post-injury, wives have reported feelings of resistance to having a sexual relationship with their head-injured husbands, because they felt that their husbands were now different people (McKinlay et al, 1981). Intimacy is an integral part of an interpersonal sensitivity, and is central to a sexually satisfying relationship. The head-injured husband with his childishness, irritability and self-centred behaviour is prone to disrupt the development and the maintenance of a close and intimate relationship (Kreutzer at al, 1990). The negative attitudes of society and of the spouse towards sexuality and disability, and the concomitant lack of information, increases the problems of sexuality after head injury (Beaver, 1987).

The Stress and Burden of the Caregivers

It is necessary to highlight the stress, the burdens and the needs of the spouse, partner or relative of the severely head-injured person, for these have a direct bearing on the quan and survival of the relationship. Studies examining the reactions to and the effects of head injury on others began in the 1970's, but only in the 1980's was more sustained interest shown in this area. This seems to some extent be the result of an increased attention on the rehabilitation of the head-injured, and the realisation that the psychiatric and psychosocial sequelae in head injury are more significant than the neurophysical sequelae. The main focus of research has been the relative's subjective sense of stress and burden. Another important focus of research has been the attempt to identify the major correlates of burden, stress and impaired psychosocial functioning. The framework of social support and stress has been extensively researched (Barrera & Ainlay, 1983; Cohen & Wills, 1985; Coyne & De Longis, 1986; Pearlin, Lieberman, Menaghan, & Mullan, 1981; Williams, Ware, & Donald, 1981), but to explore these relations in any depth is beyond the scope of this study. Nevertheless, some findings in this area of research are relevant for this study.

There is considerable evidence that stress is positively related to psychological and physical dysfunction (Brown & Harris, 1978; Cobb, 1976; Henderson, 1977; Miller, 1988; Paykel, Emms, Fletcher, & Rassaby, 1980). It has been established that this association may be causal in nature (Murphy & Brown, 1980; Williams et al, 1981). The spouse's stress as the result of living with her head-injured husband is a type of stress that is associated with psychiatric and social dysfunction (Brooks et al, 1986; Livingston et al, 1985a). Early studies of human bonding could provide an explanation for such findings. According to attachment theory, survival is not merely defined by bodily sustenance, but also in terms of psychological health (Bowlby, 1969). Bowlby (1973) states that those infants, who lacked this essential bonding with a significant other, experienced different forms of morbidity and even mortality. Such observations have been extended to adults, and if extended specifically to the spouses of head-injured husbands, it has been shown that the health of the wives has been negatively affected by the stress of dealing with the head injury (Oddy et al, 1978a).

Therefore, those adults not receiving support from a significant other, who might be either present or absent, such adults are likely to experience distress (Henderson, 1977; Henderson, Bryne, Duncan-Jones, Scott, & Adcock, 1980). In the literature, this support is defined as social support, which is generally refers to the "mechanisms by which interpersonal relationships presumably protect people fron the deleterious effects of stress" (Kessler, Price, & Wortman, 1985, p. 541). There are several psychosocial factors which protect people from the negative effects of stress (Kessler et al, 1985; Pearlin et al, 1981; Wheaton, 1985), but social support has been the most studied (Ganster & Victor, 1988; Rook, 1984). Given the radical personality changes of the their head-injured husbands, the wives feel bereft of a significant other, for after the head injury, their husbands seem like strangers (Zeigler, 1987).

In one of the more comprehensive definitions of social support, three main components are identified, from which it is presumed all other typologies are derived (Jacobsen, 1986). The first component is the material support, which denotes any physical or concrete assistance in solving practical problems. The second component is defined as cognitive support, which helps to increase understanding and adaptation to a changing environment, for example, informational aid. The third component is described as emotional support, which includes fostering feelings of security, trust, and care, as well as feelings being loved (Jacobson, 1986). In fact, emotional support, also called expressive support (Lin, 1986) or esteem support (Wills, 1985), is deemed to be the most important form of support in maintaining psychological well-being (Wethington & Kessler, 1986). The spouse has been identified as being the strongest factor in providing such emotional support (Brown & Harris, 1978; Henderson, Bryne, Duncan-Jones, Adcock, Scott, & Steel, 1978). Persons who are married receive more emotional support than their unmarried counterparts (Brown & Harris, 1978), and they are less prone to illness behaviour (Mechanic, 1989) compared to those who are single, separated or widowed (Gove, Hughes, & Style, 1983; Pearlin & Johnson, 1979; Ross & Mirowsky, 1989; Schulz & Rau, 1985). Marriage is so powerful a provider of support, that support received from a spouse cannot be properly replaced by support from other sources (Coyne & DeLongis, 1986). These findings serve to provide a framework in which the stress and burden of the spouses of head-injured husbands can be understood. As Zeigler

(1987) has noted, such wives are often emotionally separated and 'widowed' from their head-injured husbands. The emotional and marital support, which determined the quality of life for the spouse, has been shattered since the severe brain trauma, in that their head-injured husbands are no longer able to provide the social support they used to give before the injury. This lack of social support in itself, as shown above, enhances the stress experienced by the spouse, and further leaves her without her husband's support in coping with the various deficits of the head injury.

The stress and strain on parents seem to be different to those experienced by the spouse of a head-injured person. The parents, according to Lezak (1988), may find that their young brain-injured child's hope for the future is dashed, and that they will have to take care of their head-injured child, whether young or adult, throughout their lives. After the head injury the spouse realises that she has lost all the basic determinants of a successful marriage (Lezak, 1988). The spouse will need to take over all the responsibilities of their shared lives. She is no longer living with a partner, and in some more severe cases, is living with a childish stranger. Lezak states that feelings of responsibility and past gratitude towards the head-injured husband, along with feelings of guilt and the fear of social rejection and isolation, may make it difficult for the spouse to separate from or divorce her head-injured husband.

Generally, Lezak's (1978, 1986, 1988) findings are based on clinical impressions rather than on empirical or quantifiable indices of distress and family functioning. In a more empirical vein, British researchers have explored family reactions to traumatic head injury more systematically. In Oddy et al (1978a), the relatives' stress level in relation to severe head injury was assessed. Relatives reported considerable distress, to the extent of depression, within the first month of the accident. It was noted that no significant correlation could be found between the depression of the relatives and the severity of the injury, as measured in terms of post-traumatic amnesia (PTA) and length of coma, at a 6 or 12 month follow-up. This leads to the conclusion that the sequelae of head injury are more relevant to the relatives' depression than the length of PTA or coma (Brooks, 1984b).

The change of personality is also directly related to the distress experienced by the relative or spouse. When the relatives were asked to describe their main source of stress, they referred to the patient's current condition, for example "poorly controlled behaviour, fear of epilepsy, and the sheer physical stress of having to cope with a disabled member of the family" (Oddy et al, 1978a, p. 510). The second main form of stress was the concern about the patient's future. This indicates the importance of the course of recovery, as well as its vicissitudes, in relation to stress. The common complaint of not receiving sufficient information about the nature and progress of the psychosocial recovery of head injury supports the above claim.

The stress of the spouse or relatives in itself has effects on their health. Oddy et al (1978a) state that 25% experienced an illness in the first six months after the accident, and this illness seemed to be the result of emotional or psychosomatic causes. High blood pressure and heart conditions were reported to have been related to the stress. Generally, the stress experienced by spouses and relatives does not diminish with time. Therefore, it is important to readjust the head injured patient to the family and social life as well as to work. "The fact that, even 12 months after the accident, many relatives still gave evidence of significant stress suggests that marital and parental counselling should form part of the routine after-care of brain-damaged patients" (Oddy et al, 1978a, p. 512).

Brooks et al (1986) support the fact that after one year, spouses and relatives report high levels of distress or subjective burden, and that the greater the personality change, the more burdened the relative and spouse feel. Even after 5 years, the subjective burden scores in a follow-up have remained the same or have increased. This was confirmed in other studies, and the increase of burden is related to the fact that head-injured patients often become more childish, dependent and even violent (Lewin, Marshall, & Roberts, 1979; Lezak, 1978; Thomsen, 1984; Weddell, Oddy, & Jenkins, 1980).

The concept of "burden", is often used in an ambiguous manner. In order to analyse the burden of relatives, Brooks (1984b) divides the notion of burden into objective burden and subjective burden. The objective burden includes two types. The first type of

objectiv burden is concerned with changes in the family routine and health, as well as the adjustment of housing conditions, financial status, and social activities. The second type of objective burden is more directly related to head injury, and involves post-traumatic symptoms and personality changes. The subjective burden is the stress felt by the person caring for the patient within the framework set out by the objective burdens. Subjective burden is that distress that is felt by the spouse, while the objective burden could be assessed by an independent observer. Subjective stress by its very nature is more difficult to assess. This distinction allows for a more differentiated analysis of burden.

Numerous studies have focused on the main features of the burden as perceived by a spouse or relative. Factors which influence stress and the burden of spouses and relatives other than severity, are the premorbid personality of the patient, the stability of home background, and the personality of the relative or spouse (Brooks & McKinlay, 1983). High pre-accident levels of neuroticism in spouses and relatives not surprisingly, result in an increase in stress and burden after the head injury (Brooks & Aughton, 1979; Brooks & McKinlay, 1983; Livingston, 1987; Livingston et al, 1985a,b; McKinlay et al, 1981; Weddell et al, 1980).

Although the burden on the family of a severely head-injured patient can be great, it is not invariably the case. Some families cope well with situations which outsiders would find difficult, while other family systems break down after apparently minor changes in the patient. A possible predictor for the ability to cope with the head injury and the amount of stress likely to be experienced is the severity of the head injury. The more severe the psychiatric and psychosocial deficits, the more difficulties are to be expected within the spouse and family system (Oddy & Humphrey, 1980b; Oddy et al, 1978b). However, the fact that in some cases head-injured patients get along as well as they do in their marital relations, might be, at least in part, due to the unusual devotion of the wife to her impaired spouse (Walker, 1972). Thus to some extent important premorbid factors determine the level of stress and burden in the family.

Adverse personality changes and the subjective burdens were not only significantly correlated, but there was also an increase over time. This implies that spouses or relatives are less able to tolerate personality changes over longer periods of time (Brooks et al, 1986; Brooks & McKinlay, 1983; McKinlay et al, 1981). Thus the relationship between the severity and magnitude of change in the severely head-injured person and the level of subjective burden of the spouse or relative is not simply a linear one (Brooks et al, 1986). The presence of high levels of behaviour deficit is typically a good predictor of high levels of distress in the spouses. However, the presence of low levels of deficits do not necessarily mean low levels of subjective burden. The transactional theory of stress and coping provides a framework within which the event of head injury could be analysed. Lazarus and Folkman (1984) describe stress as a transactional process between the person and the environment. The person's cognitive appraisal of both the demands of the situation and his or her resources to cope with the demands is central in understanding stress and coping responses. It is the way in which the event is understood that significantly determines the stress. A distinction is made between problem-focused coping, *i.e.*, actions aimed at solving a problem, and emotion-focused coping, which consists of attempts by the person to make him/herself feel better about the situation. The spouse's and relative's own coping skills and personality play an important role in subjective burden. Those spouses and relatives who previously dealt competently and resolutely with difficulties continue to do so after the head injury. Typically however, at the first interview, spouses and relatives "put on a brave face" rather than revealing the distress, which occurs in the best of coping families and spouses (Brooks, 1990).

There has been an increased interest in exploring the needs of the relatives and spouses of the head-injured, in order to assess and specify different coping resources. Mostly the research has focused on the initial hospitalisation of the head-injured patient, and only to some extent on long-term rehabilitation (Camplair et al, 1990). Mauss-Clum and Ryan (1981) established that the most important needs in relation to professional help were, firstly, the need for a clear and kind explanation of the patient's condition and treatment, secondly, a discussion of realistic expectations, and thirdly, emotional support. In the acute-care phase, financial issues were considered to be the least important, and although emotional support from family, friends and professionals was

given, there was a greater need to have more information about the realistic expectations for long-term recovery. In terms of long-term rehabilitation, the most important needs were family support, special social opportunities, and specialised counselling (Camplair et al, 1990).

The Mourning Process of the Spouse

The family and marital subsystem are an interactive system, and any changes in one system consequently affects and produces changes in other members in the family. Injury related stress contributes to the anxiety and conflict within a family. Families and spouses struggle with ignorance about head injury, feelings of grief and exhaustion. All of these factors are complicated by the lack of community services (Kreutzer et al, 1990). Most family and relationship problems related to head injury are centrally the result of feelings of loss and grief.

Spouses and relatives seem to present an emotional pattern which reflects normal responses to an unexpected and sudden event with negative consequences. In general, what spouses and relatives experience is similar to grief work and the mourning process (Freud, 1984), which is also presented by the death and dying literature (Kastenbaum & Aisenberg, 1976; Kubler-Ross, 1970). Literature on acute grief and mourning (Glick, Weiss, & Parks, 1974; Parkes, 1972; Vollman, Ganzet, Richer, & Williams, 1980) has provided models of mourning and working through, which have been appropriated in the head injury literature (Kreutzer et al, 1990; Martin, 1990; Romano, 1974). Mourning or the work of mourning could be described as an intrapsychic process, "occuring after a loss of a loved object, whereby the subject gradually manages to detach himself from his object" (Laplanche & Pontalis, 1983, p. 485). Mourning is then defined by a lack of interest in the outside world, which sets in with the loss of a loved object. All the subject's energy is monopolised by her pain and her memories. This state of mourning remains until, over a period of time, the ego's physical and emotional need to survive, makes it slowly turn towards the world. Many of the features of mourning and melancholia or depression are the same, only "the disturbance of self-regard is absent in mourning" (Freud, 1984, p. 252).

Lezak (1986) examines the reactions of relatives in terms of the various stages of rehabilitation from her more clinical experience. Initially relatives are anxious and bewildered when they become aware of or are affected by the psychiatric and psychosocial sequelae of their head-injured family member. In their interaction with him, the poor judgement, the social inappropriateness and the general personality change becomes clear (Lezak, 1986). The relatives then often have conflicting feelings of responsibility, anger, frustration and hope (Lezak, 1986). Lezak states that overprotectiveness is a typical response towards the the head-injured patient when he returns to his home, for the patient is seen as being fragile and dependent. However, guilt about being directly or indirectly involved in the cau.. of the head injury is related to overprotectiveness, which is often a means partly to alleviate the repressed or conscious guilt. It also gives the caretaker a greater sense of control. "The level of guilt and overprotectiveness undoubtedly are interrelated" (Kreutzer et al, 1990, p. 266). When the various deficits are accepted as being relatively permanent, a more accepting approach is possible. "Detachment from and reorientation to the individual with brain injury are necessary conditions for the resumption of a relatively normal life-style" (Camplair et al, 1990, p. 209).

Rosin (1977) found that relatives of brain-injured patients in a vegetative state, went through a whole range of feelings, in which the dominant feelings were denial, anger guilt, accommodation, disengagement and rejection. The rejection was particularly harmful for the patient who partly came out of coma for certain periods of time. Thomsen (1974) equally noted that the range of feelings of relatives and spouses towards the head-injured patient are significant in establishing the relationship between spouse and patient. She found that feelings of guilt about the accident were important. Denial is another state in which major deficits of the patient are glossed over. It also manifests itself in an overly protective attitude and an inability to gain insight into the realistic outcome of the head injury (Romano, 1974; Weddell et al, 1980). However, it has been claimed that after two years, relatives and spouses generally have a more realistic appraisal of the situation, and behave in a more constructive and sensible fashion (Weddell et al, 1980).

In her study, Romano (1974) investigates the marked denial of relatives when it came to the disability of the head-injured patient and their belief of a positive recovery, when in fact there was no or very little indication of such recovery. This denial can be understood as being part of the readjustment process towards a more realistic attitude and insight. It is maybe understandable that the relatives and spouses foster an overoptimistic viewpoint, given the considerable and remarkable progress made when the patient comes out of coma. That the patient was severely injured and therefore close to death is also a significant factor. Unfortunately, Romano in her small sample did not stipulate the duration of this denial, and it needs to be said that relatives are often in a better position to assess changes than many a professional (Jacobs, 1990; Oddy et al, 1978b).

Romano (1974) notes that this persistent denial had specific features. (1) The first feature is characterised by the "common fantasies", such as the expectation that the patient would awake and thereby immediately return to his premorbid self. Such fantasies find expression in the perception of remarkable improvement or recovery where the staff sees none. (2) The second main feature of denial is found in the "verbal refusals', which means that the relatives or spouse verbally acknowledge neurophysical deficits, but refuse to accept any cognitive deficits or personality change in the head-injured patient. (3) The third feature of this persistent denial lies in the "inappropriate responses" of the relatives. There is a refusal to accept and set certain necessary and appropriate limits on the patient's behaviour. Relatives also hold onto unrealistic expectations in terms of the recovery. These three features of denial adversely affect the process of rehabilitation of the patient (Romano, 1974).

Considering the various stages of reaction, Waaland (1990) notes that the typical reactions of spouses and relatives to severe head injury begin with the first stage of shock and denial at hearing about the accident and the coma. The major concern is survival of the head-injured person. At this time, spouses and relatives will be bombarded with technical language, medical information, and, "at times, contradictory reports. In order to cope with overwhelming circumstances, family members often 'shut out' negative information" (Waaland, 1990, p. 231). In the second stage the head-injured person

regains consciousness, much to the relief of the spouse and relatives. The experience of relief is followed by feelings of elation and often massive denial. Spouses and relatives begin to compare present and past behaviour on the basis of minor improvements, which often supports the unrealistic and positive perception.

The third stage occurs usually during the rehabilitation phase. It is at this stage that spouses and relatives become discouraged by the recovery rate, and feelings of anxiety, anger, guilt and depression are most prominent. Anger is usually directed against the professionals for failing to give them enough information (Romano, 1974). The "why me?" question combines both anger and guilt, often leading to an overprotectiveness of the patient. The depression in the grieving process has been redefined as "sorrowing" by Kastenbaum and Aisenberg (1976), in order to distinguish between appropriate sadness in mourning and pathological symptoms of depression. Thus the acceptance of the permanent changes of head injury is often preceded by sorrow or sadness about the loss (Martin, 1990). The fourth stage is associated with acceptance and a more realistic adjustment to the permanent changes after severe head injury. However, care needs to be taken in conceptualising "acceptance" as a fixed stage at the end of the mourning process (Kastenbaum & Aisenberg, 1976; Martin, 1990; McKitrick, 1981-82).

Ridley (1989) points out that the term "denial" is often applied in a simplistic manner, overlooking social and cultural factors operating behind the denial, especially the perceived stigma of head injury. Also, professionals usually focus on deficits and problems in adjustment, while often ignoring positive coping skills. The failure to realise the complexity of denial is for Ridley (1989) the result of two inadequacies. The first is the health professional's emphasis on deficits and negative aspects of the recovery, thereby applying an illness paradigm. This makes it difficult for the spouses and relatives to redefine the traumatic event and the recovery, and to perceive the future in a relatively positive manner. The second inadequacy is based on the inability to conceptualise the adaptation of a disability within the socio-cultural context. Socially mediated perceptions of reality and cultural conditions of disability with its devalued status, strongly reinforce the process of denial.

The origins of denial are to be found in Anna Freud's work (Freud, 1979). For Ridley (1989), denial is seen as a pathological process in Anna Freud's work, for denial is a repression of feelings, and therefore it is a defence. The second main theory on denial comes from (Kubler-Ross, 1970), in which denial becomes part of the process of adapting to death and dying. No longer pathological, denial is valued as a temporary buffer against the effects of shock. Prolonged denial becomes pathological. Although research on denial in other patient populations has been attempted, no research on denial in the families of head-injured patients is found (Ridley, 1989), other than anecdotal literature, such as Romano's work (1974). When discrepancy between the family and the health professionals occur, the family is usually considered to be mistaken. This is clearly often the case, but Rosin (1977) notes that spouses and relatives often first notice slow but significant changes. Another important issue, which often is overlooked, is the fact that head-injured patients are renowned for behaving differently in different environments. Thus the behaviour at home may be different from that at the hospital or with an assessor. Thus different reports on the patient's behaviour can and do emerge, which do not immediately indicate denial of deficits (Ridley, 1989).

The denial of the deficits of head injury does not necessarily mean that the problem-orientated behaviour of the spouse is impeded. The denial may be part of an emotion-focused coping process, in which negative feelings are reduced. This is evident in suggestions that the spouse or relative should interact with the head-injured patient by emphasising the positive achievements rather than the negative ones (Slater, 1987). "In practice, there is a thin line between denial and seeing the situation as a challenge instead of a threat, or between acceptance and giving up hope" (Ridley, 1989, p. 558). Although many longitudinal studies (Brooks et al, 1986; Brooks & McKinlay, 1983; Livingston, 1985a,b; Oddy, Coughlan, Tyerman, & Jenkins, 1985) have investigated the impact of head injury on the family, the studies provide little data on the effects of different coping styles over time. Although there is a focus on stress and its negative consequences, the positive coping techniques are not explored. "The stage model of adaptation has persisted in spite of what has been described as a remarkable lack of empirical evidence to support the existence of a step-like process" (Ridley, 1989, p. 557).

Applying the transactional theory of stress and coping (Lazarus & Folkman, 1984) allows for a more differentiated analysis of denial. Denial can be seen as being maladaptive if it interferes with problem-focused coping skills, while it may be a positive coping method if it is emotion-focused in the attempt to establish new meaning in a permanently changed environment. In such a case, the ability to establish new meaning for the future might be more adaptive in the long run (Taylor, 1983).

On the other hand, the persistent denial evident amongst spouses and relatives of head-injured persons is partly supported by social and cultural conditions. The high cultural values of independence, success, youth and beauty in the Western world has led to powerful apparatuses of social denial concerning death, sickness, disability and old age (Kastenbaum & Aisenberg, 1976; Kubler-Ross, 1970; Ridley, 1989). A devalued status and disgrace are the effects of such social denial, and it affects the head-injured person and those close to him. Modern ideology in the Western world, with its valorisation of rational, controlled and predictable behaviour (Woolfolk & Richardson, 1984) is important in order to understand the perceived stigma of head injury. A person with deficits following severe head injury threatens those values, and thus head injury is devalued as a style of existence. In other societies and cultures, the more psychical and mystical experiences found in some cases of brain injury (Fenwick, Galliano, Coale, Rippere, & Brown, 1985), would be appreciated and valued differently, often allowing the person to fulfil a certain role in society. It is therefore not surprising that the social stigma of head injury is a central component of the denial expressed by spouses and relatives. By placing head injury in a social and ideological context, it becomes clear why not only head-injured persons experience social isolation, but their spouses and relatives also experience psychosocial impairments. Stigmas have this unfortunate characteristic of rubbing off on those close to the source of taboo, by social contagiousness as it were. In a way, the persistent denial is an attempt to normalise the deficits of head injury. The normalisation of the patient is a defence against the devaluation of society. It is important that the perceived stigma of head injury be addressed in the rehabilitation and integration into the community. The rehabilitation staff needs to redirect denial into hope, and channel it into realistic and constructive directions by means of value restructuring (Ridley, 1989).

CHAPTER TWO
THE SEQUELAE OF SEVERE HEAD INJURY

As an introduction to this chapter, it is important to state that the spouse's experience concerning her relationship with her head-injured husband, as outlined in the literature, is not merely the result of psychological factors within their relationship. The spouse's perception of the changes are based on important neurological and neuropsychological events, namely sequelae of severe head injury. Thus the complaints of the spouses are not groundless, nor can they be exclusively explained by psychological reactions to trauma, although such reactions are involved in the spouse's perception of personality changes. To gain more insight into the conditions that relate specifically to the spouse's perception and experiences of such changes, neuropsychological issues regarding severe head injury need to be addressed. Firstly, head injury and the notion of severity need to be discussed, before the various sequelae of severe head injury can be examined.

Definitions of Head Injury and Severity

There are the two main types of head injury. Open head injury occurs when the skull is pierced by an object, diffuse tissue damage occurring due to shock and pressure waves (Hook, 1988; Levin, Benton, & Grossman, 1982). Closed head injury occurs when the skull remains intact while the cranial content sustains focal and diffuse brain tissue damage. The traumatic brain injuries are classified as primary and secondary cerebral damage. Primary brain damage occurs at the moment of impact, while secondary damage is defined as delayed cerebral injury not directly attributable to the impact itself (Snoek, 1990). It consists of subarachnoid haemorrhage, brain swelling, hematomas, infections and hydrocephalus, as well as resulting in respiratory failure, hypoxia, and hypotension (Adams & Victor, 1987; Ashworth & Saunders, 1985; Teasdale & Mendelow, 1984).

Primary brain damage is the immediate result of the impact. It is irreversible and does not respond to treatment as secondary brain damage might do. Concerning the impact in primary traumatic brain damage, the "most common cause of craniocerebral injury is

the rapid acceleration and deceleration of the head which occurs in motor vehicle accidents" (Walsh, 1985, p. 148). The forces of acceleration (linear translation, rotational and angular acceleration) produces deformations and distortions of the whole brain. The "epicentres" of the most damaged areas are the result of the tearing and the rupturing of tissue, and are surrounded by larger areas of less severely but still irreversibly damaged tissue, only detectable with a microscope (Grcevic, 1988). Thus the result is a wide variety of pathological lesions, ranging from specific to general lesions, caused by contusion, laceration and haemorrhage (Walsh, 1985). It is often useful to identify three types of primary brain damage (Kay & Lezak, 1990). The first type is called coup-contrecoup injury, which implies that the brain is damaged at the front and at the opposite side of the skull, therefore affecting the occipital lobes of the brain. The second type of primary brain damage is defined by diffuse axonal injury (Langfitt, Gennerelli, Obrist, Bruce, & Zimmerman, 1982), owing to shearing strains throughout the rich connections leading to all parts of the brain, especially in the deep white matter and in the brain stem (Bigler, 1990). The third type or fronto-temporal contusions are the result of damages from the skull (forehead) and the sphenoidal ridges.

In terms of the severity of head injury, loss of consciousness or coma and post-traumatic amnesia (PTA) need to be considered. The severity of the head injury relates proportionally to the degree and length of the coma. A discussion on the various degrees, levels and lengths of coma, with the use of the Glasgow Coma Scale (GCS) (Rocca, 1989; Cartlidge, Shaw, & Kalbog, 1981; Jennett & Teasdale, 1981; Teasdale & Jennett, 1974) is beyond the scope of this study. Suffice is to say that the length of the coma and of PTA have been used as approximate measures to determine the severity of head injury, although no clear objective standard has been achieved (Jennett, Snoek, Bond, & Brooks, 1981; Long & Webb, 1983). Also, the relationship between PTA and the severity of head injury is a complex one, because many exceptions to the rule occur in both directions, with other variables of age, site of brain damage, and premorbid abilities confounding the issue (Newscombe, 1982).

Upon regaining consciousness, the patient is likely to experience PTA or a period of confusion, which extends from the time of the injury to when the memory functions are

restored. Anterograde amnesia is prominent in that patients are unable to store current events in their memory (Newscombe, 1982). The amnesia during PTA relates to the impaired or disrupted hippocampal and temporal lobe functioning (Jennett, 1983; Long & Webb, 1983). The end of PTA is understood as the restoration of other mental skills, and the return of spatial orientation (Jennett & Teasdale, 1981). In a study by High, Levin, & Gary (1990), for 70% of the head-injured patients the most common sequence of recovery of orientation was persons, place and time. Patients also have retrograde amnesia, which is defined as "the partial or total inability to recall events that occurred during and immediately preceding brain injury" (Cartlidge et al, 1981, p. 52). Although the retrograde amnesia shrinks throughout the recovery period, it is never fully overcome, because during the brain trauma, no memory trace could be stored. The four categories of severity of head injury, determined by the duration of the coma, GCS scores, the period of PTA, and significant sequelae, are "mild", "moderate", "severe", and "catastrophic" head injury. Severe head injury is defined by a coma that lasts for days or weeks, with concomitant physical impairment owing to brain stem damage. The GCS score is less than 8, and the PTA period ranges from one day to a week or more (Bigler, 1990). Organic, cognitive, behavioural and emotional deficits are severe, and hence patients will mostly remain dependent on family or social agencies for their care.

Sufficiently severe trauma to the head will lead to brain injury. The type, the location and severity of the brain damage influence the nature of the transient and permanent sequelae of brain trauma. It has been stated that "the definition of brain injury is not a simple one, but actually incorporates multiple factors" (Bigler, 1990, p. 14). There is a positive relation between the severity of behavioural disorders and the severity of brain damage (Walsh, 1985), especially in relation to the frontal lobes of the brain. Luria noted that the "functional organisation of the human frontal lobes is one of the most complex problems in modern science, and so far only the first step has been taken in the analysis of the various syndromes which can arise in lesions of the corresponding parts of the brain" (Luria, 1973, p. 225). Anatomically, the two symmetrical frontal lobes are located anterior to the central sulcus and above the Sylvian fissure (Mattson & Levin, 1990). The frontal cortex can be divided into three major areas, namely the basal or

basomedial cortex (situated above the floor of the anterior cranial fissure); the medial frontal cortex, and the dorsolateral frontal cortex (Walsh, 1985).

The frontal cortex is responsible for the reception and synthesis of the efferent and afferent connections of most regions of the central nervous system (Mattson & Levin, 1990; Nauta, 1971; Stuss & Benson 1986). To attribute a particular function to a particular portion of the brain, is to ignore the rich connections to other cortical areas. Thus any frontal cortex function can only be understood in terms of its interrelations with large portions of the temporal and parietal lobes, the limbic structures and other subcortical regions, each different cortical area displaying cytoarchitectural differences (Pandya & Barnes, 1990). The frontal lobes fulfil the executive function of the brain, in that it evaluates and controls human behaviour. They are responsible for "programming, regulating and verifying mental activity" (Luria, 1973, p. 43). The higher mental functions can be thought of as functional systems of a complex nature, with the purpose of integrating various parts of the brain (Kagan & Saling, 1988). The relationship between the control processes and lower level system is crucial for understanding how the various deficits following head injury (Burgess & Wood, 1990). Head-injuries and lesions to the frontal cortex affect these integrative relationships significantly.

For behaviour to be effective, it must fulfil social and environmental conditions, based on the "anticipatory relationship to the goal in the form of planning ... and the effectiveness of action must finally be checked against the anticipated outcome and any necessary adjustments made" (Walsh, 1985, p. 150). Such adaptive behaviour is disturbed with frontal lobe lesions, which affect the execution and preparation of action (dorsolateral cortex), appropriate mediation of self-initiated action and levels of behaviour (medial cortex), as well as the control of emotional behaviour and drives (basal or basomedial cortex) (Walsh, 1985). Also, lateralisation is a major factor. In one particular study, the lesions affecting cognitive as well as linguistic faculties of the left dorsofrontal hemisphere and the lesions on the right orbitofrontal regions relate to the most dramatic mood state alterations. A higher incidence of edginess, anxiety and depression linked to right-sided orbitofrontal lesions was evident, while anger and hostility related to left-sided dorsofrontal lesions. There was a higher and consistent

correlation between mood and cognitive variables in patients with left hemisphere lesions (Grafman et al, 1986). The "frontal syndrome" is therefore a term which entails a complex constellation of symptoms, dependent on multi-loci damage (Walsh, 1985), ranging from neurophysical over cognitive to behavioural sequelae.

The Cognitive Sequelae

If intelligence is defined as a variety of abilities necessary for adapting, surviving, and advancing within a cultural environment (Anastasi, 1985), then the cognitive sequelae are central to the psychosocial sequelae in severe head injury. Frontal lobe damage is characterised by the inability to organise material being learned, especially when this requires processing simultaneous information from various sources. Head-injured patients are not able to do more than one thing at a time, whereas premorbidly they could write down a telephone message, take notes during lectures, and talk while keeping an eye on their child (Gronwall, Wrightson, & Waddel, 1990). The difficulty of planning a complex novel task is thus compounded. Furthermore, the lack of insight into errors made, the inability to learn from mistakes and in turn to modify behaviour is a central problem in frontal cortex damage. The difficulty in utilising errors therefore increases the problems of learning new tasks. The severity of this inadequate self-criticism is a fundamental factor in rehabilitation, as well as in the assessment of progress (Walsh, 1985). Thus, the impairment of cognition, memory and learning does contribute to emotional and behavioural disturbances (Lishman, 1973). Also, cognitive sequelae are experienced as distressing by spouses and relatives of head-injured persons (Lezak, 1988; Thomsen, 1974).

Attention, memory, and learning problems need to be assessed in the light of old, intact and deeply ingrained skills, in contrast to the severe impairments of registering, storing and retrieving new information (Kay & Lezak, 1990; Stuss & Benson, 1987). Given that the frontal cortex is responsible for filtering out significant stimuli from insignificant noise in the environment, lesions to these frontal areas will cause difficulties in attention and distractibility (Brody & Pribam, 1978). This expresses itself, for example, in tangential rambling, loosing the thread of an argument, drifting off in thought, short

reading periods, and the inability to think through a plan. Unstructured and extended tasks especially highlight deficits in attention and concentration. The attentional problems in studies on head injury are often not specifically defined (Gronwall & Wrighton, 1981; Mulder, 1983; Schneider & Shiffrin, 1977; Van Zomeren, Brouwer, & Deelman, 1984). In severe head injury, patients are often "impaired on an early perceptual stage (*i.e.*, identification), on a late processing stage (*i.e.*, response selection), and on a motor stage (*i.e.*, response execution)" (Shum, McFarland, Bain, & Humphreys, 1990, p. 261). To establish the stage at which the patient is impaired is essential for rehabilitation (Brooks, 1975; Ewing, McCarthy, Gronwall, & Wrightson, 1980; Gloag, 1985; Levin, High, Goldstein, & Williams, 1988).

Different from deep temporal lobe lesions (true amnesia and the inability to register or retrieve new information), frontal lobe lesions result in frontal amnesia because there is a lack of focused attention. Even mild or minor head injury can produce an amnesia that is grossly disproportionate to the degree of trauma (Haas & Ross, 1986). The lack of organisation of information at the input stage equally contributes to memory lapses, and at times such patients do benefit from environmental cueing in aiding their recall of information (Deelman & Saan, 1990). Thus frontal amnesia is not a matter of recall, but rather making information available so that it can be committed to memory (Walsh, 1985). Damage to the left frontal lobe affects verbal memory, while a damaged right frontal lobe means that the memory concerning non-verbal information is affected. For the spouse, such cognitive deficits involving memory functions, is experienced as a burden (Mauss-Clum & Ryan, 1981). Memory problems usually decrease the ability to learn from experience, which makes the integration of the head-injured husband into the society and the family a difficult, and for the spouse, often a stressful process (Livingston et al, 1985a; Zeigler, 1987).

In the first month after regaining consciousness, verbal skills are strongly impaired, but improvement over the next four months is significant (Levin et al, 1982; Groher, 1977). Thomsen (1975) notes in her study that anomic amnesia, dysarthria, and verbal paraphasia were the most frequent language problems mentioned in severe head injury. Relatives complained mostly about dysarthric speech, which in the long-term becomes

part of a "general mental impairment" (Thomsen, 1984, p. 267). Lesions affecting the inferior zones of the premotor area of the left hemisphere give rise to efferent motor aphasia, also known as expressive or Broca's aphasia (Levin, 1990; Walsh, 1987). There is an inability to produce smooth speech, because of the difficulty of switching from one articulation to the next in polysyllabic words. A more subtle speech disturbance is the result of lesions of the left inferior frontal cortex, or anterior to the Broca's area. This produces a verbal adynamia with its paucity of spontaneous output, while comprehension, articulation, repetition and naming are good. It is also called adynamic aphasia, previously known as transcortical motor aphasia (Kagan & Saling, 1988). Relevant language disturbances are related to a cognitive language problem, revealing the inseparable relationship between cognition and language, which can be impaired in severe head injury (Marquadt, Stell, & Sussman, 1990). Language disturbances on their own have not been mentioned as being directly related to the spouse's experiences of burden and stress. In as much as such disturbances are closely related to other deficits, it becomes relevant. When a patient is fatigued or upset, or cognitive deficits are prominent, then such language disturbances have been noted in the literature (Brooks et al, 1986).

Problem-solving and strategy modification is an important cognitive deficit, namely the inability to move from particular information to a general rule or general observation. Such a process of generalisation requires mental integration after selecting relevant and particular instances. This explains why a head-injured patient often has problems with novel situations, for he is unable to generalise or abstract from similar previous situations. There is an inability to use feedback to modify strategies for approaching new problems (Brooks, 1984b). For example, the inability to solve an arithmetical task is not the result of being unable to understand arithmetics, numbers, or symbols, but rather the failure to find the solution is based on the inability to organise and to plan the information so that the arithmetical problem can be solved. Often, a plateau effect is shown, in that an increased number of learning trials do not lead to further improvement or increased retention (Luria, 1973). Deficits in higher cognitive processes of abstraction, conceptualisation and problem-solving often are not immediately apparent. The patient often understands the meaning and context of occurrences and words. The

severity and the functional impact of the cognitive impairment is hence often underestimated (McKinlay & Brooks, 1984). What is crucial is that they cannot profit from their experience or understanding (Kay & Lezak, 1990). An important aspect of this is revealed in the perseveration of head-injured persons. They have difficulty in changing their response set, despite the fact that they might recognise their response as being inappropriate, which in turn can lead to anger and frustration. Deficits in the higher cognitive functions of the severely head-injured husbands are often experienced as very stressful by the spouses. Not only is the patient unable to monitor himself, but conceptual rigidity and denial lead to an unawareness of errors, or if he is aware, he does nothing about it. This can cause immense frustration for the spouses involved (Lezak, 1986). Such deficits also increase the objective burdens, in that she has to carry most of the responsibilities of the family, finances, and child care, because the head-injured husband is cognitively and often behaviourally unable to deal with the responsibilities (Rosenbaum & Najenson, 1976). The higher cognitive deficits also lead to more concrete thinking, and thus the communication style and skills of the head-injured husband changes, which often leads to communication barriers, for the spouse feels she cannot communicate subtleties to her husband, thereby increasing her burden and loneliness (Zeigler, 1987).

The Behavioural Sequelae

A succinct and sad summary of some of the effects of severe head injury on personality and behaviour describes patients as having "lost initiative and the capacity to look forward to something and make plans or decisions; they lack phantasy and inspiration, their perception, thoughts, and ideas are reduced. They have lost the capacity for real contact with others, and are therefore incapable of real friendship, love and social relation. The have no real ego, no real world" (Goldstein, 1952, p. 255). Although Goldstein (1944, 1952) mainly observed patients with missile wounds to the brain, his description is relevant for frontal lobe damage, and therefore also for severe head injury.

Studies have established that nearly 24% of those suffering from severe behavioural disorders required medication, while between 12% and 29% of displayed behaviours

were associated with psychiatric symptoms. After five years, such sequelae were still a problem for about 40% of the patients (Najenson, Grosswasser, Mendelson, & Hockett, 1980). It has also been reported that 90% of all persons with severe traumatic brain damage experience behavioural problems, while 25% experience direct interference of severe behaviour disorders in their daily life. Depression, fatigue, anxiety, and general tension were noted in half the population, while lack of motivation, lethargy, lability, mood swings, restlessness and temper tantrums occurred in a third of all cases (Jacobs, 1990). In other studies the statistics indicate that 28% of the cases laughed, cried, and acted abusively when pressurised or criticised, which is called a "catastrophic reaction" (Goldstein, 1952), while 21% reported social isolation after injury (Bond, 1979; Brooks & Aughton, 1979; Levin et al, 1982; McKinlay et al, 1981; Weddel et al, 1980).

Wood (1984) applies the categories of positive and negative behavioural disorders to the behavioural deficits. The positive behaviour disorders are anti-social behaviours which actively interfere with the patient's social acceptability, while negative behavioural disorders are mainly disorders of drive, motivation and arousal, due to organic lethargy or apathy. Loss of inhibition is typical for basal frontal damage, and according to Walsh (1985), is highlighted by the now classical and often quoted case of Phineas Gage with his frontal lobe injury in 1848, and his subsequent disinhibited behaviours and personality change. Adequate control of inhibition is essential for the intellectual process of selectivity, as well as selecting appropriate forms of action (Walsh, 1985). Head-injured patients often present with aggressive behaviour, which is sudden, violent, unprovoked, poorly controlled, and usually short-lived (Brooks, 1988; Wood, 1984). Often it is the result of a reduced cerebral inhibition which exaggerates premorbid personality traits. Such aggression is more susceptible to the effects of stress, alcohol or frustration. It seems that sudden volatile outbursts of aggression might be a part of a more general state of irritability, which is a common symptom of head injury (Lishman, 1973).

The orbital cortex of the prefrontal region inhibits, activates and regulates the cortical tone of the brain through its connection with the limbic system and the reticular formation (Nauta, 1971). This is one of the most frequently damaged cortical areas in

closed head injury, and the presence of anosmia (owing to the destruction of olfactory bulb and tract) is a good indication of damage in this area. The area is involved with the control of emotions and levels of excitations. Lesions to the basal (orbital) zones, which are connected to the limbic system, not only give rise to disturbances in vision or smell, but also show signs of "generalised disinhibition" and "gross changes in affective processes" (Luria, 1973, p. 223). This is expressed in a lack of self-control, with violent emotional outbursts, and changes in character. With such behaviour, there is some evidence that besides the frontal cortex and limbic structures, medial temporal cortical structures are involved (Eames, 1990). One distinguishing feature between frontal and temporal lobe aggression has been suggested by Eames (1990). Aggressive behaviour because of post-traumatic temporal lobe seizures, is usually followed by feelings of guilt about the uncontrolled behaviour and its consequences, whereas in the case of frontal lobe aggression, such guilt or insight into the consequences seems to be absent. In less dramatic ways, a lack of inhibition expresses itself in rudeness, forgetting to apologise, and generally embarrassing others (Kay & Lezak, 1990). These positive behavioural disorders are often one of the most burdensome and stressful deficits experienced by spouses of head-injured husbands, because the spouse is anxious, and never quite sure when such behaviour will be triggered off (Brooks et al, 1986). These deficits in turn are also the most likely to bring about within the spouse psychiatric and social distress (Livingston et al, 1985a). Such behavioural deficits do lead to a certain emotional detachment, which could be conceived of as being a defence against the emotional pain resulting from this sequelae (Zeigler, 1987).

Inappropriate or uncontrolled sexual behaviour varies according to the severity of the head injury, as well as the premorbid personality structure. Tactless attempts at intimacy, inappropriate touching and heavily loaded sexual innuendos, and in extreme cases, public masturbation, is associated with frontal lobe injury. There is a conjunction of disinhibition and a lack of insight into the effects of such social behaviour (Wood, 1984). It has however been suggested that insight is not absent in all cases. Where the connections of the basomedial frontal cortex and the limbic system have been severed or damaged, this could lead to a cognitive awareness which is separated from voluntary inhibition. This leads to the psychological coping mechanism of denial, concerning the

inability to control, leading "the person to brazen it out" (Eames, 1990, p. 139). All this needs to be contextualised in view of the evidence that explicit sexual disinhibition is relatively rare (Wood, 1984). Abnormally high or low sexual arousal produces difficulties in sexual or marital relationships (Kay & Lezak, 1990). Inappropriate and changed sexual behaviour within the marriage often produces feelings of resistance in the wives of head-injured husbands, especially when they feel their husbands have become different persons since the brain injury (Liss & Willer, 1990; Zeigler, 1987). The head-injured husband with his childish, irritable, and self-centred behaviour is prone to disrupt the maintenance of a certain degree of interpersonal sensitivity and intimacy (Kreutzer et al, 1990; Mauss-Clum & Ryan, 1981). It is therefore not surprising that for the spouse, the radical changes since the head injury, concerning the intimate space of sexual interaction, is bound to be problematic and stressful over a long period of time.

By contrast to the positive behavioural disorders, negative behavioural disorders are related to motivation and arousal. Arousal deficits are characterised by a complete indifference to or lack of interest in the environment. Head-injured patients give the impression of being drowsy, lethargic, passive, and even seem retarded. The major cortical area affected belongs to the medial frontal cortex which mediates self-initiated actions and behaviour within an appropriate range. Lesions to this area result in apathy, lethargy, and a lack of arousal or adynamia (Kumar & Finlay, 1985). Damage to the medial zone with its close ties to the reticular formation system produces a "sharp decrease in cortical tone, leading to a disturbance of the waking state "with an added diminished critical faculty, selective mental processes and gross disturbance of memory" (Luria, 1973, p. 224). Such adynamia makes these patients oblivious to the need of reward, and they often deteriorate rapidly. "Adynamia will vary in degree ranging from akinetic mutism to minor lack of drive akin to that of 'lazy' people" (Walsh, 1985, p. 160).

Motivational deficits are the result of less severe head injury. Unlike the patients with arousal deficits, they seem to have difficulty in translating a cognitive interest into physical activity. There is a recognition that something needs to be done, yet action never follows such insight (Wood, 1984). Therefore the head-injured person often gives

the impression of competence, even good judgement, promising the world, while being unable to follow through or execute his plans. The unrealistic evaluation of his own strengths, weaknesses or lack of motivation greatly impairs his ability to fulfil his goals and keeping promises (Kay & Lezak, 1990). Considering these deficits, the most common burden for the spouse of a head-injured husband is the fundamental change of the husband, who if he was an active, lively and responsible person before the head injury, suddenly has become lethargic, lacking motivation, and is not prepared to take up responsibilities. The radical personality change and the necessity to take over the responsibility of the family, without the support of her husband, is often experienced as being stressful by the spouse of a head-injured husband (Brooks et al, 1986; Oddy et al, 1978a; Zeigler, 1987).

It needs to be stated that the label "behaviour disorder" is a social judgement. The acceptability or unacceptability of certain forms of behaviour is the result of communal values and social norms (Eames, 1990). Jacobs (1990) defines behaviour as a function of the environment and personal relationships. It is therefore related to a host of interactive variables, such as relationships and the stress of personal competency. This stress is the result of the balance between the demands of the patients of himself and his environment, and the ability to perform under increasing pressure. A supportive environment may have less stressors and hence will promulgate less dysfunctional behaviour. A more demanding environment can lead to the decomposition of the head-injured individual. Transitions and stimulus changes will also affect behaviour, whereas a marital break up or the loss of friends are more dramatic changes, since they imply a change of caretakers. Slower more insidious changes can be just as damaging, such as being unemployed, or "friendships that slowly drift away over the years until there is no one left except the television. Loneliness is perhaps the most chronic long-term challenge that persons with severe disabilities face" (Jacobs, 1990, p. 47).

The Psychosocial Sequelae

Psychosocial consequences of brain injury must include external community criteria, the quality of interpersonal relationships, social achievements and work activities (Walker,

1972). As Freud put it, to be normal means to love and to work. It seems that only a few severely head-injured patients escape psychosocial sequelae, although there is some recovery of psychosocial functioning after head injury (Bond, 1984; Levin, Grossman, Rose, & Teasdale, 1979; Oddy et al, 1985; Thomsen, 1984). It is important to note that the secondary emotional reaction to personal and social consequences are probably as important as the cortical damage received through injury (Bond, 1984; Lezak & O'Brien, 1990). Later improvements might occur (Oddy, 1984), but they are often a reflection of an "adaptation to the primary deficits and the acquisition of skills for coping with persistent sequelae" (Grant & Alves, 1987, p. 247). The various factors contributing to the psychosocial deficits are the activities of daily living, the mobility within or without the home, work and leisure activities, the satisfaction with life quality, the initiative and responsiveness in social relations, as well as the burden experienced by the spouse and/or the family (Jennett et al, 1981).

Concerning leisure and social activities, Oddy (1984) found that less severely brain-injured persons resumed leisure activities within 6 months and retained contacts with friends and acquaintances throughout the recovery period. Severely head-injured persons after 12 months still did not resume leisure activities, although they had returned to work. Their involvement in sports declined and they were more socially isolated. Although they met people and went out, the social contacts they made were superficial, and friends began visiting them less often. Thus they had few interests, usually no hobbies, and no close friends, especially not of the opposite sex.

It has been stated that mild cases of head injury present with an "extraversion" in terms of social activities, while severe cases of head injury seem to be more "introverted" when it comes to social interaction (Stern, 1985). The premorbid personality structure seems to be related to the development of social recovery. A pre-accident nervousness and helplessness hinders work and leisure activities of a head-injured patient. Also, post-traumatic verbal expansiveness seems to promote social activities (Oddy & Humphrey, 1980b, Weddel et al, 1980). Psychosocial recovery is usually understood in terms of the resumption of work activities. Work has a major social role which enhances social contacts as well as social rewards. However, the resumption of work activities does

not invariably mean that a complete premorbid vocational capacity level is reached (Blair & Spellacy, 1989; Jennett, 1984; Oddy & Humphrey, 1980a). From the pooled results of a large number of studies, there is an indication that approximately half of the head-injured patients can resume productive lives, although the severity of the head injury has a marked and direct affect on the work activities (Johnson, 1989; Oddy, 1984). The difficulty for the head-injured husband to return to work, or needing to work for less pay, means that for the spouse this increases her financial burden, and might even entail a socio-economic class adjustment (Brooks et al, 1986).

Head-injured patients "frequently describe themselves as 'out of step' with the rest of the world" (Prigatano, 1987b, p. 369). They are confused as to why others are upset about them, and thus progressively withdraw and often develop a reduced self-esteem. The confusion produced by their socially inappropriate acts as well as their low tolerance for frustration easily evokes anxiety (Fugl-Meyer & Fugl-Meyer, 1988). The brain-injured patients feel threatened, confused, and helpless, which in turn enhances restless and impulsive (often disinhibited) behaviour. Such patients probably have lost cognitive and linguistic resources to deal with their anxiety, and therefore seem more emotional (Dikmen & Reitan, 1977a). There is "an impairment of abstract attitude" (Goldstein, 1944, p. 206), which in turn means an inability to inhibit inappropriate behaviour, learn from mistakes, and thereby alleviate the anxiety. Such anxiety brings about a social withdrawal. The prominent psychosocial deficit therefore is social withdrawal. Severely head-injured patients often do not expect so much failure, and having failed repeatedly, they avoid anxiety-provoking situations by withdrawing into a safer milieu (Parker, 1990; Tadir & Stern, 1985). Unlike depression, social withdrawal correlates highly with the severity of head injury (Levin & Grossman, 1978). Any motor-sensory impairment was found to have little significance in relation to the patient's social isolation. Owing to the social withdrawal of her head-injured husband, and the fact that since the accident he has probably lost most of his friends, the spouse herself becomes more socially isolated, if she herself does not have an independent social life (Rosenbaum & Najenson, 1976).

The Psychiatric Sequelae

The psychiatric sequelae refer to disturbances of personality and behaviour. Behavioural disorders have already been discussed, but not in relation to a psychiatric framework. The importance of psychiatric sequelae is highlighted by the fact that these deficits do not resolve over a long period of time (Fordyce, Roueche, & Prigatano, 1983). This means that such deficits are a major component in the difficulties experienced with severely head-injured patients in rehabilitation and close relationships (Prigatano, 1987a). The reviews of psychiatric sequelae not only indicate a diverse symptomatology, but also a complex interaction of causes (Bond, 1984; Lishman, 1974; Mifka, 1976; Prigatano, 1987a). The etiological factors of psychiatric sequelae range from neurological variables (such as location and severity of the brain damage and the development of epilepsy) to other equally important environmental factors (premorbid personality mental constitution and the emotional reaction to the injury) (Prigatano, 1987a). Thus the relation of strictly neurological and non-neurological factors producing psychiatric sequelae in traumatic head injury is a complex one.

Some other mechanisms that might be responsible for the behavioural effects of severe head injury include, altered central neurotransmitter metabolism (Cope, 1990; Parker, 1990; Van Woerkam, Teelken, & Minderhoud, 1977), neuroendocrine disturbance related to the pituitary involvement (Paxson, Jr. & Brown, 1976), as well as reduced cerebral blood flow and disruption of the arousal effects of the reticular mesencephalic formation (Parker, 1990). During the the acute stage of recovery, the behaviour is usually combative, including arm thrashing, truncal rocking, screaming, and agitation (Levin & Grossman, 1978). Physical deficits are characterised mainly by neurological sequelae, which can range from severe to non-existent. Five more common deficits have been identified: Firstly, the sensory-motor deficits, such as the loss of smell (anosmia) and taste (parosmia) are common, as well as the blurring of vision, the loss of controlling eye movement, difficulties with balance, coordination and therefore posture, giving rise to feelings of dizziness and spinning (Ashworth & Saunders, 1985; Cartlidge et al, 1981; Gronwall et al, 1990).

Secondly, the motor control and coordination problems (ataxia) are the result of disrupted connections with the brain stem to the frontal cortex. The motor cortex is "only the outlet channel for motor impulses" (Luria, 1973, p. 80). The finer tones and the smoothing of the voluntary motor movement is given by the basal motor ganglia with its substantia nigra, and the fibres of the extrapyramidal system. The integration of complex motor movement, like turning the head and grabbing an object with a hand, is performed by the premotor area (Walsh, 1987). Lesions in the premotor cortex do not give rise to paralysis or paresis of contralateral limbs, but rather express themselves symptomatically as a "disturbance of skilled movements, which are no longer performed smoothly, and each component of the skilled movement now requires its own isolated impulse" (Luria, 1973, p. 180). This often means a change of handwriting, an inability to play a melody or to conduct any integrated and even habitual tasks of skilled labour. With some frontal lesions, the inhibitory function on the parietal lobes is suppressed (Lhermitte, 1983). This results in compulsive motor behaviour or utilisation behaviour. Patients become dependent on the visual and tactile stimulation of their environment, and are unable to inhibit grasping behaviour. It is also found in Alzheimer's disease. The excessive and compulsive dependence on environmental cues has led to the term "environmental dependency syndrome" (Lhermitte, 1986a,b). These physical deficits are also associated with a slowness of response and thought, owing to brain stem damage (Van Zomeren et al, 1984).

Thirdly, fatigue is a central deficit of all head injuries. Even after a good recovery, head-injured persons require more rest and sleep than before the injury, and any mental and physical exertion leads more quickly to fatigue (Gronwall et al, 1990). Fourthly, post-traumatic epilepsy occurs in roughly 20% of the cases, and is the result of lesions and haemorrhage (Kay and Lezak, 1990). It usually occurs within the first year of the trauma, although seizures can occur up to five years after the injury. Grandmal seizures are more rare, while partial complex seizures (temporal lobe epilepsy) are more common, because of lesions to the anterior temporal lobe. The effects of anti-seizure medication on attention, memory, cortical tone and emotion need to be monitored carefully (Gronwall et al, 1990).

Finally, the post-traumatic headache is particularly common, and can be recurrent as well as very debilitating. It is frequently associated with dizziness, irritability, failure of concentration and an intolerance towards alcohol. This constellation of symptoms is called the "postconcussional syndrome", also called "accident neurosis", "posttraumatic" or "post-concussional neurosis". There is some controversy, concerning litigations, and it seems that in many patients the postconcussional symptoms have both organic and psychological causes (Binder, 1986; Golden, Moses, Goffman, Miller, & Strider, 1983; Grant & Alves, 1987; McKinlay et al, 1983; Merskey & Woodforde, 1972). In the literature, it is well established that the physical deficits are usually considered to be less stressful and burdensome for the spouse of a head-injured husband than the cognitive and behavioural sequelae (Brooks et al, 1986; Livingston et al, 1985a; Oddy et al, 1978a; Zeigler, 1987). However, it has been noted that at the beginning of the recovery period, a main source of stress is related to poor motor control of the head-injured husband, the fear of epilepsy, and the sheer physical exertion of having to cope with the physical deficits (Oddy et al, 1987a). Another more subtle, but none the less central stressor, related to physical deficits, is the extent in which they can be grounds for the spouse to no longer be sexually attracted to their head-injured husbands (Rosenbaum & Najenson, 1976; Zeigler, 1987). This causes major difficulties in the spouse's intimate relationship with her head-injured husband.

In the discussion of the psychiatric sequelae of head injury, a general consensus concerning a nosology of psychiatric symptoms is necessary. The DSM-III-R (American Psychiatric Association (APA), 1987), as a nosology of psychiatric symptoms, allows for some kind of inter-rater agreement on what constitutes a psychiatric disorder, for example depression. It is not enough to merely ask a head-injured patient whether he is sad or depressed in order to claim that he is depressed. Rather, a number of specific symptoms need to be present before the diagnosis of depression can be made. One important factor concerning psychiatric sequelae is the time scale of events in head injury. Different stages of head injury present with different symptoms, which in turn are strongly related to the level and rate of recovery (Bond, 1984). After the emergence from coma and before the clearing of the post-traumatic amnesia (PTA), severely head-injured patients often experience confusion, perceptual

disturbances, restlessness, disorientation in terms of time, place and person, irritability, aggression, withdrawal, and even frank traumatic psychosis (Mifka, 1976). All these symptoms relate well to the psychiatric category of "delirium" (APA, 1987, pp. 100-103), which previously was called "acute brain syndrome" (Grant & Alves, 1987, p. 235).

Furthermore, three major transient syndromes have been identified: The first of these syndromes is characterised by an organic excitement, namely increased psychomotor activity, euphoria, increased talkativeness and rapid speech with flights of ideas and even grandiosity, and is related to the "organic mood syndrome" (APA, 1987, pp. 111-113). The second transient psychiatric syndrome is described by a psychosis of a paranoid delusional nature, as found in the "organic delusional syndrome" (APA, 1987, pp. 109-110). Finally, the third transient psychiatric syndrome is marked by aggressive behaviour, which in some patients is still part of their delirium. During the acute state of recovery, the patient's behaviour can be combative with arm thrashing, screaming, and agitation (Levin & Grossman, 1978). No DSM-III-R category is suitable here, except if the patients are in fact still delirious. The category of "delirium" seems the most appropriate one (Bond, 1984; Grant & Alves, 1987).

Having considered the more transient psychiatric sequelae, the more persistent psychiatric syndromes and more continuous changes in the personality of severely head-injured patients are central in understanding the long-term effects of severe head injury. In a six month follow-up study of severely head-injured patients, 65% were reported as suffering either from poor memory, loss of temper or fatigue (Oddy et al, 1978). In another study, relatives reported undesirable personality changes in 50% of the patients up to 12 months after the injury (Brooks & McKinlay, 1983), while it has also been reported that up to two-thirds of patients in a five year follow-up study had undergone profound personality change (Thomsen, 1974). One of the largest follow-up studies traced severely head-injured patients for 10 to 15 years, and found that 55% suffered from personality disturbances (Thomsen, 1984). Thus there seems to be an agreement that more than half of the severely head-injured patients experience or undergo some personality change.

The quality of evidence of these follow-up studies is anecdotal in that no specific empirically based measurement was applied to the sample. Although these follow-up studies identify personality change, a precise classification of emotional and behavioural disturbances is not available, and hence a description of a syndrome is usually applied. The syndrome in question is the "frontal syndrome", whose key features include a lack of insight, concern and responsibility, and the presence of euphoria, antisocial behaviour and disinhibited sexual actions (Bond, 1984; Lishman, 1973). The symptoms, such as explosive and aggressive behaviour, are linked to inferior medial temporal lobe lesions, while the lack of motivation or adynamia is related to lesions in the basal medial cortex as well as lesions in the hypothalamus (Grant & Alves, 1987). Thus the "frontal syndrome" is strictly speaking not a "frontal lobe syndrome". The psychiatric term "organic personality syndrome" (APA, 1987, pp. 114-116) seems to overlap largely with the "frontal syndrome", but it is limited to those patients with no marked cognitive deficits. Personality changes associated with cognitive impairments seem to be more effectively categorised by the psychiatric syndrome of "dementia" (APA, 1987, pp. 103-107).

Considering the increase of schizophrenia after head injury, the problem of a consistent diagnostic criteria becomes evident. If a broad definition of schizophrenia is taken, then the 2% to 2.5% prevalence rate is a modest increase over the 1% prevalence rate of the general population (Bond, 1984). However, stricter criteria show little or no increase over the prevalence rate in the general population (Grant & Alves, 1987). Patients with severe head injuries might be at special risk for psychosis, especially acute post-traumatic psychosis (Levin et al, 1982). In the 10 to 15 year follow-up study cited above, 8 out of 40 severely head-injured patients had experienced some psychotic episode (brief reactive psychosis) during their recovery, with 6 out of 40 having a late onset, *i.e.*, a year or more after their injury. Of the 40 patients, 2 were permanently psychotic and therefore institutionalised (Thomsen, 1984).

Considering the affective disorders associated with severe head injury, similar problems of diagnostic criteria arise. Although Lishman (1973) asserts that affective disorders after head injury are more common than schizophrenia, no specific data or criteria is offered

to support such a statement. Equally, on the basis of patients' self-reports, depressive moods have been found to be dominant 3, 6, and 12 months after the head injury in more than half of the patients in a study (McKinlay et al, 1981). Mania, or more specifically secondary mania, more frequently has been reported in the subacute phase of recovery, and only in two cases has there been evidence of secondary mania at a later stage of recovery (Clark & Davison, 1987).

Given the usual loss of insight and the lack of specific criteria, such studies on the emotional or affective disorders after head injury are only useful in a general manner. More specific distinctions of depression, such as bipolar, cyclic, dysthymic or major depression, are often not considered, and as yet, it is not clear whether such specific distinctions are of any use at all. This does not deny the clinical experience that depression is very common after head injury, but it does not seem to be related in particular to the actual severity of the head injury (Levin & Grossman, 1978). Often depression is associated with social withdrawal and a lack of motivation, including other features such as feelings of worthlessness, guilt, loss of interest, decreased libido, and loss of premorbid abilities (Lezak, 1978). These issues immobilise the patient in his depression.

When considering psychiatric sequelae in relation to personality changes, the term "personality" is often used without defining it, thereby producing some confusion. It could be defined "as patterns of emotional and motivational responses that develop over the lifetime of the organism, which are highly sensitive to biological and environmental contingencies, and are formed in large part during early childhood experiences, and are resistant to change, but are, nevertheless modifiable through continued learning and experience" (Prigatano, 1987a, p. 217). Such a construct is based on the concepts of feelings, emotions and motivations. Feelings are defined as the most rudimentary and undifferentiated perceptions of the internal body states, and are dependent on core brain receptors as well as the homeostasis of the body. The brain stem, a sensory detection apparatus and a motor structure are necessary neurological components for feelings to occur. Emotions on the other hand are understood by Prigatano to be complex and interpreted feeling states that can interrupt behaviour for survival. The limbic system,

particularly the amygdala, plays a central cortical role in terms of emotions (Prigatano, 1987a). It could therefore be concluded that emotions are closely related to the function of inhibition or repression, in which for the sake of survival, behaviour becomes inhibited and repressed, or controlled and modified in social interactions and sublimation. Turning to the concept of motivation, Prigatano (1987a) refers to motivation as being related to complex feeling states or emotions that serve arousal. In other words, motivations serve to energise goal-directed behaviour.

The advantage of this definition is that, different to most studies on head injury and personality, Prigatano's construct of "personality" incorporates neuropsychological relations without loss of a more general definition of "personality". It could be argued that Prigatano's definition does not take account of various other personality theories. Firstly, Prigatano's construct of personality is an amalgamation of both behavioural and psychoanalytic concepts (Prigatano, 1987b). Secondly, given the incompatibility and, more importantly, the incommensurability of many personality theories, Prigatano's definition is neither better nor worse than any other definition. Thirdly, in the field of brain damage, Prigatano's definition has the advantage of relating neuropsychological concepts to feelings, emotions, motivation and behaviour within a coherent definition of personality.

For Prigatano (1987a), after traumatic head injury, disturbances of emotion and motivation occur on three levels. On the first level, neurological disturbances to cortical structures, which mediate emotional and motivational responses, are damages mainly to the frontal cortex, its connection to the limbic system and the temporal lobes. These neurological disturbances produce neuropsychologically based personality disorders. The second level of disturbances are the reactionary disturbances. There are emotional and motivational responses that are the reaction to the failure of coping with environmental demands. This is especially evident when there is a reduction of cognitive capacity and the inability to formulate and execute behavioural plans or strategies. The results often produce high levels of stress, which in turn brings about withdrawal, irritability or depression (Parker, 1990). The third level of disturbances is related to the premorbid personality structure, which might emerge and modify neuropsychological and reactive

disturbances (Lishman, 1973; Parker, 1990; Wash, 1985). Premorbid active high-achievers will very likely be better off after the trauma than persons who were passive and under-achievers (Brooks, 1988). "Exaggeration of premorbid traits is common" (Bond, 1984, p. 171). Conversely, it is also true that pre-traumatic personality characteristics are eradicated, and organically determined features replace them (Bond, 1984). It is the radical personality change of the head-injured husband, which has the most profound affect on the spouse and the marital relationship (Lezak, 1986; Livingston et al, 1985a; Oddy et al, 1978a; Zeigler, 1987). Such a sudden personality change in a relationship disrupts interpersonal patterns and responses. The spouse of a head-injured husband might often feel that "its like living with a stranger", and she not only mourns "her specific losses that her partner has experienced, but also her essential loss of a partner" (Zeigler, 1987, p. 51). After the head injury, the husband is often no longer the same person for the spouse, who has suddenly a stranger in her bed.

CHAPTER THREE
MEASUREMENT OF POST-INJURY PERSONALITY AND MARITAL ADJUSTMENT

The various ways in which the assessment of personality changes after head injury have been attempted will be outlined before the discussion of the measures applied in this study. The assessment of personality in relation to brain injury has historically been presented by two forms of exploration (Prigatano, 1987b). The most common way of investigating personality change after head injury has been presented by traditional methods of psychiatry, which includes a detailed history-taking and the clinical interview. This means that personality change due to head injury is placed within the framework of psychiatric categories, for example, 'organic personality disorder', 'depression', or 'delirium'. This method of investigation is found in the works of Grant and Alves (1987), Rutter (1981), Lishman (1973), and Ota (1969). However, psychiatric categories are strictly speaking categories of pathology, and hence do not necessarily define personality.

The other form of assessment has made use of psychometric tests, which originated in the field of clinical psychology. Uses of the Rorschach (Ota, 1969), the Thematic Apperception Test (TAT) (Leftoff, 1983), and the Minnesota Multiphasic Personality Inventory (MMPI) (Dikmen & Reitan, 1977b; Fordyce et al, 1983) have been made. Also, various mood or bipolar adjective checklists (Brooks & McKinlay, 1983) and the Brief Psychiatric Rating Scale (BPRS) (Levin & Grossman, 1978) have been applied, as well as the Katz Adjustment Scale (Fordyce et al, 1983; Grant & Alves, 1987). Also, a depression scale has been used (Walker, 1972). All these tests and inventories have allowed for some insight into relative's perception of the changes experienced and observed in the head-injured person. However, the Rorschach is a projective test that is used to identify the ego's need and ability (Exner, 1986), which is basically what the TAT also assesses through story-telling, based on a picture (Bellack, 1986). Both tests do not strictly assess personality. The problem with the MMPI is that it is an inventory based on, and standardised according to, psychiatric patients. It also assumes objective self-reporting. Clinically, it has been shown that brain-injured patients often have very

little insight into their problems, which in turn could lead to misleading responses or interpretations (Prigatano, 1987a).

Thus, no inventory specifically aimed at assessing personality has been applied to the population of severely head-injured persons, in order to describe the 'personality change' constantly referred to. Also, the anecdotal reports and unstructured interviews with relatives have as yet not been supported sufficiently by any systematic analysis. In the present study, the aim is to assess systematically the effects of the personality change of severe head injury on the close and intimate relationship between the patient and his spouse, as perceived by the spouse or partner.

Given the aim to assess systematically the spouses' perception of the personality changes of head-injured husbands in relation to their dyadic adjustment, some measures of personality and dyadic adjustment are required. The choice of a particular measure assumes a specific concept of personality and relationship. In this chapter the aim will be to examine the concepts of personality and dyadic adjustment in research, in order to highlight the conceptual assumptions underlying a chosen measure. This will also be the justification for choosing such measures to test the hypothesis of this study.

The Personality Inventory

In the field of psychological research, "a diversity of current conceptions of personality" (John, 1990, p. 91) have yielded various, and often confusing, groupings of personality traits in the form of questionnaires or inventories. The variety of the great many personality inventories demands conceptual clarity, if a choice of a personality inventory is to be made. The personality inventories are usually based on certain groupings of personality traits. Given that personality traits are fundamental to the construction of inventories, a certain distinction concerning such traits is necessary. A useful distinction, in order to produce an overview, is to consider personality traits in terms of conceptual and empirical classifications. In the conceptual classification of personality traits, a theory or a rational approach dominates the grouping of traits. A good example of this is Jung's typology, in which introversion and extraversion are two attitudes that are

presented as a major orientation of personality. The four personality types, which represent ways of approaching experiences in the world, are the thinking, feeling, sensing, and intuiting types. These are higher order traits (Buss & Finn, 1987). Jung's classification of traits has found its expression in the Myers-Briggs Type Indicator (MBTI) (John, 1990). Another example would be those personality traits that are devised according to the interpersonal theories of Horney, Sullivan and Leary. The Interpersonal Style Inventory and Wiggin's circumplex model are derivatives of such a conceptual approach (Buss & Finn, 1987). Unlike the empirical classifications, the conceptual approach does not require an existing operational definition of a trait. This has lead to considerable controversy regarding the validity of, for example, Jung's classification, although recent research has reached more positive conclusions (Buss & Finn, 1987).

However, the advantage of the empirical classification is that empirical procedures can provide concrete and replicable results to some extent. The strength of the more empirical approach is that these results, based on demonstrated relations, can be used in turn to generate theoretical conceptions. Such an argument would therefore justify a personality inventory that emerges out of the empirical classification. Through factor analysis, the multitude of traits can be reduced to a smaller group of higher order personality traits. The factor analysis defines these higher order traits as dimensions or factors, enabling a single trait to be loaded on more than one dimension (Buss & Finn, 1987). An example of an inventory, in which such a factor analysis is applied, is the NEO Personality Inventory (NEO-PI) with its five factors, designed by Costa and McCrae (1985). Research within this empirical tradition "has consistently identified five factors that appear to define the basic dimensions of the natural language of personality" (McCrae, 1990, p. 237). McCrae continues to make an equally strong claim, namely that these five dimensions are also basic to many of the other personality systems, which have totally different traditions of measurement and theory (McCrae, 1990).

The NEO-PI has its historical roots in the lexical approaches of Klages and Baumgarten of the late 1920's and 1930's respectively, which in turn was taken up by Allport and Odbert in 1936 (Digman, 1990). Their examination of the language for clusters of

personality traits led to the systematic work of Cattell, whose factor analytic studies in the 1940's brought about the Sixteen Personality Factor (16 PF) questionnaire (Buss & Finn, 1987). Cattell's personality traits were regrouped and assembled via factor analysis into five higher order dimensions (Norman, 1963). This gave rise to the well-known taxonomic basis for personality, the 'Big Five' Factor Taxonomy (John, 1990). The NEO Personality Inventory (NEO-PI) (Costa & McCrae, 1985) and the abbreviated NEO-Five Factor Inventory (NEO-FFI) (Costa & McCrae, 1991), used in this study, are based on such a descriptive model or taxonomy of personality. The five factors in the NEO-PI are 'neuroticism' (factor I), 'extraversion' (factor II), 'openness' (factor III), 'agreeableness' (factor IV), and 'conscientiousness' (factor V) (Costa & McCrae, 1985).

To justify the use of the NEO-FFI in this study, it would be appropriate to briefly outline the statistically exhaustive analyses that establish the validation of the five factor model of personality both across other instruments and observers (McCrae & Costa, 1987). Within the tradition of the lexical approach, McCrae (1990) states that when Cattel's 16 PF scales were factor analysed, three broad dimensions of personality emerged, namely 'neuroticism' (N), 'extraversion' (E), and 'openness to experience' (O). Years later, the scales of 'agreeableness' (A) and 'conscientiousness' (C) were added to the NEO-PI. John (1990) in his analysis of the five factor model of personality demonstrates that from Fiske in 1949 to Norman in 1963, from Costa & McCrae in 1985 to finally Goldberg in 1989, that all these authors might use different sources and labels for their factors, but that importantly, the content of these dimensions is similar, and that these factors under different names do the same work. For example, Norman's 'surgency' factor is similar to Costa & McCrae's 'extraversion' factor, which in turn can be identified in Peabody & Goldberg's 'power' factor (John, 1990).

The validation of the five factor model across other personality systems is required, in order to justify the use of the NEO-FFI, rather than another inventory, in this study. What still needs to be be established is how the NEO-PI factors, as markers of the Big Five model of personality, relates to instruments of a different conceptual and measurement tradition. McCrae (1990) reports on such investigations done by joint factor analyses. Given the scope of the present study, only a brief summary of the results

can be presented. The California Psychological Inventory (CPI), revised in 1987, is one of the most frequently used personality inventories. The CPI is based on three vectors, namely 'externality', 'normative regulation of impulse', and 'effective intellectual and social functioning' or 'self-realisation'. These vectors statistically correspond to the McCrae & Costa factors of 'extraversion', 'conscientiousness', as well as the combination of 'neuroticism' and 'openness' respectively (John, 1990). In 1970, Eysenk presented three main factors of personality, as measured by the well-known Eysenk Personality Questionnaire. It's three factors are 'neuroticism', 'extraversion-introversion', and 'psychoticism'. Joint factor analysis reveals that the Eysenk scales relate to the NEO-PI factors of 'neuroticism', 'extraversion', and a combination of 'agreeableners' and 'conscientiousness' (Digman, 1990).

Tellegen (1982) in his Multidimensional Personality Questionnaire proposes three second order factors, namely 'positive emotionality', 'negative emotionality', and 'constraint'. These factors correlate highly with the factors of the CPI and Eysenk's factors (Buss & Finn, 1987), and correlate with the NEO-PI factors, namely being respectively a blend of 'extraversion' and 'agreeableness', 'neuroticism' and 'conscientiousness' (Digman, 1990). The Interpersonal Style Inventory, based on the above-mentioned theoretical model of Horney, Sullivan, and Leary, has the factors 'interpersonal involvement', 'socialisation', 'autonomy', 'self-control', and 'emotional stability' (Buss & Finn, 1987). Even in this theoretically different personality system, the first three factors can be shown to be measurable by the NEO-PI factors of 'extraversion' and 'agreeableness', while the other two factors reflect the factors 'conscientiousness' and 'neuroticism' (Digman, 1990). Considering the Myers-Briggs Type Indicator (MBTI), it is possible with the five factor model of Costa and McCrae to statistically relate the factor 'extraversion' with the Myers-Briggs category of 'extraversion', 'agreeableness' with 'feeling', 'conscientiousness' with 'judging', and 'openness' with 'intuition' (McCrae, 1990). Jackson's Personality Research Form (PRF) is based on Murray's need system, and a joint factor analysis of the PRF scales with NEO-PI factors demonstrates that each of the five factors is represented in the PRF needs, and all the needs load at least on one factor, many loading even on two factors (Costa & McCrae, 1988).

McCrae (1990) also addresses the multi-method assessment. The NEO-PI factors from self-reports, from mean peer ratings, as well as from spouse ratings were factored. What became evident was that each of the five factors was defined by the same trait dimensions in all three methods of measurement. Also, in terms of the NEO-PI, the cross-observer agreement across studies has achieved coefficients of relatedness in excess of 0.90 (Digman & Inouye, 1986). "Such findings demonstrate that personality traits are not cognitive fictions within the head of raters, but are consensually-validated psychological facts" (McCrae, 1990, p. 239).

Given the above discussion, at "minimum, research on the five factor model has given us a useful set of very broad dimensions that characterise individual differences. These dimensions can be measured with high reliability and impressive validity. Taken together, they provide a good answer to the question of personality structure" (Digman, 1990, p. 436). The five factor model has given rise to a taxonomic superstructure in the research of personality. What therefore emerges is that the five factors of the NEO-PI represent the basic dimensions of personality. That the various other personality inventories can be subsumed under the five factor model justifies the use of an inventory that is based on such a taxonomy. The NEO-FFI (Costa & McCrae, 1991), the abbreviated form of the NEO-PI, then becomes the choice inventory to measure the spouses' perception of the personality changes of their head injured husbands, before and after the head injury.

The Marital Adjustment Inventory

Considering the perceived adjustment in the dyadic relationship after the head injury, a measure of dyadic or marital adjustment would need to be employed. Such a measure would function as an index for the provision and quality of marital support. Marital status per se is seemingly a convenient index for marital support, but it has been shown to be insufficient, in that not all individuals experience emotional support and psychological well-being whilst they are married (Ensel, 1986). Ensel states that marital status can be a confounding variable, because the marital relationship sometimes represents a source of support, but sometimes becomes a stressor in an unhappy

marriage. Therefore, it is necessary to measure the quality within the marital relationship. The concept of marital quality has various meanings. Although attempts have been made to differentiate between 'quality' and 'satisfaction' (Fincham & Bradbury, 1987; Roach, Frazier, & Bowden, 1981), it has been noted that 'marital quality' is closely related to the constructs of 'integration', 'stability', 'adjustment', 'satisfaction', and 'happiness' (Burnett, 1987; Roach et al, 1981). No single construct can be credited with encompassing the entire range of dimensions involved in marital quality.

For the purpose of this study, a satisfied or well-adjusted marriage can be described and evaluated (Norton, 1983). A marriage described as being 'happy', 'well-adjusted' or 'satisfying' is a 'good' quality marriage. With a 'bad' marriage, the inverse is true. Furthermore, marital quality and marital stability are related, in that generally a 'good' marriage will remain intact. However, the inverse is not true in this case. Low marital quality can be found in marriages that remain intact. Spanier and Lewis (1980) in their model propose that ultimately a complex balance of intrapsychic and extrapsychic dimensions with various alternative attractions, as well as external pressures on the marital dyad, are all forces determining the quality and the stability of the marriage. Marital quality is then construed as not merely being an intrapersonal, subjectively experienced reaction, but rather is also an interpersonal experience, in which marital satisfaction is the congruence between the one's expectations and another's behaviour (Spanier & Lewis, 1980). Therefore, Spanier's (1976) Dyadic Adjustment Scale is based on a multidimensional concept of marital quality or 'marital adjustment,' which is understood as not being a fixed state, but rather "a process, the outcome of which is determined by the degree of troublesome dyadic differences; interpersonal tensions and personal anxiety; dyadic satisfaction; dyadic cohesion; and consensus on matters of importance to dyadic functioning" (Spanier, 1976, p. 17).

A large number of measures to examine marital adjustment are available, and Spanier (1976) lists over sixteen different measures, which excludes measures concerned with marital strain and the like. It is therefore evident that the concept of marital or dyadic adjustment "has taken a prominent place in the study of marriage and family relationships" (Spanier, 1976, p. 15). Although the measures have been criticised for

their methodological and conceptual weaknesses (Spanier, 1972), there is obviously a need amongst researchers for an adequate measure to assess the quality of such an adjustment. Spanier (1976) outlines how few of the previous measures reveal any adequate level of reliability and validity, and mostly do not seem to present a conceptual plan for a scale development, as has been attempted with Spanier's scale. Spanier's (1976) Dyadic Adjustment Scale includes four subscales, namely 'dyadic satisfaction', 'dyadic consensus', 'dyadic cohesion', and 'affectionate expression'. These subscales are construed as being the main components of general marital adjustment, These components are interrelated but separate (Spanier, 1976).

This scale is the product of a more comprehensive process, compared to the well-known Locke and Wallace (1959) measure. Locke and Wallace, however, sought to assess only specific dimensions, namely the dimensions of adjustment and attitude. The Dyadic Adjustment Scale provides more factors, which are more relevant for this study. In terms of the construction of the Dyadic Adjustment Scale, all items ever used in any scale that measured marital adjustment were identified, which produced a pool of around 300 items. All duplicate items were eliminated, and three judges examined all items in terms of content validity. After extensive testing, items with low variance and skewness were discarded. Although the Dyadic Adjustment Scale shares similar items with other measures of marital quality, a different factor structure has been constructed (Burnett, 1987). A factor analysis was used to empirically verify the hypothesised components or subscales of adjustment. The Dyadic Adjustment Scale finally ended up with 32 items (Spanier, 1976). The problem of whether the measure is one of individual adjustment to the relationship, or an adjustment of the dyad as a functioning group, has not been resolved (Spanier, 1976). This problem, however, seems to haunt most dyadic measures (Spanier, 1972). Given that in this study, the spouse's perception of the dyadic adjustment after head injury is sought, the Dyadic Adjustment Scale seems not only to be appropriate for this study, but also compared to other measures of adjustment, it is the most systematically assembled measure, which conceptually justifies its use.

CHAPTER FOUR
METHODS

The Aim of this Study

The aim of this study is to analyse the relationship between the spouse's perception of the post-traumatic personality change of a severely head-injured male patient and her perception of the dyadic adjustment.

The Research Hypothesis

There will be correlations between measures of the spouse's perceptions of the post-traumatic personality changes of a severe head-injured male patient and of the dyadic adjustment.

Subjects

Around 200 out of every 100 000 people in the United States suffer from traumatic brain injury each year (Willer, Abosch, & Dahmer, 1990). The figure for England and Wales is 160 head injury admissions per 100 000 people (Johnson & Gleave, 1987). These figures for England and Wales suggest a total of 4000 severe head injuries each year. Of these, 555 individuals annually will need ongoing care and are unemployable (Johnson & Gleave, 1987). In an epidemiological study focusing on Johannnesburg, in which all subjects of this study resided, a total incidence (per 100 000 of the population) of an estimated 5106 new cases of non-fatal traumatic brain injury, ranging from mild to severe, was established across all races (Nell & Brown, 1990). In the survey year, the incidence of new cases for White males of all ages having traumatic brain injury, with a wide range of severity, was 282 cases (Nell & Brown, 1990).

However, these figures do not mean that the whole population is at equal risk. There is evidence that the head-injured patients are not a random sample of the general population. Other epidemiological factors are equally important to mention, namely,

the psychiatric history of the head-injured person, the criminal record, learning disabilities, and previous head injuries, as well as alcohol consumption (Galasko & Edwards, 1974; Galbraith, Murray, Patel, & Knil-Jones, 1976; Naugle, 1990). Some people are more at risk than others, for example, males are more frequently victims of head trauma than females, with a ratio of 2:1 respectively (Naugle, 1990). This ratio of males to females was especially evident in the Johannesburg epidemiological study of traumatic brain injury (Nell & Brown, 1990). Naugle (1990) states that the highest incidences of head injury occur between the ages of 15 and 24 years, and Willer et al (1990) further differentiate this by noting that the peak of incidences for males lies between 15 and 24 years, while for females it lies between the ages of 15 to 19 years. This was also reflected in the Johannesburg epidemiological study, in which it was found that amongst White South Africans, the White male aged between 15 and 24 was at higher risk of suffering from traumatic brain injury (Nell & Brown, 1990). By far the leading cause of head injury in Northern America and Europe is motor vehicle accidents (45.5%), with the second largest number of head injuries being due to falls (15%), and the third category being that of assaults (13%) (Gennarelli, Champion, Sacco, Copes, & Alives, 1989). Therefore, traumatic brain injury is a major health problem, with vehicle accidents being the prime cause (Naugle, 1990; Thompsen & Klonoff, 1975; Walsh, 1985). These figures could to some extent also be applied to White South African males, while amongst Black South African males, the major cause for traumatic brain injury is interpersonal violence. Thus, certain political and sociological conditions of South Africa seem to be reflected in these figures (Nell & Brown, 1990). In the present study, most subjects interviewed had husbands who were injured in motor vehicle accidents.

In order to avoid the complexities of cross-cultural and gender issues in research, this study limited itself to analysing the responses of White English-speaking spouses or recently separated spouses of White male patients who have suffered severe head injury, and are between the ages of twenty and sixty-five. It is within this age group that most of the severely head-injured males are likely to have been married before the head injury. Given the figures mentioned above, it was not surprising that most data on head-injured

persons in the files of hospitals and rehabilitation centres were younger males, between 16 and 24 years of age. Many of them had not established a long-term relationship.

Importantly, to minimise the confounding factor of guilt and blame, only those subjects were selected who were not the cause of the severe head injury by, for example, being directly responsible for a motor accident which caused the head injury. A central limitation to the sample size concerned the severity of the head injury. Severe head injury meant that only those spouses were chosen whose husbands had been in coma for more than 24 hours. This criteria of severity is based on research in this field (Bigler, 1990). Another limitation was that the spouse's responses were evaluated after the patient had been home for at least one year. This limitation is required so that the severely head-injured patient's post-traumatic symptoms will have stabilised (Oddy & Humphrey, 1980), and so that changes in the head-injured person, as well as in the relationship, will have been noted by the spouse.

In terms of the dyadic relationship, the length of the relationship before the accident was no less than one year, so that it could be reasonably assumed that the spouse had some insight into the personality of the patient before the accident. As the study is limited to subjects who are White married males suffering from severe head injury, and given the already mentioned limitations, it was necessary to be realistic about the sample size. As the time to complete the questionnaire took between one and a half to two hours, the tester visited each couple in order to achieve a high return rate. Considering these factors and limitations, the sample size finally consisted of 21 subjects.

The 21 subjects of this study are all White South African wives of husbands, who have suffered from head injury. While the age of wives ranged from 21 to 70 years, with a mean age of 37.76 years, the head-injured husbands ages ranged from 21 to 68 years, with a mean age of 40.48 years. The length of time the spouses have been married ranged from 4 years to 49 years. The mean length of time they had been married was 14.67 years. In other words, the subjects of this study have been married on average for a substantial number of years. Most of the spouses (N = 19) were married to their head-injured husbands at the time of the interview. Two subjects had only recently

separated from their head-injured husbands. In terms of the date of the accident, all of the head injuries occurred between November 1988 and August 1991, with most of the head injuries occurring in 1990 and 1991. Concerning the nature of the accident, most husbands were involved in motor vehicle accidents (N = 16). Four husbands received head injury because they were assaulted, while another husband had an accident while he was paragliding.

Other demographic data revealed that most husbands' level of education indicated a middle class background. Most head-injured husbands had a matric (N = 11), two husbands had a Std. Eight level of Education, four had various diplomas, another three husbands had completed a degree in Bachelor of Commerce, while one husband had completed his Masters degree, and after the head injury and a recovery period was working on his doctorate. The pre-injury occupations of the head-injured husbands varied from personnel consultants to workshop managers, from an estate agent to a director of three companies. However, after the head injury there was a general decline in the work status and the level of responsibilities. Only the one husband writing his doctorate had kept the same level of functioning, and was expanding his level of education. After the head injury, 8 of the husbands were unemployed, one had been medically boarded, and another received disability grant. The other husbands remained active in the work field, but at a reduced level, many becoming clerks.

Procedure and Administration

The questionnaire was divided into four sections. The first part of the questionnaire consisted of questions concerning biographical data, which were followed by questions concerning amongst other things, emotional control, family obligations, work, and social status. This first section was based on the General Health and History Questionnaire, which is used by the rehabilitation and neuropsychological service in the USA (Kreutzer et al, 1990). The second section consisted of the NEO-FFI, while the third part, the Dyadic Adjustment Scale, was followed by two questions, which concluded the questionnaire. (1) "In your own words, how would you describe the personality change, if any, of your husband since the head injury?" (2) "In your own words, how would you

describe the changes of your relationship, if any, with your husband since the head injury?" In terms of time, the administration of the questionnaire ranged from one and a half hours to two hours for each subject. The spouse's telephone numbers had been obtained from the Edenvale Hospital and the rehabilitation centre for head injury, namely Headway, with permission from the respective superiors. The subjects were contacted telephonically, and they were asked if they would be prepared to participate in this study, which guaranteed full anonymity and confidentiality. Only two spouses refused. Although records from as far back as 1989 were consulted, many potential subjects were not traceable. Those that agreed to participate in the study were visited by the tester in order to guarantee that questionnaires were completed, and a high return rate was secured. Also, the responses to the last two questions needed to be taken down verbatim, in order to allow for a thematic analysis.

Instruments

The NEO Five-Factor Inventory (NEO-FFI) was designed for the ease of scoring and interpretation, and was developed to meet the need of a brief and comprehensive measure. The NEO-FFI is a shortened version of the NEO-PI, consisting of five twelve-item scales, that measure the five dimensions (Costa & McCrae, 1989). In terms of reliability, when correlated with the NEO-PI factors, the NEO-FFI scales revealed correlations ranging from .75 for C to .89 for N. The internal consistency for the NEO-FFI scales was calculated using the coefficient alpha. The values were .89 for N, .79 for E, .76 for O, .74 for A, and .84 for C. All these values are smaller than for the corresponding NEO-PI dimensions, but they are still acceptable.

Concerning the validity of the NEO-FFI, the NEO-FFI scales carry with them the same portion of the demonstrated validity of the NEO-PI scales, for they are subsets of the full scales. The convergent correlations range from .56 to .62, and none of the divergent correlations exceed .20. On average, the NEO-FFI scales account for about 75% as much variance in the convergent criteria as do the full NEO-PI factors. This is to be expected with abbreviated scales, for some precision is traded off for speed and convenience (Costa & McCrae, 1991). As it was, the interviews in the present study often

took up to two hours, and given its convenience with the acceptable degree of reliability and validity, the NEO-FFI was a useful measure in this study. The NEO-FFI enabled an assessment and comparison of the personality of the head injured patient before and after the accident, as perceived by his partner. Given that the NEO-FFI includes a version of a scale that is designed especially for an observer, which in this study was the spouse, this inventory is appropriate for this study.

In terms of the validity of the Dyadic Adjustment Scale, the construct validity was established by correlating the Dyadic Adjustment Scale with the most frequently used scale, the Locke-Wallace Marital Adjustment Scale (1959). The correlation between these scales was .86 for married respondents and .88 amongst divorced respondents (Spanier, 1976). The reliability was determined by a measure of internal consistency reliability, namely by the Cronbach Coefficient Alpha. With this conservative estimate, a total reliability of .96 was achieved. Three years later, Spanier and Thompson (1982) study a new sample in the same geographical area. The high reliability of the Dyadic Adjustment Scale was confirmed of the overall scale. The Cronbach coefficient alpha for this sample was .91 for the total scale. the four subscale factors appear robust and account for 94% of the covariance among the items (Spanier & Thompson, 1982). This indicates that there was sufficient high validity and high reliability to justify the use of the Dyadic Adjustment Scale for this study.

The five scales of the NEO Five Factor Inventory (NEO-FFI) were added up separately, according to the procedure described in the NEO Supplement Manual (Costa & McCrae, 1991). Similarly, the four different scales of the Dyadic Adjustment Scale (DAS) were scored according to the procedure set out by Spanier (1976). Therefore, each subject produced a total of eighteen scores, namely nine "before" and nine "after" scores, each being the five NEO and four DAS scores respectively. In order to get scores of differences in the NEO-FFI, the spouses were asked to fill out two different response sets, one for "before the head injury", the other for "after the head injury". In the Dyadic Adjustment Scale, the spouses were asked to respond to each question twice, placing a "X" to indicate "before the head injury" and "Z" to indicate "after the head injury". The scores of differences were established by subtracting the "after" scores from the "before"

scores (Diff = before - after). This makes it possible to determine the direction of the change from "before" to "after" the head injury. Raw scores were used in the NEO-FFI, and mean scores as percentages in the DAS, because standardised scores in such a small sample could misrepresent the distribution of the data.

In addition, certain biographical data were included, namely the length of time they had known each other, the length of the marriage, the ages of the head-injured husband and spouse respectively, the time since the injury in months, and the perceived changes in emotional control, work status, family obligations, and social status.

The Analysis of Data

In all cases, the related t-tests were used to assess differences in scores between the perception before the brain injury and after the brain injury. The related t-test is suitable for repeated measures designs (McCall, 1986), in this case when one subject provides two scores ('before' and 'after'), as in the present design. The t-test is a parametric measure, and although in this study a small sample has been used, the widespread, well-founded and consistent use of this test in research (McCall, 1986), allows for the application of this test in this study. Given the small sample size and large number of analyses, a conservative alpha level of 0.01 is set and a difference is called 'significant' only if $p < 0.01$ (on two-tailed tests of significance). Pearson's Product-moment correlations were computed between all variables, which enables an assessment of the strength of relationships, such as between the variable of perceived 'dyadic satisfaction' after head injury with the variable of 'conscientiousness' after the injury. All analyses were done using the SAS package (SAS Institute Inc., 1990).

CHAPTER FIVE
RESULTS

The Results of the NEO-FFI

The means on each of the personality factors, both before and after the brain injury, are given below in table 1. The N, E, O, A, C abbreviations in table 1 refer to the following: N = neuroticism, E = extraversion, O = openness, A = agreeableness, C = conscientiousness.

Table 1: The means of raw scores of the NEO-FFI personality factors

factors	N	E	O	A	C
before head injury	19.29	30.43	21.67	25.33	32.52
after head injury	30.19	20.81	20.23	25.38	21.52
t-value (df = 20)	-3.501	6.612	1.086	-0.016	4.569
probability t ≠ 0	0.0022	0.0001	0.2900	0.9800	0.0002

The differences on the neuroticism factor (N) reached significance, suggesting that the husbands after the head injury were perceived by their spouses to have become more "neurotic". The differences on the measure of the extraversion factor (E) also reached significance, implying that the head-injured husbands were perceived as having become more "introverted". The shift in the conscientiousness factor (C) equally designates significance, which could be taken to indicate that the head-injured husbands were experienced by the spouses as being less cooperative and less "conscientious". The differences of the openness factor (O) failed to reach significance, which might mean that the spouses perceived their head-injured husbands as being either as closed or "open" as before the injury. Similarly, the shift of the agreeableness factor (A) was not significant,

which is a possible indication that the wives of head-injured husbands did not perceive any major change in the "agreeableness" of their personality.

The NEO scores need to be converted to standard scores and examined within the context of the inventory or normative profile. The standard scores of this inventory profile have a mean of 50 and a standard deviation of 10. This normative profile is divided into score sections, ranging from 25 to 75. The 'very low' range is situated between 25 and 34.49, while standard scores from 34.5 to 44.49 fall within the 'low' range. The 'average' range is situated between 44.5 and 55.49, while the 'high' range reaches from 55.5 to 65.49, and the 'very high' range is situated between 65.5 and 75. The 'before' N mean, converted to the standard score of 52 falls within the 'average' range of 'neuroticism', while the 'after' N mean, converted to the standard score of 67, falls within the 'very high' range of 'neuroticism'. Equally, the 'before' E mean, when converted to the standard score of 55, falls within the higher 'average' normative range, while the 'after' E mean, converted to the standard score of 38, is within the 'low' range. The difference between the 'before' and 'after' C means according to the normative profile is also revealing, in that the 'before' C mean, converted into the standard score of 46, falls within the 'average' range of 'conscientiousness', while the 'after' C mean, converted into the standard score of 28, falls within the 'very low' range of 'conscientiousness' Both the 'before' and 'after' A mean convert to the standard score of 36, while the 'before' and 'after' O means convert to the standard scores of 38 and 40 respectively. Considering these A and O converted means, what is revealing concerning the normative profile, is that the husbands even before the head injury are categorised as falling within the 'low' range of 'agreeableness' and 'openness' to experience. These results will be discussed in greater detail below.

The Results of the Dyadic Adjustment Scale

The means on each dyadic adjustment scale, both before and after the brain injury, are given below in table 2. The mean scores were converted into percentages so that the units could be directly compared. The abbreviations in table 2 refer to the following:

DCON = Dyadic Consensus, AE = Affective Expression, DS = Dyadic Satisfaction, DCOH = Dyadic Cohesion.

Table 2: The means as percentages on the Dyadic Adjustment Scale

subscales:	DCON	AE	DS	DCOH
before head injury	65.5%	62.8%	69.0%	42.1%
after head injury	68.0%	51.7%	61.6%	34.6%
t-value (df = 20)	-0.473	1.672	1.070	1.252
probability t ≠ 0	0.6411	0.1101	0.2973	0.2249

The differences on the Dyadic Consensus (DCON) measure does not approach significance, which could suggest that the spouses do not experience consensus to have changed since the head injury. The shift of the Affective Expression (AE) measure also fails to reach significance, which might mean that the spouses do not perceive a major change in the expression of affection in their relationship with their head-injured husbands. The difference on the Dyadic Satisfaction (DS) measure was equally not significant, which could indicate that the level of satisfaction in the relationship has not changed with the event of the head injury of the husband. The difference on the Dyadic Cohesion (DCOH) measure also does not approach significance, thereby possibly indicating the spouses' commitment to the relationship. In summary, no significant differences before and after the head injury were evident, although a general decline is noticeable.

Correlations between Variables

The correlations that are particularly valuable for this study concern those variables dealing with personality factors after the head injury in relation to relationship factors

after head injury. Also, the above scores of differences, denoted as "diff" were correlated with all the other variables. These correlations in the table below are directly related to the aim of this study, and hence will be focused on. The meaning of the significant correlations will be discussed in the next chapter.

Table 3: Correlations between personality and relationship variables

	Nafter	Eafter	Oafter	Aafter	Cafter	Ndiff	Ediff	Odiff	Adiff	Cdiff
DCONafter	-.21	.14	.40	.72**	.35	.22	-.19	-.39	-.58**	-.35
AEafter	-.35	.22	.39	.22	.47*	.27	.13	-.21	-.40	-.33
DSafter	-.62**	.44*	.39	.57**	.66**	.59*	-.42	-.66***	-.72***	-.66**
DCOHafter	-.27	.44*	.38	.41	.58**	.36	-.30	-.35	-.50*	-.61**
DCONdiff	.42	-.19	-.39	-.63**	-.44*	-.56**	.37	.66**	.77***	.56**
AEdiff	.44*	-.26	-.28	-.34	-.49*	-.42	.22	.48*	.63**	.52*
DSdiff	.63**	-.31	-.39	-.62**	-.53*	-.76***	.52*	.68***	.88***	.66**
DCOHdiff	.39	-.39	-.32	-.46*	-.55**	-.49*	.43	.50*	.68***	.74***

* = p<.05; ** = p<.01; *** = p<.001

Correlations between NEO-FFI 'after' scores and DAS 'after' scores:

All four DAS subscale 'after' scores correlate negatively with 'N-after' score, but only one correlation coefficient is statistically significant: higher levels of 'N-after' relate with lower levels of 'DS-after'. The four DAS subscale 'after' scores correlate positively with 'A-after' and 'C-after', with two coefficients being significant in each case: lower levels of 'A-after' and of 'C-after' are associated with lower levels of 'DS-after', lower levels of 'DCON-after' with lower levels of 'A-after', and lower levels of 'DCOH-after' with

lower levels of 'C-after'. The 'E-after' score has marginally significant correlations with 'DS-after' and 'DCOH-after' scores: lower levels of 'E-after' associated with lower DAS scores. The four DAS scores correlate positively with 'O-after', but these coefficients do not reach statistical significance. All coefficients are in meaningful directions and the proportion of coefficient that are significant at @ 0.01 level (i.e. 5/20) is well above the expected number of Type I errors ($p < 0.001$ by binomial expansion (Wilkinson, 1951)).

Correlations between NEO-FFI 'diff' scores and DAS 'diff' scores:

Correlations between difference scores must be treated with caution because of measurement errors. However, all coefficients are in meaningful directions, and 11 out of 20 coefficients are significant at @ 0.01 level or better ($p < 0.0001$ by binomial expansion (Wilkinson, 1951)). Increments in 'N-diff' are associated with decrements in all DAS scores, with two significant coefficients, namely 'DCON-diff' and 'DS-diff'. Decrements in 'O-diff' are related to decrements in DAS scores, with two significant coefficients, 'DCON-diff' and 'DS-diff' respectively. Decrements in 'A-diff' are associated with decrements in DAS scores, and all four coefficients are significant. Decrements in 'C-diff' are related to decrements in DAS scores, and three coefficients are significant, namely 'DCON-diff', "DS-diff', and 'DCOH-diff' respectively. In sum, the perceived changes in 'dyadic consensus' and 'satisfaction' most reliably are associated with perceived changes in personality. Perceived changes in 'dyadic cohesion' related significantly only to perceived changes in 'agreeableness' and 'conscientiousness'. Perceived changes in 'affective expression' only associated significantly to perceived changes in 'agreeableness'.

Correlations between NEO-FFI 'after' scores and DAS 'diff' scores:

These correlations reflect patterns seen in correlations discussed in the previous two sections, in that higher 'N-after' score is associated with decrements in DAS 'diff' scores, and lower 'A-after' and 'C-after' scores are related to decrements in DAS 'diff' scores. These correlations are overall weaker than others, but 4 out of 20 are significant at @ 0.01 level ($p < 0.001$ by binomial expansion (Wilkinson, 1951)).

Results from the Interview

The number of responses concerned with the perceived changes in emotional control since the head injury are given in table 4. The number of responses dealing with the perceived changes in work status, family obligations, and social status are given in table 5. The data for these tables were taken from the first part of the questionnaire, which was based on the format of the General Health and History Questionnaire (Kreutzer et al, 1990).

Table 4: Frequency of responses concerning emotional control, (N=21)

better emotional control	3
less emotional control	16
same emotional control	2

Table 5: Frequency of responses concerning work status, family obligations, and social status, (N=21)

	work	family	social
cannot fulfil obligations	9	9	9
reduced obligations	8	7	7
unchanged functioning	4	5	5

Although in three cases the interviewed spouses perceived an improvement of emotional control of their head-injured husbands, most spouses interviewed perceived a decrease in emotional control, with two subjects claiming that there was no change in emotional control. Equally, when considering the work status, family obligations and the social status of the head-injured husband, more than 75% of the spouses interviewed reported a deterioration within all the three areas of activity.

In conclusion, these results may be taken to indicate that the perceived personality changes according to the NEO inventory occurred in relation to the personality factors of "neuroticism", "extraversion", and "conscientiousness". No significant differences before and after the head injury were expressed by the spouses in terms of the dyadic adjustment scales, although a general decline can be noted. The spouses reported perceived differences between before and after the head injury, with regards to the emotional control of the head-injured husband, his work status, his family obligations, and his social status. In order to establish the effects on the Dyadic Adjustment Scale of the responses of the three subjects who stated that there was a clear improvement since the head injury, their responses were removed and the differences re-computed. The basis on which the three subjects were identified were their responses to the question about emotional control, to which they responded by choosing the option "better". Thus on a basis independent of the DAS, this adjustment was performed. The result was that on the 'affective expression' subscale, the difference before and after head injury reached marginal significance ($t(17) = 2.437$; $p = 0.261$). This indicates that for most subjects there is a decrease in emotional expression and sharing within the relationship since the head injury.

Qualitative Data

After filling out the questionnaire, two questions were asked of each subject. (1) "In your own words, how would you describe the personality change, if any, of your husband since the head injury?" (2) "In your own words, how would you describe the changes of your relationship, if any, with your husband since the head injury?" The rationale for these questions was to allow more subjective responses and more subtle relations of

meaning to emerge, which might give a more direct insight to the perceptions of the spouse, since the inventories were not specifically designed for wives of head-injured husbands. The hope was to engage specific common themes in the answers of the spouses. A thematic analysis, based on the phenomenological method (Kruger, 1979; Schutz, 1978), reveals the common and overlapping themes. The themes tabulated below represent only those major themes that were specifically mentioned by the subjects on their own accord. One subject could of course have referred to more than one theme.

Table 6: Frequency of themes concerning personality changes after head injury

a different person	12
more self-centred	9
higher levels of aggression	8
greater mood swings	13
more passive	13
more depressed	11
more perfectionistic	3
more family orientated	3

To illustrate some of the above mentioned themes, it is worthwhile to quote some of the spouses' statements. In relation to the personality change, one spouse commented: "It is like learning to know a new person, and to accept them. It is not the person you married, you're dealing with a stranger." In a similar vein, another wife said: "You're married to a different person. On the outside, he seems the same to his friends, but day to day it's not the same." Another subject stated: "You are shocked when you realise he has changed. You don't believe it, and at first you don't want to believe it." Some

positive personality changes are given by one of the three subjects who noted a general improvement: "He has become much calmer, more willing to tolerate, and is far less aggressive. I just feel so grateful. It is as if there are less negative traits, and he is less defensive." Another spouse put it like this: "It was literally like lightening, the change I mean. He is a different person, like black and white, even in the way he dresses. Before he was such a yuppie, and now he has long hair. He is much softer now, and doesn't take me for granted."

In terms of depression, one spouse noted that, when "he is down, he gets indecisive, confused, and even anxious. He is more self-centred then, and makes it a living hell for everyone." The mood swings were described by another wife as "a roller coaster ride with ups and downs, and it's like staying with a different person." In relation to passivity and dependence spouses have commented in the following manner: "He has become more passive, even placid, and I hate to see that." "Before he was so sporty, and now he isn't at all." Another spouse said: "He was much stronger, more domineering, the leader and supporter. Now I take the lead." "I used to look up to him, but now I have to be the strong one, and that's a big responsibility." A good description was given by one spouse: "It is like a buffer, a muffler is over his brain. He has become encapsulated. Everything comes out slower, duller, less enthusiastic. He has lost his spark. The buffer cuts him off internally, but also cuts him off from his environment, and it dissipates energy coming in. So he got depressed, suicidal, and refused to do something."

The themes tabulated in table 7 represent only those major themes that were specifically mentioned by the spouses concerning the changes of the relationship since the head injury of their husbands.

Table 7: Frequency of themes concerning relationship changes after head injury

more responsibility for the spouse	16
more lonely spouse	13
more dependent husband	13
less affectionate husband	14
more affectionate husband	3
less intimate relationship	8
more intimate relationship	4
less stable relationship	11
more stable relationship	3
tough love expressed by spouse	6

In terms of responsibility, one spouse commented that, "there is only you, no one to turn to. I can't say 'I've had a terrible day', you cannot, it's not there, any response." Another spouse said: "You are carrying all the responsibility. It is suddenly thrown at you, at a blink of an eye." One wife spoke about how it had affected her: "There is a lot of uncertainty, and you withdraw. It affects my personality. I'm not the same person anymore, and the spouses should also get some support." In relation to intimacy, one subject stated that, "my husband tries, but I push him away, because it is like being with a different person." The issue of intimacy was expressed in the following way: "It's difficult. There is no sex at all. He is less sensitive now to me, and he is afraid I would leave him. There is a different person, if I could just have the other person back. There is a distance. It's very difficult, very exhausting. I can't talk to him anymore."

Another subject put it this way: "I cut off fulfilling needs from him. I'm afraid to open up, for he can't handle my needs. I'm not sure of his response, and I'm afraid of hurt or rejection." Another spouse used virtually the same words: "I cut myself off, because he would suddenly change, his violent mood swings. I'm no longer affectionate, for I have changed." Another spouse put it differently: "I had to actively amputate my feelings. I deny my emotions. I'm afraid of letting him close, because he could disappoint me. Also, I'm not sure whether I'm a mother or a wife." That was also stated by another wife, who said the following: "It changed from an equal partnership to an asymmetrical one, it's like having another person in bed. I was doing for five what two did for four people. He was like a baby, and I suddenly had five babies, from a husband to a dependent." One subject shared the following: "I got fed up with his changes and mood swings. I would get so depressed, I'd cry. I can't share my thoughts, and I feel very lonely. He will react to what I say, and that makes it worse, so I keep quiet."

Where positive changes have occurred, one wife stated: "There is a different basis. We had a great sex life with drive. But when it came to confiding, well... And now he can do that now. The physical side has lessened, but it is more rounded emotionally and physically. It's much more friendship orientated, much more caring as an individual." Another subject said: "He is much softer, less defensive, and I was surprised. It took me time to adjust. I was surprised about the changes." Also, one spouse put it this way: "I think I'm very concerned and sympathetic, maybe I'm more loving. He has become more clingy, and he is so happy to see me, his face lights up." Similarly, another spouse commented: "He has become more dependent, and more appreciative. He doesn't take me for granted anymore." Importantly, six spouses commented on their "tough love" approach, as being an important feature in their relationship with their husbands. One spouse expressed herself colourfully, when she stated:"I had to wear heavy boots and do some serious butt kicking." Another one said: "I had to push him every day, everyday to make him walk, to make him do things, to make him do his exercises." What one spouse said was that it, "wasn't always easy to be so tough, but otherwise nothing would happen. His parents thought I was too hard on him, but I was not going to treat him as a child."

In two interviews, t. ad-injured husbands were present, and right towards the end of the interview, both made comments that are worth repeating. The first husband said: "It is very, very important that my wife is around, and that she pushed me so hard. Without her, I would not be where I am at now." In a similar manner, the second husband stated: "I expected her to leave me. I don't know how it would have been possible to get this far, if she hadn't been there." These two quotes stand as a tribute to the dedication and commitment of the spouses of head-injured husbands.

CHAPTER SIX
DISCUSSION

Although a substantial body of literature discusses the effects of head injury on familial and marital relationships, most of the literature has reviewed data in an anecdotal form. Little attention has been given to research systematically the claims of personality change after head injury. In relation to the hypothesis of this study, the prediction would be that the spouse's perception of her head-injured husband would relate to the changes in the marital relationship.

Firstly, the spouse's perception of the personality change after the head injury was investigated with the NEO Five Factor Inventory (NEO-FFI). On the five scales of the NEO-FFI, the spouses scored significant differences in their perceived comparison of their husbands' personality before and after the head injury, namely the 'neuroticism' (N), 'extraversion' (E) and 'conscientiousness' (C) factors. Discussing the 'neuroticism' factor (N) first, the significant differences means that the spouses perceived in their husbands an increase of emotional instability and maladjustment after the head injury. Within the normative profile of the NEO-FFI, the sample's mean 'N-after' measure falls within the 'very high' range. It has been noted that, as is evident from these results, "high scorers may be at risk of some kind of psychiatric problems" (Costa & McCrae, 1985, p. 9). This tallies well with the psychiatric sequelae often described with head injured persons, as discussed above. In addition to anxiety, high scorers are perceived as being more likely to experience feelings of anger, sadness, embarrassment, and other negative emotions (Costa & McCrae, 1985). Thus the wives perceived their husbands being more prone to anxiety, and as being more tense and jittery than before the head injury. They saw their head-injured husbands as being more impulsive and less able to control anger than before. More feelings of insecurity, loneliness and hopelessness of their head-injured husbands are registered by the spouses. Such feelings of depression were often coupled with a negative self-image and low self-esteem with general feelings of shame and inadequacy. The spouses also experienced their head-injured husbands as being more vulnerable and dependent than before. All of this correlates well with the

more anecdotal material (Eames, 1990; Levin & Grossman, 1978; Lezak & O'Brien, 1990; Lishman, 1973; Wood, 1984).

In terms of the 'extraversion' factor (E), the spouses' responses produced a significant difference. The mean 'E-after' measure falls within the 'low' normative range. This signifies that the spouses perceived their head-injured husbands to have become more introverted since the head injury. Introverts need not be considered in a negative manner, for they could be reserved rather than unfriendly, independent rather than submissive, even-paced rather than sluggish (Costa & McCrae, 1985). However, given the very high N score in conjunction with the low 'extraversion' (E) score, it is more likely that the overall introversion perceived, is experienced in a more negative light. If a high E score refers to "emotional warmth and affection", "gregariousness", "assertiveness", "activity", and "excitement-seeking" (Costa & McCrae, 1985, p. 11), then the spouses experienced their husbands as being less emotionally demonstrative and more emotionally blunted since the head injury. The high dependency, as depicted by the N score, also means a lesser degree of assertiveness. Given that research suggests that extraversion is also related to low negative affectivity (Watson & Clark, 1984) a reduction in extraversion after the head injury (low E score) means that the head-injured husbands were experienced as having little enthusiasm, fewer moments of joy and pleasure. Another important characteristic expressed by a low E mean score is the higher degree of social withdrawal, passivity, lethargy, and inertia that spouses perceived in their husbands since the head injury. This was supported by the qualitative data gathered, and is also a recognised feature of head-injured persons, as depicted in the literature (Grownwall et al, 1990; Lezak, 1988; Prigatano, 1987b).

The final significant difference in the NEO-FFI concerns the 'conscientiousness' factor (C). According to the normative categories of the NEO-FFI, the mean 'C-after' measure falls within the 'very low' range. The spouses perceived their husbands as having become less conscientious, less reliable and more inconsistent since the head injury. The spouses felt that their husbands were unable to cope or organise their life on their own. Since the head injury, they were perceived as being less goal orientated, lethargic, and having no direction in life. In some cases there was a low need to achieve, while in

others there was a low achievement rate, although a strong desire to achieve. Consequently, this often lead to frustrations and depression, as the literature has revealed (Brooks, 1988; Lezak & O'Brien, 1990; Thomsen, 1990; Walsh, 1985). With a very low C score, there is often a lack of self-discipline involved (Costa & Mc Crae, 1991), something the spouses emphasised in their personal statements. Such low C scores also refer to a certain aimlessness and carelessness, combined with a negligent attitude and a generally weak-willed nature (Costa & McCrae, 1991). This perception of the wives is supported by the literature (Kay & Lezak, 1990; Liss & Willer, 1990; Wood in Brooks (ed.), 1984). The combination of a very high N mean score and a very low C mean score could mean a higher degree of impulsiveness and a general lack of ego resilience (John, 1990).

These scores within the normative framework of the NEO-FFI, namely a very high N mean score, a low E mean score, and a very low C mean score on the 'after' measures, basically reflect themes already mentioned in the literature. There was no significant difference between the before and after head injury score with respect to the 'openness' factor (O). This O factor refers to "active imagination, aesthetic sensitivity, receptiveness to inner feelings, intellectual curiosity" (Costa & McCrae, 1985, p. 12). Both sample's mean 'before' and 'after' measures on the O factor fall within the 'low' category of the normative profile, which means that in this sample, the spouses did not consider their husbands to be open to such experiences either before or after the head injury. This might be indicative of a bias in the sample concerning a personality factor. The lack of significant difference might be due to the fact that this study had a small sample. However, a small but not significant drop in the score was noted, which is indicative of the general decline experienced after head injury. A larger sample in future research could establish the significance of this factor for head injury.

What did not quite conform to expectations was the difference between the before and after head injury scores on the 'agreeableness' factor (A). A significant difference on this factor was expected, given that the factor "assesses the quality of the interpersonal orientation" (Costa & McCrae, 1991, p. 2). Both the 'A before' and 'A after' mean scores fall within the 'low' range of the normative profile. This suggests that the

head-injured husbands were not perceived by their wives as being agreeable even before the head injury. Thus, before the head injury, the husbands were generally experienced as being possibly uncooperative and contrary. They perceived their husbands as restraining and withholding, and maybe even discouraging, avoiding involvement and collaboration. 'Low' range of 'A after' could also refer to a certain degree of hostility and aggression, or oppositional behaviour on part of the husbands. However, this in a way strengthens the significant scores of the other factors, in that it could not be said that the wives' perception was tainted by the idealisation of the past. Also, even when the husbands were generally not agreeable before the head injury, the spouses still perceived a deterioration of the whole personality after the head injury. This means that even in a difficult marriage, the personality change can still be experienced as being significantly different after head injury. Thus, the low A mean score gives the responses of the spouses a certain degree of realistic appraisal and honesty, which merely strengthens the findings of this study. It suggests that the halo effect of the perceived personality change before the head injury is either minimally operative or even absent.

On the whole, the results from the NEO-FFI indicate that the wives perceived a general deterioration in the personality after head injury. This is supported by the findings from the questions dealing with emotional control, work status, family obligations, and social status. Seventy-six percent of the spouses claimed that there had been a decline in emotional control in their husbands since the head injury. Two subjects reported no major changes, while in three cases an improvement of emotional control was reported. Similarly, the perceived deterioration of functioning of the head-injured husband was expressed in relation to the work status, which was reported by 81% of the spouses. In terms of the head-injured husband's family obligations and social status, 76.% of the spouses in this study perceived a deterioration in functioning in the above mentioned areas. Clearly, the spouses perceived a real deterioration in their husband's lives when compared to before the head injury.

Concerning the scores from the Dyadic Adjustment Scale, no significant measures in terms of the difference between before and after the head injury were established. This would seem to indicate that no major changes have occurred since the head injury. The

changes in the relationship according to the 'dyadic consensus', 'dyadic satisfaction', 'dyadic cohesion' and the 'expression of affect', however, do indicate general declines after the head injury, as perceived by the spouses, but not statistically significant changes. Half of the subjects responses there is actually an increase in the score along the 'dyadic consensus' subscale after the head injury, compared to before the head injury. This seems at first contradictory to common sense expectations.

The 'dyadic consensus' in this dyadic adjustment measure refers to agreements or disagreements concerning family finances, recreational matters, religion, philosophy of life, common aims, goals, and decisions. Since the head-injured husband is often not able to make any major decisions in most areas of his life, his wife often takes over the decision making process and carries sole responsibility, which is not unusual (Brooks, 1984; Lezak, 1988; McKinlay et al, 1981). This was reflected in the behavioural sequelae of the head-injured husband's passivity, social withdrawal (low E score), as well as his difficulty in organising and planning, and lack of impulse control (very low C and very high N score). The carrying of sole responsibility was an often-mentioned concern of the spouses, as was expressed in the qualitative data. All of this indicates that in the process of decision making, there were less disagreements between the spouse and head-injured husband compared to before the head injury. The experience of less disagreement after the head injury expressed itself as higher scores on the 'dyadic consensus' subscale in half of the subjects interviewed. Thus the high 'dyadic consensus' score after head injury in half of the subjects reflected not so much a greater degree of harmonious consensus in the marriage after head injury, but rather a lack of disagreement on the basis of not being able to make joint decisions.

It was necessary to analyse more carefully the item that is used to measure 'dyadic consensus'. It was noted that most wives ticked off the category 'strongly agree'. It seems that the spouses chose to read 'strongly agree' or 'agree' as an absence of conflict, owing to the passivity of the head injured husbands, rather than as an agreement based on consensus or compromise. When the items of this particular subscale were analysed, it seems that the 'dyadic consensus' subscale, with it's scale ranging from 'strongly agree' to 'strongly disagree' (Spanier, 1976), was unsuitable to measure the degree of an

absence of agreement based on the spouse's sole decision-making role in the relationship. It might therefore explain why no significant score of difference was obtained. However, it must be stated that in three cases, the 'dyadic consensus' indicated a real improvement, as was evident from the qualitative data obtained from these three subjects.

As already mentioned, these three subject's responses were removed from analysis in order to arrive at some understanding of their effect on the difference scores. The results then clearly indicated a difference between before and after the head injury on the subscale of 'affective expression'. This means that most of the spouses felt that after the head injury, less feelings were expressed in the marriage than before. The reasons for these results could be found in the responses of the spouses to the last two questions. It could be inferred that it was no longer safe to share intimate feelings because the head-injured husband did not show the same sensitivity as before. Also, if he was experienced as being a different person, expressing feelings towards an emotional stranger was difficult. Another possible explanation could be that affective expression decreased because the husbands themselves had become less expressive, as indicated by the low E score.

When the results of the Dyadic Adjustment Scale are compared to the qualitative data, to the actual statements of the wives about the relationship, it seems that on the whole, the Dyadic Adjustment Scale was not able to capture the subtle but profound changes the wives perceived in the marriage since the head injury. The Dyadic Adjustment Scale turned out to be not really sensitive to the deterioration of the marital quality after the head injury. For example, of 32 items only 2 items deal with physical intimacy. In one item the spouse is asked whether being too tired for sex is a problem in the relationship. The other question is: "Do you kiss your mate - every day, almost every day, occasionally, rarely, never?" (Spanier, 1976, p. 28). All subjects stated that they kiss their husbands every day, yet that is hardly indicative of 'dyadic satisfaction', which this item claims to measure. To paraphrase a spouse's comment about this item, a good-bye kiss in the morning before going to work cannot be viewed on the same level as the sexual intimacies and problems of dealing with a head-injured husband. Some wives commented

that they felt that the questions of the DAS were not sensitive enough to highlight their specific problems. On the whole, the statements of the spouses rather than the results of the Dyadic Adjustment Scale were more helpful in comprehending the quality of the marital relationship and the adjustment that is required after the head injury.

In the analysis of Pearson's correlation coefficients, the relationship between the perceived personality changes of the head-injured husbands and the changes after the head injury in the marital relationship become significant. The correlation coefficients between NEO-FFI 'after' scores and DAS 'after' scores reveal that all four DAS subscale 'after' scores correlate negatively with the 'N after' score, but only one coefficient is statistically significant, namely higher 'N-after' negatively correlates with 'DS-after' (-.62). Higher levels of 'neuroticism', anxiety or emotional instability after head injury is associated with a lower level of 'dyadic satisfaction' after the head injury. Therefore, the perceived dissatisfaction in the relationship since the severe head injury is related to the perceived negative personality change in the head-injured husband.

Also, the four DAS subscale 'after' scores correlate positively with the 'A-after' and 'C-after' scores, with two correlation coefficients being significant in two cases. The 'DS-after' variable correlates significantly with the 'A-after' variable (.57), and lower levels of 'A after' relate significantly to lower levels of 'DCON-after' (.72). This means that the spouses' perception of lower levels of 'agreeableness', uncooperativeness, or hostility is associated with lower levels of 'dyadic satisfaction' and 'consensus' in the relationship after the head injury. The head-injured husbands' lack of 'agreeableness' related intelligently to how the spouses' experience less satisfaction and consensus within their relationship with their husbands.

Further significant positive correlations are found in the relation of lower levels of 'C-after' scores to lower levels of 'DS-after' (.66), and lower levels of 'DCOH-after' (.58) respectively. The 'E-after' score has marginally significant correlations with 'DS-after' scores (.44) and 'DCOH-after' scores (.44). which mean lower levels of 'conscientiousness' and 'extraversion' are associated with lower levels of 'dyadic satisfaction' and 'cohesion'. Thus for the wives, the resultant general inadequacy, an

well as unpredictability, dependability and unreliability are importantly related to the spouses experiences of both satisfaction and cohesion in marital relationships, in that satisfaction and cohesion were disturbed by the presence of an effectively different personality after the head injury. In a way, this indicates how tenuous the relationship with head-injured partners is, and how the relationship is perhaps no longer merely essentially dyadic in nature, but the high degree of dependability could bring about a more care-giving relationship, as found in the mother-child relationship. This was commonly expressed in the personal statements of the spouses, and is supported by the literature (Camplair et al, 1990; Liss & Willer, 1990; Mauss-Clum & Ryan 1981; Zeigler, 1987). What these correlations reveal is that the significant personality factors are meaningfully related to the perceived satisfaction, cohesion, and consensus in the relationship.

The perceived 'affective expression' or 'AE-after' variable approaches a significant positive correlation with the 'C-after' variable (.47). As the qualitative data also suggests, the spouses had greater difficulties in expressing their feelings after the head injury. This is related to the fact that the head-injured husbands had become more impulsive, more unpredictable, and unreliable. Such interpretation is also supported by the significant difference on the AE subscale of the DAS, when the responses of three subjects, who reported marked improvements in their husbands since the head injury, were removed and the differences re-computed. The spouses found it difficult to risk expressing intimate and sensitive feelings, as secure emotional space was not guaranteed. Also, the high degree of dependability of the husbands since the head injury brought about more motherly feelings, as was expressed in the personal statements made by the spouses. Thus often the sharing and the expression of feelings within an equal relationship, including sexual feelings were suppressed. This means that, given the significant differences of perceived personality factors before and after head injury, the findings suggest that the dyadic relationship is significantly and profoundly affected by these important personality changes of the head-injured husbands. Such results are supported by the more anecdotal and clinical findings of the literature (Brooks et al, 1986; Lezak, 1986; Thomsen, 1984; Oddy et al, 1978b; Weddel et al, 1980).

Concerning the significant correlations that involve the variables of differences, some important findings emerge. Increments in 'N-diff' are associated with decrements in all DAS scores, with two significant coefficients, namely 'DCON-diff' (-.56) and 'DS-diff' (-.76). Also, decrements in 'O-diff' are related to decrements in all DAS scores, with two significant correlations, 'DCON-diff' (.66) and 'DS-diff' (.68) respectively. Thus, the perceived changes in 'dyadic consensus' and 'satisfaction' significantly relate to the personality changes concerned with an increase in 'neuroticism' and a decrease in 'openness'. Furthermore, decrements in 'A-diff' are associated with decrements in DAS scores, and all four coefficients are significant ('DCON- diff' = .77; 'AE-diff' = .63; 'DS-diff' = .88; 'DCOH-diff' = .68). Decrements in 'C-diff' are related to decrements in DAS scores, and three coefficients are significant, namely 'DCON-diff' (.56), 'DS-diff' (.66), and 'DCOH-diff'(.74). In sum, the above mentioned correlations of differences indicate that perceived changes in 'dyadic consensus' and 'satisfaction' are most reliably associated with perceived changes in personality. Perceived changes in 'dyadic cohesion' related significantly to perceived changes in 'agreeableness' and 'conscientiousness', while perceived changes in 'affective expression' in the relationship is significantly only associated with perceived changes in 'agreeableness'. The findings suggest that changes across most personality factors, were perceived by the spouses as being central to the relationship after the head injury, for it implies that even minor personality changes, for example the 'A-diff', were experienced as being central in affecting the dyadic relationship. This means that the perceived changes in personality themselves, whether minor or major, relate significantly to the perceived quality of the relationship after the head injury.

Correlations between the NEO-FFI 'after' scores and DAS 'diff' scores reflect a similar pattern, as noted in the discussion of correlations above. Higher 'N-after' score is associated with decrements in DAS scores, and lower 'A-after' and 'C-after' scores are related to decrements in DAS scores. These correlations are overall weaker than others, but 4 out of 20 coefficients are significant. On the whole, these significant correlations support the findings that the spouses' perceived changes are significantly related to the personality factors of 'neuroticism', 'agreeableness', and 'conscientiousness' after the head injury.

Beyond the significant correlations, it is important to note that all correlation coefficient indicate meaningful directions. Thus despite the lack of significance in the mean difference DAS scores, nonetheless the coefficients of the DAS scores were in many cases significant, and in all cases meaningful in terms of directions. This means that the DAS scores, in the context of correlations, are supportive of the hypothesis of the present study.

A discussion of the qualitative data is concerned with the spouses' statement or verbatim quotes. As already mentioned, these statements about the marital relationship did not concur with the DAS results. The statements of the spouses seem to be revealing of the issues involved. These statements are often self-explanatory or self-evident in the phenomenological sense. There is no need to reiterate the results in this chapter, but rather to explore certain central issues will be more useful. What became evident in the interviews how similar phrases would often be used by subjects without them having had contact with one another. The head-injured husband was repeatedly described as being "a different person". This is one of the most central themes that emerged with 12 out of 21 subjects. Similar statements have been reported in the literature, as discussed above (Lezak, 1988; Mauss-Clum, 1981; Thomsen, 1990; Zeigler, 1987). The other nine subjects referred to personality changes, but denied that their husbands were "different persons". The importance of this theme lies in its relation to the NEO-FFI results, in that the spouses' statements actually refer to a category shift concerning the personality after head injury. These spouses did not mean that a certain personality trait had become more extreme or less prominent, they referred to a new constellation of personality traits. This important finding could bring into question whether the NEO-FFI could in fact pick up such a sense of difference experienced by the spouses. Thus these statements might be referring to personality 'types', which the NEO-FFI does not register. However, it could also mean that in a 'profile' analysis of the NEO-FFI, a combination of differences on the various scales may relate to a radical change in personality. The present study's sample is, however, too small for any further analysis along these lines.

Often related to this categorical shift of personality, was the fact that the spouses had immense difficulties in expressing their feelings as they had done before the head injury.

After the head injury, there was less intimacy and less affection in relation to this 'different' person, although the feelings of commitment were still present. This situation increased the loneliness of the spouses, and often brought changes about within themselves. "I have changed"... "I actually amputate my feelings"... "I'm not sure whether I'm a mother or a wife". These statements indicate that when the category shift of personality in their husbands was experienced, it also changed them. In one aspect the spouses took on more of a care-giver role, which was often epitomised by the mother figure. Thus the perceived roles in the relationship changed with the perceived personality changes after the head injury.

The statements about increased responsibility relate to the increased role of the care-giver, and the higher degree of dependency and passivity in the husbands since the head injury. Often a fundamental lack of trust in their husband's capability in taking over responsibility was expressed, which was based on the powerful mood swings, the cognitive deficits, as well as the lack of insight into their own disability.

Other central themes concerning personality that emerged were related to the husbands' mood swings, their depression, and their passivity. This was supported by the analysed responses from the questionnaire, especially the very high N score, the low E, and the very low C score. In three cases, a higher degree of perfectionism was noted, which does not refer to the three spouses who reported a general personality improvement. Rather, here a higher degree of obsessionality is described, which could be an adaptation of the husband to cope with his deficits, and which has been reported in the literature (Lezak & O'Brien, 1990; Thomsen, 1990).

The theme of self-centredness refers to the spouses' experiences of their husbands being more self-centred, and at times more egotistical since the head injury. The spouses commented on the self-absorption, which often relates to their husbands' depressive affect. The higher degree of self-centredness in their husbands makes it difficult for the spouses to share feelings, for they felt that their feelings were not considered, if they were recognised at all. Spouses stated that they felt they could not express themselves or their pain and difficulties, for they risked hurt, indignation, in one case even attacks. The

self-centredness experienced was also related to the husbands' lack of insight into his disability. The husbands were often not aware what effect they had on others and their spouses, and pointing this out often was met with denial by the head-injured husbands, as has been reported in the literature (Lezak, 1986; Liss & Willer, 1990). The statements concerning a higher degree of aggression in their husbands since the head injury is linked to the difficulty of impulse control, as was evident in the very high N score and very low C score in the NEO-FFI results. For the spouse this fed into feelings of greater instability in the relationship with their husbands, and made expression of feelings extremely difficult.

In three interviews a general improvement was noted, and this is reflected in the theme of greater family orientation after the head injury. The three spouses described their head-injured husbands as being more affectionate than before, more understanding and supportive, and more appreciative of their spouses. The spouses stated that before the head injury, the marriage existed merely on paper, but not in terms of commitment and emotions. The spouses stated that they themselves needed to adjust to this sudden positive personality change, having to overcome years of distrust and hurt.

Importantly, six spouses mentioned that they had needed to be "tough", "pushy", "strict", "a bully", "even hard at times" in order to support the rehabilitation of their head-injured husbands. These statements were summarised under the theme of "tough love", which one spouse expressed as meaning that she refused to treat her head-injured husband like a child, as her mother-in-law had wanted to do. She refused to accept the status quo, and in her case was rewarded for her engagement with an incredible progress in the rehabilitation of her husband. It seemed as if she became his will, his drive towards improvement, which the husband had temporally lost owing to the head injury. It seems that the attitude of "tough love" allowed the spouses to take up the care-giver role, but without this role being totally subsumed by a motherly role. It allowed her to express her respect towards her husband by believing in his capabilities, believing he can and needs to do things on his own. This respect in turn often enabled the head-injured husband to regain a certain degree of self-respect by having overcome certain difficulties by himself without being constantly "rescued". This self-respect is an important feeling,

given the often mentioned low self-esteem, which often in turn leads to depression or denial. Also, "tough love", as one spouse put it, enabled the spouse to deal with her anger about her situation. The spouse's anger can be a form of energy in the rehabilitation process (Kreutzer et al, 1990). One spouse, for example, would get angry with her husband for not doing his exercises, "push him" to continue his exercises. It seems that such anger, a part of dealing with trauma and mourning, is expressed in a more positive and constructive manner.

Implications and Limitations of this Study

The implications of this study concern both the field of research and rehabilitation. In the area of research, this study has given a more systematic foundation to the anecdotal and clinical findings related to the personality and relationship changes after head injury. With the use of well-established inventories, a more empirical analysis of data was made possible, and this could possibly lead to the use of such inventories and statistical analyses in other areas of research concerning traumatic brain injury. Another implication would involve a more methodological discussion. In the field of traumatic brain injury, this study could introduce the debate of the use of more well-researched inventories. It poses the question whether such inventories are at all productive in this field of research, or whether certain limitations need to be recognised. A good example would be that some spouses felt that they were with "a different person" after the head injury, and others felt that the personality of their husbands has shifted to one or other extreme. A phenomenological investigation with in-depth interviewing techniques of this concept and related themes could possibly establish whether a category shift was involved, or whether the theme is a semantic means to express movement towards the extremes of personality factors. Within a 'profile' approach to personality, as is presented by the five factor model, this could mean that a combination of differences in various scales, when analysed, may relate to radical personality changes. Thus the spouse's experience of the head-injured husbands being a radically "different person" does not invalidate the five factor model of personality, for it can account for such changes in personality in its analysis. Another possible explanation is that the sense of

radical personality change might involve 'types' of personality that are not covered by the five factor model.

Also, a similar methodological issue arises when considering how the Dyadic Adjustment Scale on the 'dyadic consensus' subscale was unable to distinguish between agreement and an absence of agreement, which is not the same as disagreement, owing to the fact that the spouse took all the major decisions after the head injury. Before the head injury, as became evident from the qualitative data, husbands were more responsible for and more central within the decision-making process. Generally, compared to the qualitative data, the Dyadic Adjustment Scale was not as sensitive to the specific issues involved as the statements made by the spouses themselves. In terms of further research, this could lead into two directions. Firstly, the anecdotal or clinical findings could be more carefully researched in future by establishing more closely the subtle meanings elicited in the subject's statements. This would increase the subtlety and richness of the data. Secondly, more inventories could be designed specifically for the field of traumatic brain injury.

In terms of rehabilitation, the implications of this study could possibly mean a greater structural involvement of the spouse in the rehabilitation programme. Many spouses stated that they felt left out of the programme, and others who got actively involved stated that their involvement and "tough love" attitude had made a significant difference in their husbands' rehabilitation. Not only the spouses' involvement in the rehabilitation programmes needs to be considered, but also importantly, the findings of this study reveal how the spouses themselves are powerfully affected by the head injury. Many spouses expressed the need for a more structured support for themselves in the rehabilitation programme. They felt that it should include more information about the effects of head injury and possible coping techniques to deal with difficulties. The study revealed how the relationship was mostly negatively affected by the personality change of the head-injured husband. Many in their way, grieved the loss of the person before the injury, and sought to adapt to the new situation. Some spouses stated that they would have taken up therapy or counselling, if such options had been available. Two spouses had thought of setting up a support group in order to fill this gap. All these

concerns could in turn generate more research questions that would deal with the issues and problems of the rehabilitation programmes and support groups that include the spouses. In this way the areas of research and rehabilitation concerning traumatic brain injury would interact for the benefit of both the head-injured person, and those around him or her.

Certain critical issues of this study need to be raised. Firstly, the sample is not large enough to allow for generalisations. In a way, this study is more of a pilot study that outlines possible implications and areas for further research. Because of the small sample, the scores of the personality in the NEO-FFI depicted before the head injury could be skewed in a specific direction. This could mean that the study could have inadvertently found a certain grouping of personality traits that could affect the results concerning the changes after the head injury. For example, the low O score indicates that in this sample the husbands were perceived as generally not being open to aesthetic concerns or intellectual issues. Further research with a larger sample could establish a basis for more normative data concerning personality factors before the head injury. However, other researchers have noted that across the population, the distribution of head injury is not equal (Brooks, 1990; Naugle, 1990). It seems possible that personality factors might be involved, and that this study merely reflects these. However, more epidemiological research would need to be done concerning the personality before the head injury. This equally applies to the dyadic adjustment after head injury. A larger sample would mean more equal distribution of the various qualities of relationships before the head injury. This in turn would allow for more normative results in this research of this area.

A methodological issue concerns the choice of investigative instruments or measures. Although the measures chosen are the most well-researched in their respective fields, it is still questionable whether these inventories gauge all the issues involved in the perceived personality and relationship changes, for example the category shift in terms of personality, and the sensitivity of the Dyadic Adjustment Scale to the subtle but important issues concerning head injury and marital adjustment. This might call for the construction of a personality and relationship questionnaire specifically designed for

traumatic brain injury, and further research would need to establish its validity and reliability. Also, in this study, the statements concerning the shift of category in terms of personality could have been explored more with in-depth interviewing techniques. The problem was that this would have stretched the interviewing time way beyond the two hour mark. It could have also shifted the focus of this study, which was after all the systematic analysis of personality and relationship changes as perceived by the spouses with the use of well-researched inventories.

CONCLUSION

The aim of this pilot study was to analyse systematically the relations between the perceived personality changes of a head-injured husband and the perceived changes in their relationship, as perceived by the spouse. The application of the NEO-FFI has revealed significant perceived personality differences before and after the head injury. The significant personality factors were 'neuroticism', 'extraversion', and 'conscientiousness', which means that the spouses in general perceived their head-injured husbands as being more impulsive, more anxiety-prone, and more depressed with low self-esteem, being more passive and socially withdrawn, often emotionally blunt, and unreliable in terms of taking over responsibilities. The high degree of dependence was also important. All of this did not apply to three subjects who noted a marked improvement in personality after the head injury, in that the husbands were perceived to be more family orientated, as having more emotional control, and being more appreciative of their wives.

Concerning the perceived changes in the relationship, the results of the Dyadic Adjustment Scale revealed no significant differences between before and after the head injury, although a general decline on all the factors was noted. When the responses of the three subjects mentioned above were removed and the differences re-computed, a marginally significant difference was reached on the subscale of 'affective expression'. This indicates that most of the spouses felt that there was a decline of emotional expression and sharing of feelings since the head injury. This could be related to the husbands' impulsiveness (combination of very high N score and very low C score), which made it unsafe to express feelings, and it could also be linked to the husbands' own emotional and social withdrawal (low E score). In other words, the head injury had affected the spouses' experience of the emotional quality of their marriage. When the variables concerning personality factors after the head injury were correlated with perceived changes in the relationship after the head injury, significant relations were evident. Although the results of the Dyadic Adjustment Scale revealed no significant differences between before and after head injury mean scores, some Dyadic Adjustment Scale scores as correlation coefficients proved to be significant, while all of them were

meaningful in terms of directions. This supports the research hypothesis of the present study, namely that the spouses' perception of difficulties in their marriage relate to the perceived personality changes of their husbands since the head injury. The spouse's perception of differences in the personality of their husband was experienced by the spouse as affecting the dyadic relationship negatively.

All the above findings were supported by the qualitative data, established by the two questions that allowed the spouses to state in their own words how they perceived the changes in personality and relationship since the head injury. What emerged was that 12 out of 21 subjects stated that they perceived their husbands to be "a different person" since the head injury. They were quite emphatic about this categorical shift of personality, which however could be explained in terms of the differences in scales within a multidimensional analysis of personality. It could also mean that other personality dimensions were involved, which the NEO-FFI does not cover. This important finding is worthy of further research. Another important implication of this study is that a larger sample of subjects is required in order to achieve more normative data, and therefore more generalisable results. In terms of implications for the area of rehabilitation, the importance of "tough love" which emerged from the qualitative data, indicates that some spouses found a way of involving themselves actively in the rehabilitation process, and a more structural inclusion of the wives in the rehabilitation programme would not only benefit the patient, but also would support the wives, who have often become the sidelined victims of head injury. It is the spouses' adaptation and survival, despite the emotional and financial obstacles, that cannot but be admired, and which deserves more systematic support in the rehabilitation programmes of head injury.

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APPENDIX

Covering Letter

Dear Madam,

thank you for availing yourself for this study. This study is concerned with the changes that occur after head injury. It is hoped that the results of this study will shed some light on how close relationships are affected by head injury.

Please follow the instructions as laid out in the beginning of every part of this questionnaire. Your information will be treated with the strictest confidentiality. Therefore, I do not need your name, and no one will know what you have said. In this way, a true understanding of your circumstances can be reached whilst your personal identity is concealed.

Thank you very much for your co-operation.

Ingo Lambrecht
Department of Psychology
University of the Witwatersrand
Private Bag 3
P.O. WITS
2050

QUESTIONNIARE

Please fill in the spaces below.

Date:_____

Responder's No.:_____

Age:_____

Telephone No.: Home:_____ Work:_____

Personal Details of Husband or Partner:

Age:_____

Highest Level of Education:_____

Occupation before Injury:_____

Present Occupation:_____

For how long have you known each other?:_____

For how long have you been married / lived together?:_____

Date of Injury:_____

Period of unconsciousness:_____

Period of post-traumatic amnesia:_____

Brief description of accident:

_____

_____

Please place a cross (x) in the appropriate bracket. Some questions ask for a brief description, which would allow you to briefly describe a condition in your own words. Other questions ask for a brief comment, if you wish to clarify an issue. Such comments, however, are optional.

Since the injury, does your husband / partner report any of the following:

Headaches:
( ) No ( ) Yes ( ) same as before ( ) more than before

Dizziness:
( ) No ( ) Yes ( ) same as before ( ) more than before

Tolerance to loud sounds:
( ) No ( ) Yes ( ) same as before ( ) more than before

Problems with vision:
( ) No ( ) Yes ( ) same as before ( ) more than before

Brief Description: _____

Problems with memory:
( ) No ( ) Yes ( ) same as before ( ) more than before

Brief Description: _____

Problems with speech:
( ) No ( ) Yes ( ) speech normal ( ) difficult to understand ( ) unintelligible

Brief Description: _____

Problems with emotional control: (laughing, crying, temper outbursts)
( ) No ( )Yes ( ) same as before ( ) less control than before ( ) better control than before

Brief Description: _____

_____

Other Injuries: _____

_____

How would you describe the following:

Work status since the injury:
( ) same as before ( ) reduced level ( ) cannot work

Comment:_____

Status of family obligations since the injury:
(looking after children, running the home, controlling financial matters)
( ) same as before ( ) reduced level ( ) cannot fulfil obligations

Comment:_____

Social Activities:
(receiving visitors, visiting friends, sports. hobbies)
( ) same as before ( ) less than before ( ) worse than before

Comment:_____

Interpersonal Relationships:

	same as before	worse than before	better than before
Parents:	( )	( )	( )
Siblings:	( )	( )	( )
Spouse:	( )	( )	( )
Children:	( )	( )	( )
Relatives:	( )	( )	( )
Friends:	( )	( )	( )

Comment:_____

_____

NEO Inventory

Please refer to the response sheet for instructions.

1. He is not a worrier.
2. He likes to have a lot of people around him.
3. He doesn't like to waste his time with daydreaming.
4. He tries to be courteous to everyone he meets.
5. He keeps his belongings clean and neat.

6. He often feels inferior to others.
7. He laughs easily.
8. Once he finds the right way to do something, he sticks to it.
9. He often gets into arguments with his family and co-workers.
10. He is pretty good about pacing himself so as to get things done on time.

11. When he is under a great deal of stress, sometimes he feels like he is going to pieces.
12. He doesn't consider himself to be "light-hearted".
13. He is intrigued by the patterns he finds in art and nature.
14. Some people think he is selfish and egotistical.
15. He is not a very methodical person.

16. He rarely feels lonely or blue.
17. He really enjoys talking to people.
18. He believes letting students hear controversial speakers can only confuse and mislead them.
19. He would rather cooperate with others than compete with them.
20. He tries to perform all the tasks assigned to him conscientiously.

21. He often feels tense and jittery.
22. He likes to be where the action is.
23. Poetry has little or no effect on him.
24. He tends to be cynical and sceptical of other's intentions.
25. he has a clear set of goals and works toward them in an orderly fashion.

26. Sometimes he feels completely worthless.
27. He usually prefers to do things alone.
28. He often tries new and foreign foods.
29. He believes that most people will take advantage of you if you let them.
30. He wastes a lot of time before settling down to work.

31. He rarely feels fearful and anxious.
32. He often feels as if he is bursting with energy.
33. He seldom notices the moods or feelings that different environments produce.
34. Most people he knows like him.
35. He works hard to accomplish his goals.

36. He often gets angry at the way people treat him.
37. He is a cheerful, high-spirited person.
38. He believes we should look to our religious authorities for decisions on moral issues.
39. Some people think of him as cold and calculating.
40. When he makes a commitment, he can always be counted on to follow through.

41. Too often, when things go wrong, he gets discouraged and feels like giving up.
42. He is not a cheerful optimist.
43. Sometimes when reading poetry or looking at a work of art, he feels a wave of excitement.
44. He is hard-headed and tough-minded in his attitudes.
45. Sometimes he is not as dependable or reliable as he should be.

46. He is seldom sad or depressed.
47. His life is fast-paced.
48. He has little interest in speculating on the nature of the universe or the human condition.
49. He generally tries to be thoughtful and considerate.
50. He is a productive person who always gets his job done.

51. He often feels helpless and wants someone else to solve his problems.
52. He is a very active person.
53. He has a lot of intellectual curiosity.
54. If he doesn't like people, he lets them know it.
55. He never seems to be able to get organised.

56. At times he has been so ashamed he just wanted to hide.
57. He would rather go on his own way than be a leader of others.
58. He often enjoys playing with theories or abstract ideas.
59. If necessary, he is willing to manipulate people to get what he wants.
60. He strives for excellence in everything he does.

Response Sheet for the Neo Inventory

This questionnaire contains 60 statements. Read each statement carefully. In the first response set, for each statement fill in the circle that best represents your opinion on how your husband / partner was before the head injury.

In the second response set, for each statement fill in the circle that best represents your opinion on how your husband / partner is after the head injury.

Fill in the circle marked SD if you *strongly disagree* or the statement is definitely false.

Fill in the circle marked D if you *disagree* or the statement is mostly false.

Fill in the circle marked N if you are *neutral* on the statement, you cannot decide, or the statement is equally true and false.

Fill in the circle marked A if you *agree* or the statement is mostly true.

Fill in the circle marked SA if you *strongly agree* or the statement is definitely true.

Fill in only one response for each statement. Respond to all of the statements, making sure that you fill in the correct response. Note that the responses are numbered in *rows*.

First Response Set–before the head injury

Enter your responses here—remember to enter responses *across the rows.*

SD = *Strongly Disagree*; D = *Disagree*; N = *Neutral*; A = *Agree*; SA = *Strongly Agree*

1 (SD) (D) (N) (A) (SA)	2 (SD) (D) (N) (A) (SA)	3 (SD) (D) (N) (A) (SA)	4 (SD) (D) (N) (A) (SA)	5 (SD) (D) (N) (A) (SA)
6 (SD) (D) (N) (A) (SA)	7 (SD) (D) (N) (A) (SA)	8 (SD) (D) (N) (A) (SA)	9 (SD) (D) (N) (A) (SA)	10 (SD) (D) (N) (A) (SA)
11 (SD) (D) (N) (A) (SA)	12 (SD) (D) (N) (A) (SA)	13 (SD) (D) (N) (A) (SA)	14 (SD) (D) (N) (A) (SA)	15 (SD) (D) (N) (A) (SA)
16 (SD) (D) (N) (A) (SA)	17 (SD) (D) (N) (A) (SA)	18 (SD) (D) (N) (A) (SA)	19 (SD) (D) (N) (A) (SA)	20 (SD) (D) (N) (A) (SA)
21 (SD) (D) (N) (A) (SA)	22 (SD) (D) (N) (A) (SA)	23 (SD) (D) (N) (A) (SA)	24 (SD) (D) (N) (A) (SA)	25 (SD) (D) (N) (A) (SA)
26 (SD) (D) (N) (A) (SA)	27 (SD) (D) (N) (A) (SA)	28 (SD) (D) (N) (A) (SA)	29 (SD) (D) (N) (A) (SA)	30 (SD) (D) (N) (A) (SA)
31 (SD) (D) (N) (A) (SA)	32 (SD) (D) (N) (A) (SA)	33 (SD) (D) (N) (A) (SA)	34 (SD) (D) (N) (A) (SA)	35 (SD) (D) (N) (A) (SA)
36 (SD) (D) (N) (A) (SA)	37 (SD) (D) (N) (A) (SA)	38 (SD) (D) (N) (A) (SA)	39 (SD) (D) (N) (A) (SA)	40 (SD) (D) (N) (A) (SA)
41 (SD) (D) (N) (A) (SA)	42 (SD) (D) (N) (A) (SA)	43 (SD) (D) (N) (A) (SA)	44 (SD) (D) (N) (A) (SA)	45 (SD) (D) (N) (A) (SA)
46 (SD) (D) (N) (A) (SA)	47 (SD) (D) (N) (A) (SA)	48 (SD) (D) (N) (A) (SA)	49 (SD) (D) (N) (A) (SA)	50 (SD) (D) (N) (A) (SA)
51 (SD) (D) (N) (A) (SA)	52 (SD) (D) (N) (A) (SA)	53 (SD) (D) (N) (A) (SA)	54 (SD) (D) (N) (A) (SA)	55 (SD) (D) (N) (A) (SA)
56 (SD) (D) (N) (A) (SA)	57 (SD) (D) (N) (A) (SA)	58 (SD) (D) (N) (A) (SA)	59 (SD) (D) (N) (A) (SA)	60 (SD) (D) (N) (A) (SA)

Second Response Set–after the head injury

Enter your responses here—remember to enter responses *across the rows.*

SD = *Strongly Disagree*; D = *Disagree*; N = *Neutral*; A = *Agree*; SA = *Strongly Agree*

1 (SD) (D) (N) (A) (SA)	2 (SD) (D) (N) (A) (SA)	3 (SD) (D) (N) (A) (SA)	4 (SD) (D) (N) (A) (SA)	5 (SD) (D) (N) (A) (SA)
6 (SD) (D) (N) (A) (SA)	7 (SD) (D) (N) (A) (SA)	8 (SD) (D) (N) (A) (SA)	9 (SD) (D) (N) (A) (SA)	10 (SD) (D) (N) (A) (SA)
11 (SD) (D) (N) (A) (SA)	12 (SD) (D) (N) (A) (SA)	13 (SD) (D) (N) (A) (SA)	14 (SD) (D) (N) (A) (SA)	15 (SD) (D) (N) (A) (SA)
16 (SD) (D) (N) (A) (SA)	17 (SD) (D) (N) (A) (SA)	18 (SD) (D) (N) (A) (SA)	19 (SD) (D) (N) (A) (SA)	20 (SD) (D) (N) (A) (SA)
21 (SD) (D) (N) (A) (SA)	22 (SD) (D) (N) (A) (SA)	23 (SD) (D) (N) (A) (SA)	24 (SD) (D) (N) (A) (SA)	25 (SD) (D) (N) (A) (SA)
26 (SD) (D) (N) (A) (SA)	27 (SD) (D) (N) (A) (SA)	28 (SD) (D) (N) (A) (SA)	29 (SD) (D) (N) (A) (SA)	30 (SD) (D) (N) (A) (SA)
31 (SD) (D) (N) (A) (SA)	32 (SD) (D) (N) (A) (SA)	33 (SD) (D) (N) (A) (SA)	34 (SD) (D) (N) (A) (SA)	35 (SD) (D) (N) (A) (SA)
36 (SD) (D) (N) (A) (SA)	37 (SD) (D) (N) (A) (SA)	38 (SD) (D) (N) (A) (SA)	39 (SD) (D) (N) (A) (SA)	40 (SD) (D) (N) (A) (SA)
41 (SD) (D) (N) (A) (SA)	42 (SD) (D) (N) (A) (SA)	43 (SD) (D) (N) (A) (SA)	44 (SD) (D) (N) (A) (SA)	45 (SD) (D) (N) (A) (SA)
46 (SD) (D) (N) (A) (SA)	47 (SD) (D) (N) (A) (SA)	48 (SD) (D) (N) (A) (SA)	49 (SD) (D) (N) (A) (SA)	50 (SD) (D) (N) (A) (SA)
51 (SD) (D) (N) (A) (SA)	52 (SD) (D) (N) (A) (SA)	53 (SD) (D) (N) (A) (SA)	54 (SD) (D) (N) (A) (SA)	55 (SD) (D) (N) (A) (SA)
56 (SD) (D) (N) (A) (SA)	57 (SD) (D) (N) (A) (SA)	58 (SD) (D) (N) (A) (SA)	59 (SD) (D) (N) (A) (SA)	60 (SD) (D) (N) (A) (SA)

Have you responded to all of the statements? _____Yes _____No

Have you entered your responses in the correct boxes? _____Yes _____No

Have you responded accurately and honestly? _____Yes _____No

Dyadic Adjustment Scale

Most people have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner on the following list. Place a X to indicate how it was before the head injury, and mark a Z to indicate how it is after the head injury.
If there is no difference, place both marks, X and Z in the same answer box.

		Always Agree	Almost Always Agree	Occa-sionally Agree	Often Disagree	Almost Always	Always Disagree
1	Handling family finances						
2	Matters of recreation						
3	Religious matters						
4	Demonstrations of affection						
5	Friends						
6	Sex relations						
7	Correct or proper behaviour						
8	Philosophy of Life						
9	Ways of dealing with parents or in-laws						
10	Aims, goals, and things believed to be important						
11	Amount of time spent together						
12	Making major decisions						
13	Household tasks						
14	Leisure time and activities						
15	Career decisions						

		All the time	Most of the time	More often than not	Occasionally	Rarely	Never
16	How often do you discuss or have considered divorce, separation, or terminating your relationship?						
17	How often do you or your mate leave the house after a fight?						
18	In general, how often do you think that things between you and your mate are going well?						
19	Do you confide in your mate?						
20	*Do you ever regret that you* married (or lived together)?						
21	How often do you and your partner quarrel?						
22	How often do you and your mate "get on each others nerves"?						

		Every Day	Almost Every Day	Occasionally	Rarely	Never
23	Do you kiss your mate?					

		All of them	Most of them	Some of them	Very few of them	None of them
24	Do you and your mate engage in outside interests together?					

		Never	Less than once a month	Once or twice a month	Once or twice a week	Once a day	More often
25	Have a stimulating exchange of ideas						
26	Laugh together						
27	Calmly discuss something						
28	Work together on a project						

These are some things about which couples sometimes agree and sometimes disagree.
Indicate if either item below caused differences of opinions or were problems in your relationship during the past few weeks (Check yes or no).

		Yes	No
29	Being too tired for sex		
30	Not showing love		

31 The x's on the following line represents different degrees of happiness in your relationship.
The middle x, 'happy', represents the degree of happiness in most relationships.
Please circle the x which best describes the degree of happiness, all things considered in your relationship.

Extremely Unhappy	Fairly Unhappy	A little Unhappy	Happy	Very Happy	Extremely Happy	Perfect

----------X----------X----------X----------X----------X----------X----------X----------

32 Which of the following statements best describes how you feel about the future of your relationship?

- [ ] I want desperately for my relationship to succeed, and would go to almost any length to see that it does.
- [ ] I want very much for my relationship to succeed, and will do all I can to see that it does.
- [ ] I want very much for my relationship to succeed, and will do my fair share to see that it does.
- [ ] It would be nice if my relationship succeeded, but I can't do much more than I am doing now to help it succeed.
- [ ] It would be nice if it succeeded, but I refuse to do anymore than I am doing now to help it succeed.
- [ ] My relationship can never succeed, and there is no more that I can do to keep the relationship going.