PARENTAL MOOD, EMOTIONAL DISTRESS, AND COPING IN FAMILIES WITH A HEAD-INJURED OFFSPRING

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We accept this dissertation as conforming
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ABSTRACT

This study attempted to describe and evaluate parental mood, emotional distress, coping, and physical health in families with a head-injured offspring. Interview and assessment data were obtained 2 - 4 years post-injury. In order to characterize those features unique to parents living with a head-injured patient, two control groups were utilized for between-group comparisons and included parents of offspring with orthopedic injury, as well as parents of non-injured offspring. Data from mothers and fathers were examined and analyzed separately.

Based on previous research in the area, it was hypothesized that caring for, and living with, a head-injured offspring would place stress upon parents and that this would be reflected by an increased risk of mood disturbance, emotional distress, and physical illness. This hypothesis was not supported as group comparisons failed to yield significant differences between parents of head-injured, orthopedically-injured, and non-injured offspring. As well, no quantitative or qualitative differences in coping patterns emerged between parents of head-injured, orthopedically-injured and non-injured offspring.

Another objective of this study was to examine the relationship between parental adjustment, coping, and physical health and the degree of offspring dysfunction. For these analyses the entire sample of offspring were included. Several aspects of the offspring' level of functioning were examined, including mood, emotional distress, extent of physical impairment, and degree of psychosocial dysfunction.

It was hypothesized that the degree of parental anxiety, depression, emotional distress, physical health and extent of parental coping efforts would be negatively correlated with the offsprings' degree of health-related dysfunction. Canonical correlation analyses failed to detect a significant relationship between parent and offspring characteristics and reasons for this lack of association were discussed.

Inspection of the intercorrelation matrices however, suggested that aspects of offsprings' mood and emotional well-being were associated with mothers' anxiety, depressive symptomatology, emotional distress, and health status. No such relationships appeared for the fathers' sample. The extent of mood disturbance and emotional distress for both parents correlated with the degree of psychosocial dysfunction that they attributed to their offspring. In contrast, the degree of physical impairment attributed to the offspring was not associated with any aspect of parental mood, coping, or health status.

Supplemental analyses were conducted that focused on the degree to which parents and offspring agreed with respect to the offsprings' functional status at time of follow-up. Lack of concordance between parents and offspring with regards to offsprings' psychosocial functioning was associated with aspects of parental mood and emotional distress. In contrast, as for ratings of the offsprings' level of physical impairment, the degree of parent-offspring concordance was not associated with parental adjustment, coping, and health status.

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DEDICATION

This dissertation is gratefully dedicated to my parents, Elaine and Harold O'Brien.

INTRODUCTION

Head trauma represents one of the most frequent mechanisms of brain injury in North America. In 1981, over 48,000 Canadians sustained head injuries severe enough to warrant a visit to a hospital (Statistics Canada, 1984), and in the United States it has been estimated that over 422,000 new cases of head injury occur each year (Kalsbeek, McLaurin, Harris, & Miller, 1980). A steady increase in the number of hospital admissions for head injuries (Field, 1976; Hawthorne, 1978) and an increase in the number of head injury survivors (Lewin, Marshall, & Roberts, 1979) have also been reported; findings that have significant implications for the after-care and rehabilitation needs of this population (Jennett, 1975).

While many individuals die from their head injuries, a much larger number survive with persisting disabilities. Investigators examining the acute and long-term outcome of individuals with head injuries have reported a variety of problems. These include physical disabilities (Bond, 1975), impaired intellectual functioning (Dikman, Reitan & Temkin, 1983; Gronwall & Wrightson, 1974; Mandleberg & Brooks, 1975; van Zomeren, 1981), language disturbances (Levin, Grossman, & Kelly, 1976; Levin, Benton, & Grossman, 1982; Newcombe, 1982; Ross, 1984; Thomsen, 1975), memory loss (Brooks, 1976; Fodor, 1972; Levin et al., 1982; Lezak, 1979; Newcombe, 1982; Russell, 1971; Schacter & Crovitz, 1977), emotional and behavioral difficulties (Fordyce, Roueche, & Prigatano, 1983; Lezak, 1978), personality changes (Brooks & McKinlay, 1983; Lezak, 1978; Tyerman & Humphrey, 1984), and psychiatric symptomatology (Lishman, 1973; Merskey & Woodforde, 1972). Disruption of psychosocial functioning involving reduction or cessation of recreational activities, disturbed interpersonal relationships, and changes in occupational status have also been reported (Klonoff, 1984; Lezak, Cosgrove, O'Brien, & Wooster, 1980; Humphrey & Oddy, 1978; Oddy & Humphrey, 1980).

Historically, the primary emphasis of neuropsychological evaluations of the head injured has been on description of various aspects of the patient's post-injury intellectual, emotional, and behavioral status; documentation of impairment for the purpose of litigation and compensation; and assessment of the patient's potential for rehabilitation. Much less attention has been focused on the repercussions that a member's head injury poses for the family (Bond, 1983).

Over the past 25 years there has been growing recognition that the family constitutes a legitimate unit of analysis in terms of health care intervention, and medical prevention (Bishop, Epstein, & Baldwin, 1981; Shapiro, 1983). There are several reasons for this development. First, the family has been ascribed a fundamental role in defining the presence of illness in its members, in validating the "sick role" of an unwell member, and in implementing the initial steps of seeking out and obtaining medical/health care (Litman, 1974; Parsons, 1951). Second, evidence from several studies suggest a relationship between family dynamics and various aspects of family health and health-related behavior (Bursten, 1964; Bursten, 1965; Cobb, 1976; Gartner, Fulmer, Weinshal, & Goldklank, 1978; Livsey, 1972). Third, the family environment has been found to play an important role in the rehabilitation of patients with a variety of disabilities (Bishop, et al., 1981; Litman, 1974; Mauss-Clum & Ryan, 1981). Fourth, medical advancements in the treatment of once life-threatening conditions such as severe head injury, and trends toward the deinstitutionalization and outpatient care of chronically ill individuals, have served to increase the family's responsibility to provide long-term care for these patients (Bell, 1966; Goldstein, Regnery, & Wellin, 1981; Jennett, 1975; London & Smith, 1982). Fifth, in families where a member has an acute or chronic condition, investigators have noted a variety of difficulties including changes in family structure and functioning (For reviews see Bishop et al., 1981; McCubbin, Joy, Cauble, Comeau, Patterson, Needle, 1980). Finally, the application of general systems theory and principles to models of family process have introduced new concepts and ways of describing family function (Olson, 1975; Sluzki, 1983). These theoretical developments carry important implications with regard to treatment and intervention (a brief description of the major features and assumptions of family systems theory has been presented in Appendix A).

Family Response To Head Injury

Prior to 1974 only a handful of studies had made more than passing reference to problems faced by relatives of head-injured patients (e.g., Bruckner & Randle, 1972; Lockart, 1969; London, 1967). These investigators insightfully recognized that relatives caring for a head injured member may have to cope not only with an individual who has suffered permanent physical disability or disfiguration, but one who may have undergone changes in intellectual capacity, behavior, and personality. Families in which a member has sustained significant brain injury have to manage not only the immediate medical crisis, but they must often face a prolonged process of recovery which rarely results in the patient's full return to premorbid levels of functioning (Lezak et al., 1980).

Many investigators have noted that problems faced by relatives are experienced most acutely by family members serving as the principal caretakers. Family members providing primary care for a brain-injured spouse, sibling, or child frequently feel trapped, tied-down, and isolated as friends and extended family withdraw support (Bond, 1983). To make matters worse, caretakers may be verbally abused, belittled, or threatened with physical violence by the patient (Lezak, 1978). Furthermore, it has been suggested that family members most likely to assume the caretaker role are those who may be least fit for the task, i.e., those with personalities characterized by weak ego strength and strong feelings of guilt or a sense of duty (Semenza, personal communication, July, 1983).

Recently, clinical, anecdotal, and empirical investigations have begun to focus specifically on the plight of families coping with head injury. These studies have described significant post-injury mood disturbance and adjustment problems in family members and changes in various aspects of family life and functioning (see Bond, 1983 for a review). However, conclusions from this early research have been questioned on methodological grounds. Specifically, McKinlay, Brooks, Bond, Martinage, & Marshall

(1981) have cited lack of adequate controls, insufficient description of selection criteria for patients, and insufficient description of patient populations (particularly with respect to head injury severity) as reasons for interpreting previous findings with caution. In addition, few investigators have provided sufficient description of the relatives' sample, especially regarding the respondent's relationship to the patient. Yet these investigations represent a beginning attempt to understand the family's reponse to head-injury.

An insightful report of family response to head injury was provided by Romano (1974) who discussed the reactions of 13 families in which a patient had suffered a head injury 7 to 48 months prior to interview. Although denial was expected in the acute post-injury period, Romano noted that persistent denial was a feature shared by all of the families, even in those where contact had been maintained for up to 4 years. Denial was manifested primarily in three ways: (a) unrealistic beliefs that the patient would suddenly return to his/her premorbid state; (b) verbal refusals - many families denied that the patient was any different than before the head injury, even when confronted with clearly deviant behavior; and (c) inappropriate responses (e.g., parental reluctance to provide contraceptives for a judgmentally impaired sexually mature female patient). That denial is a frequent response in families confronted with a brain-injured member is a finding that has been confirmed by several other investigators (e.g., Blazyk, 1983; Bond, 1983; Kapust, 1982; Klonoff & Prigatano, in press; Rosin, 1977). Although denial in Romano's sample appeared to be dysfunctional in that it prevented appropriate treatment and intervention, the functional (and potentially adaptive) aspects of denial also have been described (Beisser, 1979; Luterman, 1985).

In a later paper, Rosin (1977) discussed the reactions and attitudes of families of 24 patients who remained in an unresponsive vegetative state following a head injury. Although he too observed denial in some of his families, Rosin noted that patterns of family adaptation were variable. Six types of family response were identified: anxiety, guilt, denial, accomodation, disengagement, and rejection. Accomodation, defined as "perception by the family of the patient's disability together with a helpful attitude and behavior appropriate to his needs and care" (Rosin, 1977, p. 1), often occurred only after several months and was thought to represent the end-point toward which families should be guided.

Recent attempts to conceptualize the process of family adaptation has led some investigators to propose stage models of family response to brain injury (Blazyk, 1983; Bond, 1983). Typically, the initial stage is characterized by denial of the patients disability and hope for a full recovery, whereas later stages are characterized by bewilderment, depression, and despair as relatives begin to understand the extent and permanence of the brain injured member's deficits. Finally, if family members have been able to successfully cope and move through earlier stages, a degree of acceptance is achieved as well as restoration of emotional stability (Bond, 1983). To date, methodologically sound and detailed longitudinal investigations of family adaptation and coping after head injury are lacking. Further research is certainly needed.

Although it is recognized that physical disabilities and intellectual impairment create hardships for the patient and his or her family (Bond, 1983), considerable attention has been focused on behavioral and personality changes in the patient and their impact on family adjustment (Bond, 1975; Brooks & McKinlay, 1983; Lezak, 1978; McKinlay et al., 1981; Oddy & Humphrey, 1980; Thomsen, 1974). In her review of the literature, Lezak (1978) identified five broad characterological features as being the most problematic for families:

1) emotional alterations (the most common being apathy, silliness, lability, irritability, and changes in sexual

interest).

2) impaired capacity for control and self-regulation.
3) impaired capacity for social perceptiveness or social sensitivity.
4) stimulus-bound behavior (e.g., social dependency, lack of initiative, and problems planning and organizing activities).
5) inability to profit from experience.

Lezak and others have described the phenomenon of marked characterological change as "personality death", and have noted that in the absence of actual corporal death, relatives are unable to mourn for what truly amounts to a loss of a once familiar member (Lezak, 1978; Romano, 1974). Furthermore, in the absence of a member's physical death, survivors are unable to receive the type of support and comfort that is provided for those bereaved by death. Lezak also has noted that even relatively mild changes in personality, such as irritability or slight reduction in drive, seem to have stressful repercussions for the family. Subsequent investigations have supported these oberations (Klonoff & Prigatano, in press; Mauss-Clum & Ryan, 1981; McKinlay et al., 1981; Thomsen, 1974).

In an early report, Thomsen (1974) described the status of patients and relatives 12 to 70 months post-injury. Suprisingly, none of the relatives interviewed by Thomsen complained about the patient's physical or motor dysfunction, but many complained about the patient's neuropsychological deficits. Of these, the most problematic for relatives were changes in the patient's personality. Thomsen also observed that response to a member's injury varied with the relationship one had with the patient: compared to spouses, mothers appeared better able to accept changes in the patient's behavior.

Within the last 5 years, investigators have begun more detailed examination of the relationship between family stress and changes in the head-injured member. For example, McKinlay et al. (1981) assessed subjective burden in relatives of 55 head-injured patients using a 7-item analog scale (1=no stress, 7=severe stress). Over 50% of the respondents were spouses, and 27% were parents. Approximately two-thirds of the relatives complained of "medium" to "high" stress when interviewed 3 and 6 months after the patient's injury. Moreover, the degree of subjective burden in relatives was correlated with the number of changes they perceived to have occurred in the patient, particularly with respect to thinking, somatic symptoms, and disturbed behavior. Specifically, relatives of patients with many symptoms were more likely to report greater subjective burden than relatives living with members they viewed as less symptomatic.

In a later study, Brooks & McKinlay (1983) reported a significant association between relative's report of personality change in the patient and their degree of subjective burden. That is, ratings of moderate to high subjective burden were more likely to come from relatives who reported personality changes in the patient than from relatives who did not report such changes. Subjective burden in relatives was also associated with the magnitude of scores on specific patient personality traits.

Emotional disturbances in the relatives themselves have been noted by several investigators, although depressive features are the symptoms most often described. In addtion, feelings of anger, frustration, tension, guilt, and anxiety also have been reported by relatives caring for head-injured members (Bond, 1983; Lezak, 1978; Mauss-Clum & Ryan, 1981; Oddy, Humphrey, and Uttley, 1978a; Rosin, 1977; Todd & Satz, 1980).

Oddy et al. (1978a) interviewed 54 relatives within 1 month of the patient's head injury and again 6 and 12 months later. Based on scores from a self-rating depression scale, Oddy and his colleagues noted depressive symptomatology in 39% of the relatives interviewed at one month post-injury. By six months the incidence of depression had dropped to 20%, and remained at approximately this level (24%) when assessed at 12 months.

It is noteworthy that depression among relatives correlated with their reports of patient confusion, verbal expansiveness and subjective symptoms. In addition, although depression in relatives was correlated with severity of injury at 3 months, this association was not evident at 6 and 12 months follow-up.

More recently, Livingston, Brooks, and Bond (1985a) have reported on the outcome at 3-months of female relatives living with a severely head-injured member. Head injury severity was based on duration of posttraumatic amnesia (Russell & Smith, 1961). The relative's sample was comprised of family members in various relation to the patient: approximately half of the relatives were wives of head-injured men, 37% were mothers, and 9% were sisters. For comparison, a control group of patients with mild injuries and members from their family were interviewed as well. With regard to disturbances of mood, Livingston et al. found greater anxiety, psychiatric symptomatology, and subjective burden in relatives living with the severely head-injured patients. Overall, 32.5% of the relatives were identified as suffering from clinically significant anxiety, but relatives of the severely injured were at significantly greater risk compared to those living with less severely injured relatives. Fewer relatives were classified as depressed (21.4%), and surprisingly, no group differences in depressive symptomatology were reported. However, such symptoms were present in 14% of all relatives.

In a subsequent report, Livingston, Brooks, and Bond (1985b) described the 1-year outcome of relatives living with a severely head-injured member. Anxiety, psychiatric symptoms, and subjective burden continued to be problems for many of the relatives. For example, 38% of the relatives conntinued to be suffering from anxiety symptoms - a proportion approximately equal to that observed at three months. As well, the incidence of depression remained about the same (26%).

The observation that living with a characterologically-altered member results in stress that is associated with adjustment and social disturbance in relatives is consistent with findings of such investigators as Holmes & Rahe (1967) and others who have examined the relationship between stress and the subsequent onset of illness. Nonetheless, few studies have examined the relationship between physical health status and stress in relatives of head-injured individuals. One such investigation was conducted by Oddy and associates who interviewed 54 relatives within 1 month of the patient's head injury and again at 6 and 12 months post-injury (Oddy et al., 1978). All the patients were 16 to 39 years old, and had received severe head injuries. In addition to completing a brief depression inventory relatives were also asked to describe any current stresses, physical illnesses, or complaints regarding the patients' treatment. Over 50% of the relatives admitted experiencing stress as a result of the patient's head injury when interviewed at 6 and 12 months, and approximately 25% reported suffering from an illness within the preceding 6 months. Of those with physical complaints, over half had illnesses that the authors regarded as psychosomatic (i.e., migraine, duodenal ulcer, asthma). Although 8% of the relatives had been prescribed sedatives, none had sought or received psychiatric treatment. Unfortunately, it cannot be concluded that physical illness in this group of relatives was greater than that expected for the general population, because no control group was used.

Structural changes have also been noted in families with a brain injured member. Rosenbaum and Najenson (1976) examined the marital adjustment of wives whose husbands had been injured during the 1973 Yom Kippur War. Since 8 out of 10 men had received penetrating missile wounds, their neuropsychological, behavioral, and emotional deficits may not be representative of a closed head injury sample. However, their findings, as they pertain to family coping, may be relevant here. Three groups of wives were obtained:

10 with brain-injured husbands, 6 with husbands who were paraplegic but with no evidence of brain-injury, and 14 married to men who fought in the war but were uninjured. Overall, wives of brain-injured men reported more problems and less satisfaction with their roles than wives of either the paraplegics or controls. Furthermore, in families with a brain-injured spouse, wives' low mood was associated with adverse changes in family structure and diminution of activities.

The impact of head injury on family relationships also has been evaluated by Oddy et al. (1978a). In families with a head-injured member, the relationship between patient and their parents showed no deterioration, but there was some evidence to suggest decreased communication between patient and siblings. Changes in personality were characteristics of the patient most closely associated with poorer family relationships. In contrast to what had been reported by Thomsen (1974), few problems were noted for spouses living with a brain-injured patient - either at 1 or 2 years post-injury. Of those spouses that did report injury-related difficulties, diminution of affection for their injured partners was a primary area of concern.

A detailed examination of families with a severely head-injured patient was reported by Livingston et al. (1985a). Employing a self-report social adjustment scale these investigators assessed 42 families 3 months after the patient's injury. Families of 41 patients with mild head injuries served as controls. Significant marital and family dysfunction was observed for relatives of patients with severe head injuries, but not for relatives of patients with mild injuries. Later evaluations of the families with severly injured patients revealed that marital and family dysfunction continued to be problems at 6 and 12 months post-injury (Livingston et al., 1985b).

In summary, this discussion has reviewed clinical reports and investigations that have described head injury-related consequences for the intact family members, particularly those serving as the primary caretakers. These may be summarized as follows:

1) It is recognized that physical and neuropsychological deficits may place substantial burden and stress upon the patient and their relatives. Nonetheless, the most frequent sources of family distress are personality and behavioral changes in the patient.
2) Relatives and family members living with a head-injured patient report disturbances in mood, particularly anxiety and depression. Relatives also may be at greater risk for physical illness following the patient's injury.
3) Changes in family structure, family functioning, and

family relationships have been reported, but systematic and objective assessment has often been lacking. Still, much is not known. For example, little attention has been directed toward what family members actually do to adapt or cope with challenges brought about by a member's head injury-related physical, neuropsychological, and/or behavioral changes. Yet, investigations describing the impact of a variety of disabling conditions on family life suggest that coping behavior is an important factor in determining how well a family responds to a problematic event or crisis (Hill, 1965). Though the literature on stress and family coping is extensive and an exhaustive review is beyond the scope of this discussion, a few historical details are worth reviewing in order to provide a context with which to appreciate more recent attempts to describe and quantify family coping efforts.

Family Coping and Adaptation - Historical Background

The concept of stress as an important factor contributing to the manifestation of certain physiological and psychological symptoms emerged in the first half of the 20th century and followed a growing recognition in modern medicine that disease may not be only a result of pathogenic agents, but that it could result from the adaptive mechanisms of an individual as well (Hinkle, 1974). Although a precise, universally accepted definition of "stress" is lacking, two early pioneers viewed it as a given state of the organism (Selye, 1966; Wolff & Goodell, 1968). A more detailed definition was later provided by Selye, who wrote that the state of stress was "manifested by a specific syndrome which consists of all of the non-specifically induced changes within a biologic system" (cited in Hinkle, 1974, p.338).

Investigation of stress and its effects on an individual's physiological and psychological health gained considerable momentum in the mid-1960's and was perhaps best exemplified by the work of Holmes and Rahe. These investigators identified a relationship between the presence of stress and later onset of disease or illness (e.g., Holmes & Rahe, 1967; Rahe, 1968). Presence or absence of stress was inferred from the number of positive and negative life events that occurred within a given period of time - usually a year. Although contradictory findings have been reported since, the importance of the social and cultural environments as variables which influence the incidence, prevalence, course, morbidity, and mortality of disease has not been seriously questioned (Hinkle, 1974). Moreover, it should be noted that the concept of stress as applied to biological systems was an important step in the development and growth of psychosomatic medicine.

Conceptualizations of family response to stress did not appear in the literature until the middle of the 20th century. One of the first models to describe how families respond to stress was proposed by Hill (1949), who based his conceptualizations on his study of the effects of war-induced separation on family adjustment. In his model, Hill attempted to identify and describe those variables linked to the precipitation of a family crisis, i.e., a situation in which the family had little or no prior preparation, and consequently, one which was viewed as problematic (Hill, 1965). According to Hill whether or not a family experiences a crisis depends upon the type of event, the crisis-meeting resources of the family, and the family's perception or definition of the event. When families experience a crisis they undergo a period of disorganization followed by recovery, the degree of which may by great (such that the family's post-crisis level of organization is the same as or better than before) or limited, resulting in a level of reorganization much lower and less optimal than before the crisis. Consequently, families that have faced a stressful event or crisis are at risk for additional crises if their capacity or resources for coping with problems have been impaired or depleted.

Over the last 30 years, investigators examining family reponse to a variety of stressful events and situations have provided general support for Hill's model. Many acute and chronically disabling conditions have been studied including dementia (Kapust, 1982), diabetes (Crain, Sussman, & Weil, 1966), Hurler's syndrome (Crocker & Cullinane, 1972), kidney disease (London & Smith, 1982; Molumphy & Sporakowski, 1984; Palmer, Canzona, & Wai, 1982), leukemia (Kaplan, Smith, Grobstein, & Fischman, 1973), multiple sclerosis (Maybury & Brewin, 1984), myocardial infarction (Croog, Lipson, & Levine, 1972; Dhooper, 1983; New, Ruscio, Priest, Petritsi, & George, 1968), physical disability (Christopherson, 1960; Fink, Skipper, & Hallenbeck, 1968), poliomyelitis (Deutsch & Goldston, 1960), psychiatric illness (Anthony, 1970; Mayo, O'Connell, & J. O'Brien, 1979; Reiss, Costell, Jones, & Berkman, 1980), retardation (Vadasy, Fewell, Meyer, & Schell, 1984), spina bifida (Dorner, 1973), spinal cord injury (Cleveland, 1979; Crew, Athelstan, & Krumberger, 1979; El-Ghatit & Hanson, 1975; Jackson, 1972; Weller & Miller, 1977), stroke (Biorn-Hansen, 1957; Borden, 1962; Kinsella & Duffy, 1979; New et al., 1968; Watzlawick & Coyne, 1980), and tuberculosis (Anthony, 1970; Parad & Caplan, 1965). In general, findings from these studies suggest that any serious threat to family stability increases the likelihood of change in some aspect of family life; however, coping tasks seem to vary from one disease to another (Kaplan et al., 1973).

Consequently, although some generalizations from the literature can be applied to families with a head injured member, a more thorough examination of this population is called for. Yet, it is only within the last decade that specific attention has been directed toward families with a brain injured member (Blazyk, 1983; Bond, 1983; Brooks & McKinlay, 1983; Humphrey & Oddy, 1978; Lezak, 1978; Mauss-Clum & Ryan, 1981; McKinlay et al., 1981; Oddy & Humphrey, 1980; Oddy et al, 1978a; Romano, 1974; Rosenbaum & Najenson, 1977; Rosin, 1977; Todd & Satz, 1980).

Although continuing to exert a powerful influence upon current thinking and research, Hill's model has undergone some modification and revision over the last 15 years (Burr, 1973; McCubbin & Patterson, 1983). In particular, McCubbin and his colleagues have criticized Hill's model because of its primary focus on pre-crisis variables to account for differences in family vulnerability to a stressor event. In order to develop a model that took more into account the dynamic nature of family processes, McCubbin and his colleagues developed a model which adds post-crisis variables to Hill's original conceptualization. Five types of variables were added: (a) additional life events and changes occurring *after* the initial crisis which make adaptation more difficult to achieve; (b) existing and expanded psychological and social factors that families draw upon to manage crisis situations; (c) the meaning the family gives to their total situation which includes the initial crisis, the pile-up of additional changes and stressors, old and new resources, and their estimate of what needs to be done to manage the current disequilibrium; (d) those processes families employ to achieve satisfactory resolution (i.e., coping behaviors); and (e) the outcome of the family's efforts (McCubbin & Patterson, 1981; McCubbin & Patterson, 1983). Based upon their longitudinal study of families with a missing-in-action or captive spouse during the Vietnam War, McCubbin and Patterson (1983) noted that family adaptive coping was a particularly important variable, since it represents the interaction of family resources, perceptions and behavior. According to the authors:

> Coping, then, becomes a bridging concept which has both cognitive and behavioral components wherein resources, perception, and behavioral responses interact as families try to achieve a balance in family functioning. Family coping efforts may be directed at (a) eliminating and/or avoiding stressors and strains; (b) managing the hardships of the

situation; (c) maintaining the family system's integrity and morale; (d) acquiring and developing resources to meet demands; and (e) implementing structural changes in the family system to accommodate the new demands (McCubbin & Patterson, 1983, p.16-17).

For the purposes of this study coping has been defined as "... personal or collective (with other individuals, programs) efforts to manage the harships associated with health problems in the family" (McCubbin & Patterson, 1981, p.87).

Critique of Studies Examining Family Response to Head Injury

Several investigators have commented on the inadequacy of prior studies on outcome after head injury (Oddy, Humphrey, and Uttley, 1978b), and in particular, the difficulty in drawing clear conclusions from studies that may differ with respect to sample characteristics and methodology. Many of these criticisms apply to the literature on family response to head injury as well. First, many studies have failed to control for the family member's relation to the injured member. In many investigations, the term "relatives" was used to include mothers, fathers, husbands, wives, siblings, children, and in some cases, close family friends who served as care-takers. Yet evidence from studies examining psychosocial outcome following medical illness suggest that family response to disability varies depending on the role of the injured member (e.g., whether the patient is a breadwinner, dependent, spouse, child, etc.) (Bishop et al., 1981). Although not conclusive, there also is evidence to suggest that one's relationship to the patient (e.g., wife versus mother) has a differential affect on a family member's psychiatric, emotional, and psychosocial adjustment following the patient's accident (Livingston et al., 1985a; Oddy & Humphrey, 1980). Thus, the first aim of the current study was to systematically examine parental adjustment to an offspring's head injury. To this end, only mothers and fathers who were living with or involved with the daily care of the patient at the time of interview were interviewed and evaluated.

To date, no investigation has attempted detailed objective assessment of the coping behavior of family members living with a head-injured person. Nonetheless, a variety of instruments and assessment devices have been developed and described in the family coping and family stress literature (See Bishop, Baldwin, Epstein, & Keitner, 1983; McCubbin & Patterson, 1983; McCubbin & Patterson, 1981; Moos, 1974; Moos & Moos, 1981). Consequently, a second aim of this study was the description and quantification of coping behaviors and strategies employed by parents at the time of interview.

A third and serious limitation of prior investigations has been a lack of adequate control groups. Even when used, sufficiently detailed information on the selection criteria and demographic characteristics, (or in some cases, injury-related information) was often not provided. A third aim of the study then was to utilize adequate controls so that aspects of parental adjustment and coping specific to families with a head-injured member could be evaluated. For this purpose two control groups were employed: orthopedic patients and uninjured individuals who were of comparable age, education, and socioeconomic status as the CHI group. Patients with orthopedic fractures or injury were considered appropriate controls as they share important characteristics with the head-injured population, i.e., they come from a similar "at risk" population, have sustained a traumatic injury requiring hospitalization, and in some cases, have injuries resulting in moderate to severe disability. The advantages and disadvantages of orthopedic patients as controls for studies of the head-injured have been reviewed by McKinlay and Brooks (1984). It was also considered desirable to utilize a sample of healthy, non-injured individuals (and their parents) as additional controls. In this way, analyses could be conducted that would allow direct comparison of parental adjustment and coping in families with a head-injured offspring to those not dealing with the brain-related disablement of a member.

Another methodological drawback of many earlier studies concerns the assessment procedures employed, particularly with respect to ratings of the patient's post-injury status. In several investigations the source of these ratings were from the relatives alone (e.g., Brooks & McKinlay, 1983; Livingstone et al., 1985a,b; Mauss-Clum & Ryan, 1981; McKinlay et al., 1981), whereas in some, ratings were obtained from both patients and relatives (Oddy & Humphrey, 1980; Oddy et al., 1978a,b). In several of these investigations (McKinlay et al., 1981; Oddy et al., 1978a; Rosenbaum & Najenson, 1976), relatives were asked to describe changes in the patient subsequent to the head injury, as well as the degree of stress or subjective burden that they themselves experienced. As McKinlay and Brooks (1984) note in their review of methodological issues relating to psychosocial research, when relatives are the source of information for both patient functioning and their own adjusment and emotional status, it is not possible to presume causation, as personality characteristics of the relative may influence interest).

2) impaired capacity for control and self-regulation.

3) impaired capacity for social perceptiveness or social sensitivity.

4) stimulus-bound behavior (e.g., social dependency, lack of initiative, and problems planning and organizing activities).

5) inability to profit from experience.

Lezak and others have described the phenomenon of marked characterological change as "personality death", and have noted that in the absence of actual corporal death, relatives are unable to mourn for what truly amounts to a loss of a once familiar member (Lezak, 1978; Romano, 1974). Furthermore, in the absence of a member's physical death, survivors are unable to receive the type of support and comfort that is provided for those bereaved by death. Lezak also has noted that even relatively mild changes in personality, such as irritability or slight reduction in drive, seem to have stressful repercussions for the family. Subsequent investigations have supported these obserations (Klonoff & Prigatano, in press; Mauss-Clum & Ryan, 1981; McKinlay et al., 1981; Thomsen, 1974).

In an early report, Thomsen (1974) described the status of patients and relatives 12 to 70 months post-injury. Suprisingly, none of the relatives

Thus another aim of the current study was to evaluate family response in a representative sample of patients with closed head injury covering a broad range of injury severity and outcome.

Evidence from several studies indicates that relative's adjustment may be associated with the injury severity of the patient during the acute stage; however, these relationships are less evident, or absent altogether, at 6, 12 or 24 months post-injury (Livingston et al., 1985a; McKinlay et al., 1981; Oddy & Humphrey, 1980). Rather, changes in the patient's personality, behavior, neuropsychological functioning, and physical status, create problems for the family. These results support the notion that the patient's level of functioning may have dramatic influence upon the remaining family members. A similar conclusion has been suggested by Livingston et al. (1985b). A final aim for the present study then was the systematic assessment of the patient's current level of functioning, and to evaluate its contribution to parental adjustment.

In summary, findings from investigations reviewed previously suggest that the family unit is at risk for structural and functional changes following a variety of crises. When the precipitating event is a member's head injury, clinical and empirical evidence indicate that families can be temporarily, and chronically, disrupted.

As well, family members living with the stress of a characterologically-altered member may be at risk for a variety of psychiatric, emotional, and adjustment problems, as well as physical illness.

Summary of Study Objectives

The following objectives represented the specific aims of this study:

1) The quantitative evaluation of parental adjustment in families with a head-injured offspring. For the purpose of the present study, parental adjustment encompasses mood, emotional-distress, and physical health status.
2) Assessment of specific coping behaviors and strategies and quantification of stressful family events that were hypothesized a priori to be related to parents' emotional well-being and physical health.
3) Evaluation of parental adjustment and coping in familes with a head-injured member and comparison of these families to those without a head-injured offspring. It was hypothesized that living with and caring for a head-injured member would place such parents at greater risk for mood disturbances, emotional distress, and physical health problems.
4) Examination of the relationship between parental health,

coping, and adjustment and their offspring's functional status. It was hypothesized that parental adjustment would vary in proportion to their offspring's level of functioning. In addition to the offspring's degree of psychosocial and physical functioning, other variables were included because of their likely impact on parental adjustment. These included self-ratings of the offsprings' anxiety and depression, as well as an interview-derived measure of emotional distress.

METHOD

Subjects

Head-Injured Patients

This investigation utilized parents of offspring with a diagnosis of closed head injury (CHI) who had been admitted to one of three Portland, Oregon hospitals[1] 9 to 48 months prior to the time of interview. Appendix B provides the types of codes used to identify and select patients; codes were based on the International Classification of Diseases (9th Revision) (ICD9). Head-injured patients were selected without regard to injury severity, sex, handedness, or presence of multiple trauma. However, any individual with a previous head injury involving a documented loss of consciousness, or CHI-related hospitalization exceeding 1 day, or pre-injury history of psychiatric institutionalization was excluded.

Controls

Two control groups were employed in this study. Patients with ICD9 codes indicative of a major limb fracture or injury, but without documented CHI involvement, were selected for the ORTHO group (see Appendix B). Uninjured individuals of comparable age, education, and socioeconomic were used as the second control group (CONTROLS). As indicated earlier, many investigations have failed to employ adequate controls in their examination of family coping and reponse to head injury. Even when control groups have been used, few studies have provided sufficient data with which to determine if the control patients were comparable to the head-injured patients in terms of such characteristics as age, sex, and education. Descriptions of parent characteristics have generally been lacking.

It is important to obtain appropriately matched controls in outcome studies because patients with head injuries appear to differ from the general population in several demographic and psychosocial characteristics (McKinlay & Brooks, 1984; McLean, Dikman, Temkin, Wyler, & Gale, 1984). To this end, a variety of methods have been reported in order to obtain appropriate controls. One such procedure has been reported by McLean and associates (McLean et al., 1984). These investigators used the friends of head-injured patients as controls, reasoning that one usually chooses friends that are similar to oneself. It was anticipated that such a strategy would yield a control group with demographic and premorbid characteristics comparable to that of the head-injured families. Initially, the above method was adopted for the current study. However, recruitment of controls based on recommendations from families with a head-injured member was lower than expected (9 names of family friends were provided by 5 families). Consequently, participants in the ORTHO and CONTROL groups also were asked to provide names of family friends that could be contacted for purposes of the study.

Since it was the objective of the current study to investigate adjustment and coping of mothers and fathers residing with a head-injured offspring, parents were selected whose families met the following criteria:

1) Patient, or non-injured offspring, was living at home for at least 1 month[2] prior to interview, or had daily physical and/or telephone contact with parent(s).
2) Patient/offspring was 12 to 30 years old. An upper limit of 30 was deemed appropriate as few non-injured individuals over 30 were expected to be living with their parents, whereas a lower limit of 12 years old was utilized to insure that respondents had sufficient education (i.e., 6th grade) with which to read and complete the various inventories and questionnaires.
3) No other offspring had suffered documented loss of consciousness secondary to a blow, or had been hospitalized more than 1 day for a CHI-related injury[3].

Appendix C provides data on the entire subject pool and presents a breakdown of patient and family eligibility, as well as rate of participation. Initially, 384 families with an accidentally injured member (CHI-230, ORTHO-154) that appeared to meet the selection criteria were contacted by letter to request their cooperation in the current study. (Copies of the letters that were sent by each hospital have been provided in Appendix D). In all, 155 (40.4%) eligible families were located and contacted by telephone regarding participation in the study. Forty-one eligible control families also were contacted by letter, and later by telephone to request their participation.

Response rates for each group were computed based on the number of families that actually participated relative to the total number that were eligible (i.e., the sum of those interviewed plus those that refused). As such, the participation rates for the CHI, ORTHO, and CONTROL families were 57%, 45%, and 50%, respectively. Initially, 20 eligible CONTROL families agreed to cooperate, 9 with a male offspring participant, and 11 with a female offspring participant. In order to insure that the male-to-female ratio of the CONTROL group was similar to that of the CHI and ORTHO samples, 5 of the families with female offspring were excluded based on random selection.

Group Determination

Three groups of families were thus classified according to the offspring's injury status:

1) CHI families (n=53) - those with a head-injured member

who may or may not have suffered additional physical injury.

2) ORTHO families (n=28) - those with a member who had sustained a major limb injury (i.e., arm, shoulder, ankle, leg, hip) regardless of injury severity or resultant disability. Patients with minor orthopedic trauma such as fractures of the fingers, toes, or ribs (in the absence of additional orthopedic involvement) were excluded.
3) CONTROL families (n=15) - those with an offspring participant who had no prior history of a CHI with documented loss of consciousness, a CHI-related hospitalization exceeding 1 day, or a major limb fracture within 36[4] months prior to interview).

Materials and Procedure

Parents and patients underwent a brief semi-structured interview to evaluate aspects of their emotional adjustment and physical health status, and also completed a battery of inventories that assessed mood, and their perception of the offspring's health-related functional status. Parents also completed questionnaires that evaluated their coping behavior, and the number of stressful events to which the family had been exposed in the year prior to interview. In most cases, the entire protocol took place in the family's home and generally required approximately 2 to 3 hours per household (1 to 1 1/2 hours per participant). Care was taken to insure privacy and confidentiality of the participant's response. To this end, interviews were usually conducted in a separate room, away from other family members; nonetheless, for a small number of individuals this was not possible. In cases where privacy was not completely assured, the evaluation was continued only with the explicit consent and cooperation of the participant.

Upon meeting the families at their home (or hospital for 7 families), the rights and requirements of research subjects were explained to them. Participants were free to ask questions, and upon indicating that they understood the purpose, scope, and requirements of the study, they were then requested to sign the consent form (see Appendix E). For patients or non-injured controls under the age of 21, parental co-signature was requested.

Patient Protocol

For each patient, injury-related and treatment information were obtained from the medical records. This information included:

1) date of injury
2) cause of injury

3) presence/absence of other injuries
4) length of stay at primary care facility
5) severity of head injury as measured by the 15-item Glasgow Coma Scale (GCS)[5].

When information was unavailble from the hospital records, data were obtained from the patient and/or parent(s). Typically, the patient was interviewed first and relevant demographic and injury-related data were obtained at this time. Following this prefatory interview, the patient was given a semi-structured interview that evaluated various aspects of the patient's current emotional status and physical health (see Appendix F). In 2 of the 96 families, the patient was unavailable for interview: one ORTHO patient refused to cooperate, although his parents chose to participate; and one CONTROL offspring failed to show up for his appointment. Upon termination of the interview, which required approximately 20 to 30 minutes, patients were then provided instructions for completion of a self-administered rating scale for depression and a multi-scale measure of health-related dysfunction. In a few cases where a CHI patient exhibited comprehension or reading difficulty, scales were administered with the examiner's assistance. More detailed description of these instruments has been provided below.

Parents Protocol

Prior to their offspring's interview, parents were given several inventories and questionnaires and provided instructions for their completion. Parents were encouraged to ask questions at any time if they were unsure of the instructions. Upon demonstrating their understanding of each instrument, parents were then requested to complete these on their own in another room. Following the patient's interview, each parent was administered a similar protocol in separate sessions. Every attempt was made to interview both parents, but in several cases this was not possible due to schedule conflicts or single-parent households. In all, 90 mothers and 44 fathers participated (Table 1). Descriptions of the semi-structured interview and various inventories have been provided below.

Semi-structured Interview

A three-part semi-structured interview was developed to elicit relevant demographic data, and to assess the emotional well-being and physical health status of each participant. It required approximately 20 to 30 minutes to complete. Information was obtained for the following areas:

Part I: Demographic Data. (see Appendix F, Table F-1). The following information was elicitted:

1) age

Table 1

Breakdown of Particpants by Group and Type

Family Group	n	Type of Participant Patient	Mother	Father
CHI	53	53	48	26
ORTHO	28	27	28	13
CONTROL	15	14	14	5
Total:	96	94	90	44

2) education
3) work status
4) family income (total)
5) number of members currently residing at home.
6) race
7) religious preference
8) marital status

Part II: Assessment of Emotional Distress[6] (see Appendix F, Table F-2). The degree of emotional distress for each participant was assessed by a 26-item examiner-administered instrument, the Emotional Distress Inventory (EDI), that was specifically developed for the purpose of the current study. Item content was based on a review of the literature that revealed several complaints frequently attributed to relatives caring for head-injured members.

Part III: Assessment of Physical Health Status (Appendix F, Table F-3). In this section physical health status was assessed for the 12 month period prior to interview. Interview items covered the following areas:

1) extent of minor illness suffered in the last 12 months (e.g., colds, headache, flu, migraine)
2) presence/occurrence of major medical problems (e.g., arthritis, cardiovascular disease, hypertension, ulcer, etc.) within the last 12 months

3) self-rating of overall state of physical health (HRATING) (1-excellent, 6-very poor).

A composite measure of health status (TOTILL) also was derived for purposes of the study. This index was simply the sum of minor and major illness types.

All participants (i.e., parents and patients) were administered inventories to assess their current mood (Clinical Anxiety Scale, and Carroll Rating Scale for Depression), and required to complete an inventory that assessed their perception of the patient's current functional status (Sickness Impact Profile, patient or relative version). Parents also completed an inventory that assessed their coping behavior. A brief description of these materials and procedures for their administration is provided in the following section.

Assessment of Mood

As noted previously, only a few studies have attempted objective assessment of relatives' mood. Although depressive symptomatology in relatives has been described by several investigators, comparable data from suitable controls groups has often been lacking, making it impossible to determine if relatives are at greater psychiatric risk than the general population. Very few studies have reported on the incidence of anxiety in relatives of head-injured individuals, and as with the assessment of depression, few investigations have used appropriate controls. To this end, each participant was assessed by means of the following two scales.

Carroll Rating Scale (CRS) (Carroll, Feinberg, Smouse, Rawson, & Greden, 1981) (Appendix G). Presence and extent of depressive symptomatology was assessed by means of the Carroll Rating Scale (Carroll et al., 1981), a 52-item, self-report version of the Hamilton Rating Scale for Depression (HRS) (Hamilton, 1960). Items are rated by 3 or 5-point scales and include evaluation of: Depressed Mood, Feelings of Guilt, Suicidal Ideation, Early-, Middle-, and Late-Insomnia, Work & Activities, Retardation, Agitation, Psychic Anxiety, Somatic Anxiety, Gastrointestinal Symptoms, General Somatic Complaints, Genital Symptoms, Hypochondriasis, Weight Loss, and Insight.

Split-half reliability of the CRS has been demonstrated for odd-even and YES-NO items, and it has been shown to have internal consistency comparable to that of the HRS (Carroll et al., 1981). The CRS also has been found to have acceptable face, content, and concurrent validity (Carroll et al., 1981; Nasr, Altmman, Rodin, Jobe, and Burg, 1984; Robbins, Alessi, Colfer, and Yanchyshyn, 1985). Preliminary normative data have been reported for both adults (Carroll et al., 1981) and adolescents

(Yanchyshyn & Robbins, 1983).

Clincal Anxiety Scale (CAS) (Snaith, Baugh, Clayden, Husain, & Sipple, 1982) (Appendix H). The Clincal Anxiety Scale (Snaith et al., 1982) was developed to assess the severity of anxiety disorder. Assessing both physiological and psychological concomitants of anxiety, the CAS is a 6-item, observer-rated version of the Hamilton Anxiety Rating Scale HAS) (Hamilton, 1959). Reliability of the HAS has been demonstrated for inter-rater agreement (Hamilton, 1959), but no such data is available yet for the CAS. Validity of the CAS has been demonstrated by studies that have examined the relationship between the CAS and other measures of anxiety, including physicians' global ratings, visual analog scales, and other anxiety inventories (Snaith & Taylor, 1985; Snaith et al., 1982). To date, normative data has been limited to two samples of patients diagnosed as suffering from anxiety neurosis (Snaith et al., 1982).

Assessment of Patient Functional Status

Previous investigations of family response to head injury have tended to focus on specific areas of the patient's post-injury status - usually changes in personality or behavior. Few have attempted assessments that encompass a wider spectrum of abilities. In order to allow more detailed description of patient characteristics and to evaluate their differential impact on parental adjustment, patients and parents alike were requested to complete a detailed assessment of the patients post-injury level of functioning.

Sickness Impact Profile (SIP) (Bergner, Bobbitt, Pollard, Martin, & Gilson, 1976).

The functional status of patients at the time of interview was evaluated by means of the Sickness Impact Profile (SIP), a self-rating questionnaire developed to measure sickness-related behavioral dysfunction (Pollard, Bobbitt, Bergner, Martin, & Gilson, 1976) (see Appendix I). Specifically, the SIP was designed to evaluate the impact of sickness on the respondent's actual behavior and performance (Bergner & Gilson, 1980). Although first developed as an outcome measure in the evaluation of medical services and treatment, the SIP has since been used in the investigation of quality of life in patients with a variety of medical problems, including chronic obtructive pulmonary disease (McSweeney, Grant, Heaton, Adams, & Timms, 1982), sarcoma (Sugarbaker, Barofsky, Rosenberg, & Gianola, 1982), and more recently, CHI (Klonoff, 1984; Stampp, 1984).

Reliability of the 136-item SIP has been demonstrated in terms of overall scores, individual categories, and agreement in the checking of items (Pollard, et al., 1976).

Validity of the SIP has been demonstrated by studies which have examined the relationship between the SIP and other health status measures, including the Activities of Daily Living Index and selected items from the National Health Interview Survey (Bergner, Bobbitt, Carter, & Gilson, 1981). In addition, the SIP is sensitive to differences in type and severity of illness, as well as to changes in health status over time (Bergner et al., 1976).

The SIP is composed of 12 categories - each measuring a different type of activity: Sleep & Rest (SR), Eating (E), Work (W), Home Management (HM), Recreation & Pastimes (RP), Ambulation (A), Mobility (M), Body Care & Movement (BCM), Social Interaction (SI), Alertness Behavior (AB), Emotional Behavior (EB), and Communication (C). Three summary scores are also provided: an Overall score which is derived from all 12 subscales; a Physical Dysfunction score (derived from the A, BCM, and M categories); and a Psychosocial Dysfunction score (derived from the SI, C, AB, and EB categories) (Bergner & Gilson, 1980). Completion of the self-administered SIP requires approximately 20 - 30 minutes.

Recently a relative's version of the SIP was constructed by rephrasing the questions in the third person (Stampp, 1984). This allowed a close relative, i.e., one living with, or caring for the patient, to describe the impact of sickness on the patient's current level of functioning. In a preliminary study of 63 head-injured patients and their relatives conducted via mail-questionnaire, good agreement between relative and patient SIP ratings was reported. For the 12 individual scales, Pearson correlation coefficients ranged from 0.32 to 0.93, whereas correlations for the Overall, Physical, and Psychosocial summary scales were 0.76, 0.93, and 0.54, respectively (Stampp, 1984). These findings suggest that relatives are capable of assessing the health-related functional status of a head-injured member, although the degree of parent-offspring agreement appears to vary with the type of activity.

Assessment of Parental Coping and Stress.

Parental coping was evaluated using an instrument developed by investigators from the Family Stress Project at the University of Minnesota. These investigators also designed an instrument to record the pile-up of life events and changes experienced by family members to serve as an index of family stress. Each of these inventories have been described in detail below.

The Coping Health Inventory for Parents (CHIP) (McCubbin, Nevin, & Cauble, 1983). The Coping Health Inventory for Parents (CHIP) is a 45-item self-report questionnaire designed to assess parent's perceptions of their reponse to the management of family life when faced with a child who is chronically ill (McCubbin et al., 1983; McCubbin, McCubbin, Patterson, Cauble, Wilson, & Warwick, 1981) (scale and item content have been presented in Appendix J). Items for the CHIP were derived from the authors' previous work with family response to stress, as well as from social support theory, family response theory, theoretical developments in the psychology of coping, and from knowledge of family/medical support interaction. The CHIP is composed of three subscales each of which assesses a pattern of coping behavior: (a) CHIP I - Maintaining Family Integration, Cooperation and an Optimistic Definition of the Situation, (b) CHIP II - Maintaining Social Support, Self-Esteem, and Psychological Stability, and (c) CHIP III - Understanding the Medical Situation Through Communication With Other Parents and Consultation with Medical Staff. Completion of the questionnaire requires approximately 15 - 30 minutes.

To date, the reliability of each of the CHIP's 3 subscales has been demonstrated in terms of internal consistency. Validity of the CHIP has been assessed by examining the relationship between parental coping patterns and measures of family functioning, family structure, and improvement in the health status of a chronically-ill child (McCubbin & Patterson, 1981).

Family Inventory of Life Events and Changes (FILE) (McCubbin, Patterson & Wilson, 1981). The Family Inventory of Life Events and Changes (FILE) "is a 71-item self-report inventory designed to record normative and non-normative life events and changes experienced by a family unit" (McCubbin & Patterson, 1981, p.21). The events and changes that specifically make up the FILE are those situations which frequently take longer to adapt to, or are those which by their chronic nature subject the family to strain and potential distress (Appendix K). Item selection for the initial version of the FILE was guided by those situations described in other life change inventories (e.g., Social Rating Readjustment Scale by Holmes & Rahe, 1967), but also included situational and developmental changes typically experienced by families during the life cycle.

Items of the FILE have been grouped into nine dimensions based on factor analytic procedures: Intra-family strains, Marital Strains, Pregnancy and Child-bearing Strains, Finance and Business Strains, Work-Family Transitions and Strains, Illness and Family "Care" Strains, Losses, Transitions "In and Out", and Legal. To measure stress, two primary scores can be computed: Total Recent Life Changes is the total number of stressful events which have occured in the family during the last 12 months. The Past Life Change score represents a sum of those events which the family has experienced at any time before the last 12 months. The FILE is completed by adult family members and requires approximately 30 minutes for administration.

Reliability of the FILE has been demonstrated in terms of internal reliability and test-retest comparability (McCubbin & Patterson, 1981; McCubbin & Patterson, 1983b; Olson, McCubbin, Barnes, Larsen, Muxen, & Wilson, 1982). Validity of the FILE has been assessed by examining the relationship between number of life stressors and health status of children with cystic fibrosis, as well as with other measures of family functioning (McCubbin & Patterson, 1981; Patterson & McCubbin, 1984).

RESULTS

Outline

This section contains the principal and supplemental statistical analyses and results for the current study. To aid discussion, analyses have been reported according to the type of respondent, i.e., by patients, mothers, and fathers. Unless otherwise stated, parents are grouped according to their offspring's injury status: CHI, ORTHO, or CONTROL. Various subsets of the data were analyzed to address specific hypotheses or issues pertinent to the study. These can be summarized as follows:

1) CHI patient characteristics are reported. These include demographic information and injury-related data (CHI and ORTHO). Group comparisons are conducted to determine if CHI, ORTHO, and CONTROL offspring differ with respect to demographic characteristics, and to determine if CHI and ORTHO patients differ with with repect to injury-related characteristics.
2) CHI patient interview and rating scale data are reported. Group comparisons are conducted to evaluate the presence or absence or group

differences with regards to offsprings' self-appraisal of their current mood and functional status.

3) Parent demographic data are reported and group comparisons are conducted to establish the presence or absence of group differences with respect to relevant matching variables. In this and all subsequent sections statistical analyses for mothers and fathers have been conducted and reported separately.

4) Parental ratings of the CHI patients' functional status are reported. Specifically, scores from each of 12 SIP subscales and 3 summary dimensions are reported for the both the mother and father subsamples. Group comparisons are conducted (separately for mothers and fathers) to determine whether parental appraisal of CHI patients' level of dysfunction varies from that of ORTHO or CONTROL parents.

5) Parental adjustment data for the CHI sample are presented. These include measures of parental anxiety (CAS), depressive symptoms (CRS), emotional distress (EDI), patterns of coping behavior (CHIP), occurrence of stressful events (FILE), and physical health status (HRATING, TOTILL).

6) Group comparisons on aspects of parental adjustment are performed utilizing data from the CAS, CRS, CHIP, and FILE inventories, as well as from the interview derived EDI and HRATING.
7) The relationship between offspring functional status and parental adjustment (i.e., mood, emotional distress, coping, and physical health status) are identified based on a series of canonical correlation procedures.
8) Post-hoc, exploratory analyses are conducted to examine trends in the data and to suggest hypotheses for future research. These entail examination of the relationship of parental adjustment with the degree and direction of offspring-parent agreement on the SIP Physical and Psychosocial scales.

Patient Demographic and Post-injury Characteristics

CHI Sample (n=53)

Demographic information for the CHI sample has been summarized in Appendix L (Tables L-1 TO L-5). The majority of patients were males (79.2%), outnumbering females by a ratio of 3.8 to 1 (Table L-1). Most (97.9%) had never been married (Table L-2), and half of the patients were age 17 to 25 at follow-up (Table L-3). The median level of education for the CHI patients was

12th grade; although 26% of the patients reported some college, and 3.8% had obtained baccalaureate degrees (Table L-4). Many of the patients were still in school at the time of interview, however. Specifically, just under half (47%) of the patients were either full-time or part-time students, whereas 25% were engaged in either full-time (FT) or part-time (PT) work. Unemployment was a problem for one-fourth of the CHI sample, although 2% of the patients had achieved employment in a sheltered workshop setting.

Group Comparisons

To determine if the control groups (ORTHO and CONTROLS) had been adequately matched with the CHI patients, group comparisons for selected demographic variables were conducted by means of a MANOVA with Wilks' criterion. No significant group differences emerged for age, sex, education, family income, or family size (Table 2). No group comparisons were conducted for race as nearly all patients were caucasian (Table 3). A trend toward greater unemployment and relatively fewer students emerged for the CHI group, but this difference did not reach statistical significance (X^2 =4.029, $p>.30$) (Table 4).

Injury-related information for the CHI and ORTHO groups has been presented in Tables 5 to 8. Fifty-one

Table 2

Statistical Analysis of Offspring Demographic Variables

Multivariate Analysis of Variance with Wilks' Criterion $p>.10$

FACTOR	CHI (n=53)	ORTHO (n=27)	CONTROLS (n=14)	Univ. ANOVA
Age	20.58 (4.40)	18.81 (3.73)	18.50 (2.82)	$p>.08$
Sex	1.21 (0.41)	1.30 (0.47)	1.43 (0.51)	$p>.20$
Education	11.66 (1.92)	11.78 (1.63)	11.86 (1.83)	$p>.90$
Family Income	3.77 (1.78)	4.67 (2.47)	4.36 (1.45)	$p>.10$
Family Size	3.83 (1.28)	4.04 (0.98)	3.86 (0.77)	$p>.70$

Note. S.D.'s are in parentheses. MANOVA based on reduced number of cases due to missing data for two patients.

Table 3

Group Comparisons of Offsprings' Race

(n=96)

Race	CHI (n=53)	ORTHO (n=28)	CONTROL (n=15)
Caucasian	92.5	98.1	100.0
Hispanic	1.9	0.0	0.0
Asian	1.9	0.0	0.0
Native American	1.9	0.0	0.0
Other	1.9	1.9	0.0

Table 4

Chi-square Analysis of Offspring Occupation

Employment Status[1]	CHI	ORTHO	CONTROL	Row Sum
FT/PT work	13	5	4	22
School[2]	27	19	10	56
Unemployed	13	4	1	18
Column Sum:	53	28	15	96

[1] $\chi^2(4, \underline{N}=96) = 4.029$, $\underline{p}>.30$ (The number of employment categories was reduced to minimize the number of cells with expected frequencies < 5 (Siegel, 1956).

[2] Includes 2 patients attending sheltered workshops

percent of the CHI patients suffered injury as a result of a motor vehicle accident (MVA), but this was the cause of injury in just 7.4% of the ORTHO patients (Table 5). Conversely, few (7.5%) CHI patients incurred injuries while engaged in sports activity, whereas a much larger proportion of ORTHO patients (37%) suffered such injuries. This group difference was statistically significant (X^2 (df=3) = 21.6, $p<.001$).

CHI patients were in hospital an average of 44 days (range=1 to 171 days), and ORTHO patients averaged just over 8 days (range=1 to 55 days). This group difference also was statistically significant (X^2 (df=3) = 13.75, $p<.01$) (Table 6).

Time since injury (TSI) data have been presented in Table 7. Fifty percent of all injured patients (i.e., CHI & ORTHO) were interviewed within 18 to 32 months post-injury (range = 9 to 48). When TSI frequency distributions for the CHI and ORTHO subsamples were compared, no statistically significant group difference emerged (X^2 (df=4) = 1.623, $p>.80$). These results reflect the use of a selection criterion that insured comparable chronicity between the two patient groups.

A frequency analysis of type of injury sustained by CHI and ORTHO patients has been provided in Table 8. For the CHI patients, the most frequently incurred

Table 5

Chi-square Analysis of Injury Etiology (CHI & ORTHO)

Etiology	CHI	ORTHO	Row Sum
MVA (driver, passenger, or pedestrian)	27	2	29
MCA/Moped/ATV/Bicycle	16	8	24
Sports	4	10	14
Other/Unknown	6	8	14
Column Sum:	53	28	81

$X^2(3, \underline{N}= 81) = 21.60, \underline{p}<.001$.

Table 6

Chi-square Analysis of Length of Hospitalization (LOS)

CHI and ORTHO Patients

Length of Stay (LOS)	CHI	ORTHO	Column Sum
< = 7 days	20	18	38
8 - 14 days	5	6	11
15 - 60 days	12	4	16
> 60 days	16	0	16
Column Sum:	53	28	81

X^2 (3, N= 81)) = 13.747, p<.01

Note. LOS categories were combined to reduce the number of cells with expected frequencies <5 (Siegel, 1956).

Table 7

Chi-square Analysis of Time Since Injury (TSI)

CHI and ORTHO Patients

Time Since Injury	CHI	ORTHO	Row Sum
9 - 18 months	14	8	22
19 - 24 months	12	9	21
25 - 30 months	10	4	14
31 - 36 months	7	4	11
37 - 48 months	10	3	13
Column Sum	53	28	81

$X^2(4, \underline{N}=81) = 1.623, \underline{p}>.80$

Note: A number of TSI categories were combined to to reduce the number of cells with expected frequencies <5 (Siegel, 1956)

Table 8

Frequency Analysis of Type of Injury

Type of Injury[1,2]	CHI (n=53)	ORTHO (n=28)
Brain-related:	100.0%	0.0%
Concussion - no LOC[3]	11.3%	0.0%
Concussion - brief LOC	26.4%	0.0%
Concussion - moderate LOC	5.7%	0.0%
Concussion - prolonged LOC	24.5%	0.0%
Concussion - unknown LOC	9.4%	0.0%
Skull Fx: basal/linear/depressed	35.8%	0.0%
Epidural/extradural hematoma	1.9%	0.0%
Subarachnoid/subdural hemorrhage	3.8%	0.0%
Intracranial hemorrhage	18.9%	0.0%
Cerebral edema	1.9%	0.0%
Cerebral contusion/laceration	28.3%	0.0%
Other - nonspecified	18.9%	0.0%
Extra-cranial:	90.6%	100.0%
Abdominal injury	17.0%	7.1%
Chest (heart/lung)	18.9%	0.0%
Facial injury: Fx	15.1%	3.6%
Facial injury: other	62.3%	3.6%
Upper limb injury: Fx	15.1%	17.9%
Upper limb injury: other	32.1%	7.1%
Lower limb injury: Fx	20.8%	75.0%
Lower limb injury: other	30.2%	21.4%
Rib fracture(s)	5.7%	3.6%
Scalp injury	30.2%	0.0%
Spinal (and plexus) injury	15.1%	10.7%
Upper trunk injury:Fx	11.3%	3.6%
Upper trunk injury:other	28.3%	0.0%
Lower trunk injury:Fx	13.2%	7.1%
Lower trunk injury:other	11.3%	7.1%
Miscellaneous abrasions, contusions, lacerations	54.7%	14.3%
Other - nonspecified	28.3%	7.4%

---

[1] Descriptive labels based on actual ICD9 codes.

[2] Some patients had more than 1 type of injury.

[3] Loss of consciousness

injury was a skull fracture (35.8%), followed by cerebral contusion or laceration (28.3%). Over one-fourth of the CHI patients suffered a brief loss of consciousness and 34% suffered moderate to prolonged loss of consciousness. Most of the CHI patients (91%) suffered additional, extra-cranial injuries, although in some cases these injuries were minor (e.g., miscellaneous abrasions, contusions, or lacerations). Not surprising, the most frequent type of extracranial injury for CHI patients involved the face (62.3%), and 15.1% had documented fractures of the facial bones. As well, fractures of other bones were not uncommon and included involvement of the upper or lower leg (21%), arm (15%), shoulder (11%), and hip (13%).

On the other hand, the most frequent type of injury for the ORTHO patients was fracture of the leg (75%) or arm (18%). Inspection of Table 8 reveals that fewer ORTHO than CHI patients suffered from multiple trauma, and that when additional injuries did occur, they were less likely to be life-threatening. For example, none of the ORTHO patients suffered injury to the heart or lung that may have compromised cardiopulmonary functioning, but 19% of the CHI sustained such injury.

Severity of Injury - CHI patients

In order to compare the CHI sample in the present study with those described in previous investigations, information of severity of head injury was obtained. Head injury severity was assessed by means of the GCS (15-item version). For the CHI subsample, scores ranged from 3 to 15 (recall that 3 is the lowest possible score). Employing criteria reported by Rimel et al. (1981), patients in this study were divided into three subgroups based on their total GCS scores: Severe (3-8), Moderate (9-12), and Mild (13-15). In all, 35.8% of the CHI patients were classified as Severe, 24.5% as Moderate, and 39.6% as Mild (Table 9).

Patient Interview and Rating Scale Data

CHI Sample (n=53)

The following section presents interview and inventory data that assessed current aspects of the patient's mood, emotional well-being, and health-related dysfunction. These data were included to characterize the self-perceptions of the patient participants as to their current functional status. Frequency distribution data for the two mood scales (CAS, CRS) and interviewer-administered evaluation of emotional distress (EDI) have been presented in Appendix M (Tables M-1 to M-3)). Mean score for the CRS was 5.93 (S.D.=4.69) and is comparable to that reported by

Table 9

Frequency Analysis of GCS Scores - CHI Patients

GCS Score	Absolute Freq. (n=53)	Relative Freq. (%)	Cumulative Freq. (%)
3	1	1.9	1.9
4	2	3.8	5.7
5	2	3.8	9.4
6	2	3.8	13.2
7	4	7.5	20.8
8	8	15.1	35.8
9	2	3.8	39.6
10	0	0.0	39.6
11	3	5.7	45.3
12	8	15.1	60.4
13	2	3.8	64.2
14	8	15.1	79.2
15	11	20.8	100.0

CHI Groups by Severity of Injury Using GCS Scores:

Group	GCS Score	Relative Freq. (%)
Mild	(13 - 15)	39.6
Moderate	(9 - 12)	24.6
Severe	(3 - 8)	35.8

Yanchyshyn and Robbins (1983) for a group of normal adolescents (mean = 5.5). The mean score of the CAS was 4.46 (S.D.=2.36); this is less than the cut-off score of 7 and suggests that as a group, CHI patients reported relatively low levels of anxiety. Although normative data is lacking, the mean EDI score was 52.12 (S.D. = 8.78); recall that the maximum score possible was 104.

To identify patients with clinically significant anxiety and/or depressive symptoms, cut-off scores were employed. On the CRS, scores greater than 10 are considered indicative of significant depressive symptomatology (Carroll et al,, 1981). For the CAS, a cut-off score of 7 was employed. Although no single cut-off score has been suggested, preliminary normative data for the CAS indicate that 75% of patients diagnosed to be suffering from moderate anxiety obtained scores greater than 7 (Snaith et al., 1982). Using these criteria, 14.7% of the patients were classified as depressed, and 12.6% were considered to have significant anxiety symptoms.

CHI patients' health-related dysfunction was evaluated by the SIP which assesses 12 areas of functioning, and provides additional indexes of overall, physical, and psychosocial functioning. Scores are computed by summming the weights of the endorsed items and dividing this by the total possible score for a given subscale. The resulting score represents the degree of dysfunction on a particular subscale. The expected subscale and composite scale score for healthy, uninjured individuals is 0%. For purposes of this study, scores representing a degree of dysfunction in excess of 5% were considered indicative of significant impairment. As shown in Table 10, there was marked variation within the 12 subscales and 3 composite scales. Elevations exceeding 5% dysfunction occured in 9 out of 12 subscales and represent, among others, persistent problems in the areas of employment, recreation and pastimes, sleep and rest and home management. All four subscales that comprise the Psychosocial scale (Alertness Behavior, Emotional Behavior, Communication and Social Interaction) were elevated, whereas just one component of the Physical scale (Ambulation) was so elevated.

Group Comparisons

Group comparisons were conducted via MANOVA with Wilks' criterion to determine if CHI, ORTHO, and CONTROL offspring differed in their degree of emotional adjustment as assessed by the CAS, CRS, and EDI scales. No statistically significant differences emerged

Table 10

Mean Performance on the Sickness Impact Profile (SIP)

For CHI Sample - Patient Ratings

(n=48[1])

Subscales	Mean	S.D.	Min. Value	Max. Value
Composite Scales:				
Overall Score	6.78	6.94	0	26.9
Physical Scale	3.26	3.96	0	15.6
Psychosocial Scale	10.07	11.34	0	51.9
Physical Subscales:				
Body Care & Movement	2.45	2.98	0	9.8
Mobility	2.68	5.31	0	21.3
Ambulation	5.68	10.22	0	40.4
Psychosocial Subscales:				
Emotional Behavior	10.22	14.41	0	48.4
Social Interaction	7.51	10.66	0	58.0
Alertness Behavior	16.66	23.80	0	82.8
Communication	7.94	12.19	0	61.7
Independent Categories:				
Sleep & Rest	8.01	13.83	0	62.3
Home Management	7.21	15.20	0	69.8
Work	11.52	22.21	0	70.1
Recreation & Pastimes	10.04	15.09	0	61.8
Eating	0.66	2.12	0	11.3

---

[1] Data from 5 cases are missing (see text).

($F(6,164)=0.84$, $p>.50$) (Table 11).

As well, group comparisons were conducted to determine if self-ratings of the patient's functional status varied significantly across the 3 groups of offspring. Table 12 contains descriptive statistics on the SIP scales for each group. Means and S.D.'s are provided for the three summary scales (Overall, Physical, and Psychosocial) and for each of the 12 subscales. Comparison of health-related dysfunction beween the 3 groups was evaluated first by entering the scores from the Overall, Physical, and Psychosocial composite scales into a MANOVA using Wilks' criterion. The results of this analysis indicate a significant overall group effect ($F(6,168)=2.45$, $p<.027$) (Table 13). Examination of the univariate tests revealed significant group differences in Overall scale ($p<.041$) and Psychosocial scale scores ($p<.011$), but not for Physical scale score ($p>.10$). The Duncan's Multiple Range test (adjusted for unequal n's) was then used for pairwise comparisons among the group means. These analyses, which have been summarized in Table 13, indicate that the CHI patients report greater Overall and Psychosocial dysfunction than the ORTHO and/or CONTROL groups.

A more detailed evaluation of group differences on the SIP was performed by entering each of the 12 SIP

Table 11

Statistical Analysis of Offspring Scores on the CAS[1], CRS[2], and EDI[3]

Multivariate Analysis of Variance with Wilks' Criterion
p>.50

FACTOR	CHI (n=46)	ORTHO (n=27)	CONTROLS (n=14)	Univ. ANOVA
CAS	4.196 (2.207)	5.000 (2.617)	4.286 (2.301)	ns
CRS	6.043 (4.512)	6.222 (5.287)	5.000 (4.242)	ns
EDI	52.565 (9.106)	52.778 (8.107)	49.357 (9.018)	ns

Note. S.D.'s are in parentheses. MANOVA based on reduced number of cases due to missing data (see text).

[1] Clinical Anxiety Scale

[2] Carroll Rating Scale for Depression

[3] Emotional Distress Inventory

Table 12

Offspring Ratings on the Sickness Impact Profile (SIP)

	Group Means					
	CHI (n=48)		ORTHO (n=27)		CONTROL (n=14)	
	X	S.D.	X	S.D.	X	S.D.
<u>Summary Scales</u>:						
Overall Score	6.78	6.94	4.57	7.05	1.86	3.13
Physical Score	3.26	3.96	3.20	6.33	0.56	1.43
Psychosocial Score	10.07	11.34	4.40	8.60	2.46	5.01
<u>Subscales</u>:						
Ambulation (A)	5.68	10.22	6.25	11.29	0.00	0.00
Mobility (M)	2.68	5.31	1.52	4.53	2.45	6.42
Home Management (HM)	7.21	15.20	5.25	13.51	1.97	4.12
Body Care & Movement (BCM)	2.45	2.98	2.54	6.43	0.11	0.40
Social Interaction (SI)	7.51	10.66	5.32	13.68	1.78	4.98
Comunnication (C)	7.94	12.19	1.97	5.17	0.66	2.46
Alertness Behavior (AB)	16.66	23.80	2.44	5.64	1.39	3.55
Emotional Behavior (EB)	10.22	12.41	7.17	10.95	6.88	12.29
Sleep and Rest (SR)	8.01	13.83	7.49	12.26	9.51	23.60
Eating (E)	0.66	2.12	0.58	1.67	0.44	1.63
Recreation&Pastimes (RP)	10.04	15.09	10.28	16.79	3.32	7.52
Work (W)	11.52	22.21	12.07	25.24	0.00	0.00

Table 13

Statistical Analysis of the Sickness Impact Profile

Offspring Ratings (n=89)

Multivariate Analysis of Variance with Wilks' Criterion
$\underline{F}(6,168) = 2.45$, $\underline{p} < .027$.

SIP Scale	Sig. level of Univ. test	Duncan's Multiple Range Test[1]
Overall	$\underline{p} < .04$	CHI > CONTROL
Physical	ns	-----
Psychosocial	$\underline{p} < .02$	CHI > ORTHO, CONTROL

---

[1] Computations adjusted for unequal n's (Kramer, 1956).

subscales into a MANOVA using Wilks' criterion. Although the CHI patients tended to report greater dysfunction than ORTHO patients on most of the 12 subscales, who in turn reported greater dysfunction than CONTROLS, these differences failed to reach statistical significance (F(24,150) = 1.43, p=.10).

Demographic Data - CHI Mothers (n=48)

Demographic and descriptive data for mothers of head-injured offspring have been presented in Appendix N (Tables N-1 to N-8). Approximately half of the mothers were age 40 to 49 years (Table N-1). Inspection of the marital status data reveals that two-thirds of the mothers were married and living with their spouses at the time of interview (Table N-2). Of these, 59% had been married once, and 34% had been married 2 or more times. The majority of mothers (91.8%) had attained at least a 12th grade education, although some (13.4%) held university degrees (Table N-3). Ninety-two percent of the mothers were Caucasian; just three classified themselves as belonging to a minority group (i.e., Hispanic, Asian, or Native American) (Table N-4). With regard to religious preference, 48% were Protestant or Christian, 15% Roman Catholic, and 8% belonged to other religious denominations (Table N-5). Twenty-five percent of the mothers indicated no religious affiliation. Approximately half of the mothers (45.8%) were engaged in full-time employment at the time of follow-up, 16.7% were working part-time, and 27.1% of the mothers described themselves as housewives. The median family income level for mothers who participated was $20,000 to $29,000; this represented the combined family income of both mother and father in two parent households (Table N-7). Annual income was less than $20,000 in 29% of the families, and greater than $70,000 in 6.3%. The median family contained 4 members, and 81% of the households had between 3 to 5 members residing in the same dwelling (Table N-8). In summary, the typical or modal mother of a head-injured patient was a caucasion, 45 year-old high school graduate, who lived with her spouse and 2 children on a total family income of approximately $25,000.

Group comparisons

As with the patient data, CHI, ORTHO, and CONTROL mothers were compared on selected demographic variables were achieved via a MANOVA using Wilks' criterion. No significant group differences emerged for age, education, family income, or family size (Table 14).

Table 14

Demographic Data - Mothers

Multivariate Analysis of Variance using Wilks' Criterion
$F(8,154) = 1.04$, $p>.40$

	Injury Status of Offspring		
Demographic Variable	CHI (n=43)	ORTHO (N=26)	CONTROLS (n=14)
Age	45.98 (8.31)	44.00 (4.45)	44.64 (6.02)
Education	12.70 (2.14)	13.88 (1.66)	13.57 (1.95)
Family Income Level[1]	3.67 (1.91)	4.73 (2.49)	4.36 (1.45)
Family Size	3.84 (1.36)	4.04 (1.00)	3.86 (0.77)

Note: Standard deviations in parentheses.

[1] See Appendix F for description.

Group comparisons for occupation, and religion were conducted using Chi-square analysis, and again, no significant group differences emerged (Table 15). No statistical test was performed for race, because nearly all mothers were caucausion. In contrast, analysis of marital status data suggested that a greater proportion of CHI mothers were divorced or widowed relative to those in the ORTHO or CONTROL groups (X^2 (df=2) = 6.705, $p<.05$).

Demographic Data - CHI Fathers (n=26)

Descriptive information for the father participants has been summarized in Appendix O (Tables O-1 To O-8). Two-thirds of the fathers were age 34 to 49 (Table O-1), with a median age of 46.0. As shown in Table O-2, the majority (89%) of fathers who participated were married and living with their spouse at the time of interview. Of these, 57% had been married once, and 39% had been married 2 or more times. Nearly all fathers (97.7%) reported at least a 12th grade education, and 24% were college graduates (Table O-3). As noted for the mothers' sample, 96% of the fathers were caucasion (Table O-4). Religious preference data have been presented in Table O-5 and reveal that: 62% of the

Table 15

Summary of Group Comparisons - Mothers' Demographic Data

Variable	N	X^2	df	Sig. Level
Occupation	90	1.891	2	ns
Marital Status	90	6.705	2	$p < .05$
Religious Pref	95	5.356	4	ns
Race[1]	90	---	-	--

[1] No statistical test was conducted as most mothers were caucasian (CHI-92%, ORTHO-100%, CONTROL-100%)

fathers were Protestant or Christian, 8% were Roman Catholic, and 20% had no religious affiliation. Employment and family income data have been summarized in Tables O-6 and O-7, respectively. These data reveal that 81% of the fathers were employed full-time, and that the median household income of families in which a father participated was between $30,000 to $39,000. As well, the median family size was 4, but ranged from 2 to 6 members sharing the same residence. Taken together these data depict the modal father as a caucasian 46 year-old high school graduate, employed full-time, who lives with his spouse and 2 children, on an annual family income of $30,000 to 39,000.

Group Comparisons

To determine if the CHI and control groups (i.e., ORTHO and CONTROL) were comparable with respect to selected demographic variables, group comparisons for four selected demographic were evaluated by means of a MANOVA using Wilks' criterion. Results of this analysis indicate no group effect for age, education, family income, or family size (Table 16). Due to the small number of fathers interviewed, no statistical tests were performed on the remaining four demographic variables. Nonetheless, inspection of the data suggest that the three groups are roughly equivalent with respect to

Table 16

Demographic Data - Fathers

Multivariate Analysis of Variance using Wilks' Criterion
F(8,66) = 0.69, *p*>.70

	Injury Status of Offspring		
Demographic Variables	CHI (n=23)	ORTHO (n=12)	CONTROLS (n=4)
Age	48.48 (8.85)	45.58 (6.26)	43.75 (5.38)
Education	13.48 (1.95)	13.83 (1.90)	15.00 (2.00)
Family Income	4.57 (1.73)	4.92 (1.68)	5.50 (0.58)
Family Size	3.91 (1.00)	4.17 (0.83)	3.50 (1.00)

Note: Standard deviations in parentheses. Five cases excluded from analysis due to missing data.

paternal occupational status, marital status, race, and religous preference (Table 17). Taken together, these results indicate that fathers in the CHI, ORTHO, and CONTROL groups do not significantly differ with respect to any of the eight demographic variables. Thus it would not be expected that differences in paternal adjustment, coping, and health status would be due to these factors.

Mothers' Ratings of CHI Patients' Level of Functioning

Descriptive statistics on the SIP scales for mothers with a head-injured offspring have been presented in Table 18. Means, standard deviations (S.D.'s), minimum, and maximum values have been reported for each subscale, and for the 3 composite scales. Note that the S.D.'s indicate marked variation within each subscale. Elevations exceeding 5% dysfunction appear on 8 of the 12 subscales, and of these, four (EB, SI, AB, and C) comprise the psychosocial dimension. None of the three subscales that comprise the physical dimension (BCM, M, and A) showed elevations greater than 5%. As higher scores indicate greater dysfunction, these findings indicate that mothers view psychosocial impairment in their head-injured member as more

Table 17

Fathers' Demographic Data - Group Comparisons %)

Demographic Variables	CHI (n=26) (%)	ORTHO (n=13) (%)	CONTROLS (n=5) (%)
WORK:			
Full-time	80.8	84.6	80.0
Part-time	3.8	0.0	0.0
Unemployed or Retired	15.4	15.4	20.0
MARITAL STATUS:			
Married	88.5	100.0	100.0
Divorced/Sep'd	11.5	0.0	0.0
RACE:			
Caucasian	96.2	100.0	100.0
Other	3.8	0.0	0.0
RELIGION:			
Roman Catholic	7.7	15.4	40.0
Protestant or Christian	61.5	53.9	40.0
Other	11.5	7.7	0.0
None	19.2	23.1	20.0

Table 18

Mean Performance on the Sickness Impact Profile (SIP)

For CHI - Mothers' Ratings

(n=48)[1]

Scale Type	Mean	S.D.	Min. Value	Max. Value
<u>Composite Scales</u>:				
Total Score	8.22	9.71	0	36.2
Physical Scale	3.61	6.42	0	35.8
Psychosocial Scale	13.58	17.43	0	60.8
<u>Physical Subscales</u>:				
Body Care & Movement	3.16	7.35	0	45.6
Mobility	4.76	9.50	0	35.6
Ambulation	3.70	7.12	0	29.5
<u>Psychosocial</u>:				
Emotional Behavior	10.98	15.79	0	61.1
Social Interaction	12.89	17.61	0	58.8
Alertness Behavior	24.59	35.19	0	100.0
Communication	5.70	12.12	0	53.8
<u>Independent Categories</u>:				
Sleep & Rest	8.33	18.52	0	73.3
Home Management	6.08	11.97	0	44.3
Work	11.31	23.60	0	70.1
Recreation & Pastimes	11.60	13.97	0	40.0
Eating	1.09	5.29	0	35.5

---

[1] One mother did not complete the SIP.

pronounced than physical impairment.

Group Comparisons

Group comparisons were conducted to determine if maternal ratings of their offsping's health-related behavior varied significantly across the CHI, ORTHO, and CONTROL groups. Table 19 contains descriptive statistics on the SIP scales for each group of mothers. Means and S.D.'s are provided for the three composite scales (Overall, Physical, and Pyschosocial) and for each of the 12 subscales. Health-related dysfunction between the three groups was evaluated by entering the Overall, Physical, and Psychosocial composite scale scores into a MANOVA using Wilks' criterion. Results of this analysis indicate a significant overall group effect ($p<.025$) (Table 20). Significant univariate tests emerged for the SIP Overall ($p<.014$) and Psychosocial scores ($p<.012$), but failed to reach significance for the Physical scale score. Pairwise group comparisons were conducted by means of Duncan Multiple Range Test. For both the Overall and Psychosocial scales, mothers rated CHI patients as more severely impaired than ORTHO and CONTROL patients.

More detailed examination of group differences on the SIP was conducted by entering all of the 12 subscales into a MANOVA using Wilks' criterion. Results

Table 19

Mothers' Sickness Impact Profile Ratings of Their Offspring

	Group Means					
	CHI (n=47)		ORTHO (n=27)		CONTROL (n=14)	
	X	S.D.	X	S.D.	X	S.D.
<u>Summary Scales</u>:						
Overall Score	8.22	9.70	4.38	5.94	1.70	3.01
Physical Score	3.61	6.42	2.29	5.51	0.00	0.00
Psychosocial Score	13.58	17.43	4.60	7.15	4.58	9.54
<u>Subscales</u>:						
Ambulation (A)	3.70	7.12	5.43	13.50	0.00	0.00
Mobility (M)	4.76	9.50	1.01	3.01	0.00	0.00
Body Care & Movement (BCM)	3.16	7.35	1.44	3.49	0.00	0.00
Social Interaction (SI)	12.89	17.61	6.99	13.59	2.86	6.27
Communication (C)	5.70	12.12	1.10	3.24	0.00	0.00
Alertness Behavior (AB)	24.59	35.19	2.68	6.69	0.61	2.30
Emotional Behavior (EB)	10.98	15.79	5.43	9.53	7.20	17.57
Sleep & Rest (SR)	8.33	18.52	6.63	11.85	5.94	12.26
Eating (E)	1.09	5.29	0.56	1.64	0.87	2.22
Home Management (HM)	6.08	11.07	3.43	8.90	4.58	9.54
Recreation&Pastimes (RP)	11.60	13.97	10.18	15.74	1.00	3.74
Work (W)	11.31	23.60	16.54	27.64	1.03	2.61

Table 20

Statistical Analysis of the Sickness Impact Profile

Mothers' Ratings (n=89)

Multivariate Analysis of Variance with Wilks' Criterion $F(6,168) = 2.48$, $p<.025$.

SIP Scale	Sig. level of Univ. test	Duncan's Multiple Range Test[1]
Overall	$p<.014$	CHI > ORTHO, CONTROL
Physical	ns	---
Psychosocial	$p<.012$	CHI > ORTHO, CONTROL

---

[1] Computations adjusted for unequal n's (Kramer, 1956)

of this analysis indicate a significant overall group effect (*p*<.008) as well as significant univariate tests for the Mobility (*p*<.029), Alertness Behavior (*p*<.001), Communication (*p*<.037), and Recreation & Pastimes (*p*<.04) subscales (Table 21). For the significant univariate tests, pairwise comparisons of group means were conducted using Duncan's Multiple Range Tests. These analyses revealed that CHI mothers rated their offspring as more impaired than CONTROL and/or ORTHO mothers on the Mobility (M), Alertness Behavior (AB), Communcation (C), and Recreation & Pastimes (RP) subscales. Two of the subscales for which group differences emerged (AB and C) are contained in the Psychosocial composite scale, whereas one subscale contained in the Physical scale score (M) varied significantly across the three groups.

Fathers Ratings of CHI Patients' Level of Functioning

Descriptive statistics on the SIP scales for fathers of head-injured patients have been presented in Table 22. Means, s.d.'s, minimum, and maximum values have been reported for each subscale, and composite scale. As with the mothers' SIP ratings, marked variation is evident within each subscale. Nine out of

Table 21

Statistical Analysis of the Sickness Impact Profile

Mothers' Ratings (n=89)

Multivariate Analysis of Variance with Wilks' Criterion $\underline{F}(24,150) = 1.91$, $\underline{p}<.008$.

SIP Scale	Sig. level of Univ. test	Duncan's Multiple Range Test[1]
Ambulation	ns	---
Mobility	$\underline{p}<.029$	CHI > ORTHO, CONTROL
Body Care & Movement	ns	---
Social Interaction	ns	---
Communication	$\underline{p}<.037$	CHI > ORTHO
Alertness Behavior	$\underline{p}<.001$	CHI > ORTHO, CONTROL
Emotional Behavior	ns	---
Sleep & Rest	ns	---
Eating	ns	---
Home Management	ns	---
Recreation & Pastimes	$\underline{p}<.040$	CHI > CONTROLS
Work	ns	---

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[1] Computations adjusted for unequal n's (Kramer, 1956)

Table 22

Mean Performance on the Sickness Impact Profile (SIP) For CHI Sample - Fathers' Ratings

(n=26)

Subscales	Mean	S.D.	Min. Value	Max. Value
Composite Scales:				
Total Score	9.57	9.34	0	35.0
Physical Scale	4.61	7.29	0	28.6
Psychosocial Scale	12.82	16.61	0	63.1
Physical Dysfunction:				
Body Care & Movement	4.40	9.19	0	41.5
Mobility	5.40	9.98	0	35.2
Ambulation	4.40	9.25	0	40.1
Psychosocial Dysfunction:				
Emotional Behavior	14.90	18.45	0	61.0
Social Interaction	11.64	15.39	0	53.6
Alertness Behavior	17.93	27.38	0	100.0
Communication	7.61	14.55	0	60.3
Independent Categories:				
Sleep & Rest	9.20	16.02	0	48.9
Home Management	7.66	14.65	0	67.5
Work	25.45	32.34	0	73.6
Recreation & Pastimes	19.28	26.74	0	100.0
Eating	2.44	7.10	0	35.5

12 subscales have elevations exceeding 5%, 4 of which (EB, SI, AB, and C) belong to the Psychosocial dimension. One of the three subscales that comprise the Physical dimension (M) showed elevations greater than 5%. These findings are similar to that reported for the mothers sample; correlations between parental SIP ratings ranged from .23 to .99 with 10 of 12 correlations exceeding .50. These findings indicate that both parents perceive relatively more psychosocial dysfunction than physical impairment in this sample of head-injured offspring.

Group Comparisons

Descriptive statistics, i.e., means and S.D.'s, for the 3 SIP summary scales and 12 subscales of each group have been summarized in Table 23. Inspection of the data reveals a pattern of relationships very similar to that of the mothers: fathers rated CHI patients as more dysfunctional than ORTHO patients, who in turn were rated as more dysfunctional than CONTROL patients. However, when group comparisons were conducted via MANOVA with the three SIP composite scales entered into the analysis, no overall group effect emerged ($F(df=6,78) = 1.00$, $p>.40$) and no univariate tests were significant at the .05 level. A more detailed evaluation of group differences was conducted by

Table 23

Group Means for the Sickness Impact Profile (SIP)

Fathers' Ratings (n=44)

	CHI (n=26) X	CHI (n=26) S.D.	ORTHO (n=13) X	ORTHO (n=13) S.D.	CONTROL (n= 5) X	CONTROL (n= 5) S.D.
Composite Scales[1]:						
Overall Score	9.57	9.94	5.11	6.38	1.02	1.87
Physical Score	4.61	7.29	1.48	3.23	0.00	0.00
Psychosocial Score	12.82	16.61	7.30	10.38	2.12	4.05
Subscales:[2]						
Ambulation (A)	4.40	9.25	4.35	10.84	0.00	0.00
Mobility (M)	5.40	9.98	1.15	2.89	0.00	0.00
Body Care & Movement (BCM)	4.40	9.19	0.39	1.41	0.00	0.00
Social Interaction (SI)	11.63	15.39	8.14	16.25	3.58	8.01
Communication (C)	7.61	14.55	1.42	3.48	0.00	0.00
Alertness Behavior (AB)	17.93	27.37	3.54	10.20	2.06	4.61
Emotional Behavior (EB)	14.90	18.45	9.95	12.22	1.30	2.91
Sleep & Rest (SR)	9.20	16.02	8.26	24.18	1.96	4.38
Eating (E)	2.43	7.10	0.80	1.95	1.22	2.73
Recreation&Pastimes (RP)	19.28	26.74	15.31	16.93	0.00	0.00
Work (W)	25.45	32.34	12.53	26.30	1.44	3.22

---

[1] For 3 SIP Composite scales: MANOVA with Wilks' Criterion, $F(6,78) = 1.00$, $p>.40$.

[2] For SIP scales 1-12: MANOVA with Wilks' Criterion, $F(24,60) = 0.66$, $p>.80$.

entering all 12 SIP subscales into a MANOVA, but it too was nonsignificant (*F*(24,60) = 0.66, *p*>.80).

In light of the significant group differences that emerged for the mothers' (and patients') ratings, it is surprising that such relationships are not significant for the fathers' sample. Since the actual group differences are similar in direction to the mothers' sample, there may have been insufficient power to detect a "true" significant difference due to the small sample size (Bruning & Kintz, 1977; Winer, 1971). Consequently, further research with a larger sample of fathers is necessary in order to replicate these findings.

Maternal Adjustment and Coping

The first objective of this study was the description and quantitative evaluation of parental adjustment in families with a head-injured offspring. To this end, statistical analyses of parental adjustment data are presented: these data include measures of mood (CAS & CRS), emotional distress (EDI), patterns of coping behavior (CHIP), the recent occurrence of stressful events (FILE), as well as physical health-status data. Statistical analyses of mothers' adjustment and coping data are presented first, followed by a discussion of the fathers' results.

Mothers of Head-injured Offspring

Maternal adjustment was hypothesized to encompass aspects of mood, emotional distress, specific coping behavior patterns, and health status. Mothers' anxiety (CAS) and depression (CRS) scores have been summarized in Tables 24 and 25. The median CAS total score was 4, although scores ranged from a low of 0 to a high of 10. Using a cut-off score of 7 (the same used for the patient sample), 10.9% of the mothers obtained scores indicative of clinically significant anxiety. On the CRS, scores ranged from 0 to 17, out of a total possible of 52. However, when classified using a cut-off score of 10, 19.1% were found to have clinically significant depressive symptomatology, a rate twice that of the initial normative sample (Carroll et al., 1981).

The EDI was developed to evaluate emotional distress in parents living with a head-injured offspring. Recall that items are based on a variety of relatives' complaints that have been described in previous research. For the entire sample of mothers, the median EDI total score was 51.0, and half of the participants obtained scores between 46 to 58 (Table

Table 24

Frequency Analysis of CAS Scores

CHI Mothers (n=48)

CAS Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0	1	2.2	2.2
1	6	13.0	15.2
2	10	21.7	37.0
3	5	10.9	47.8
4	6	13.0	60.9
5	4	8.7	69.6
6	6	13.0	82.6
7[1]	3	6.5	89.1
8	2	4.3	93.5
9	2	4.3	97.8
>= 10	1	2.2	100.0
Missing data	2	---	---

---

[1] Cut-off score used to screen patients with clinically significant anxiety (10.9%).

Table 25

Frequency Analysis of CRS Scores

CHI Mothers (n=48)

CRS Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0	3	6.4	6.4
1	2	4.3	10.6
2	7	14.9	25.5
3	9	19.1	44.7
4	4	8.5	53.2
5	2	4.3	57.4
6	1	2.1	59.6
7	4	8.5	68.1
8	3	6.4	74.5
9	2	4.3	78.7
10[1]	1	2.1	80.9
11	1	2.1	83.0
12	3	6.4	89.4
>=13	5	10.6	100.0
Missing data	1	---	---

---

[1] Cut-off score used to screen patients with clinically significant depressive symptomatology (19.1%).

26). As this is a new instrument, no normative data is available per se. However, analyses of the EDI will be presented later to determine if emotional distress scores of mothers of head-injured offspring differ from mothers of orthopedically-injured and non-injured offspring.

Health status data for the CHI mothers have been summarized in Table 27. With regard to minor illness, i.e., health problems that pose no threat to life, colds were the most frequently reported illness event (54.2%), followed by headaches (43.8%), allergies (39.6%), influenza (35.4%), migraine (29.2%), skin problems (20.8%), and minor stomach distress (18.8%). As well, many mothers suffered from a major illness in the year prior to interview. For example, the following illnesses or medical conditions were reported by 10% or more of the mothers: arthritis/rheumatism (35.4%), cardiovascular disorders (22.9%), and bladder/bowel problems (14.6%). Sixty percent of the mothers had at least one major illness event in the previous 12 months. Frequency data for the composite health index (TOTILL) and self-rating of physical health (HRATING) have been summarized in Table 28. The median number of minor/major illness types reported for the year prior to interview was 4. Nonetheless, all mothers rated their

Table 26

Frequency Analysis of Emotional Distress Inventory (EDI)

CHI Mothers (n=48)

EDI Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
33 - 36	1	2.1	2.1
37 - 39	1	2.1	4.2
40 - 42	2	4.2	8.3
43 - 45	5	10.4	18.8
46 - 48	9	18.8	37.5
49 - 51	8	16.8	54.2
52 - 54	6	12.6	66.7
55 - 57	3	6.3	72.9
58 - 60	4	8.4	81.3
61 - 63	1	2.1	83.3
64 - 66	3	6.3	89.6
67 - 69	2	4.2	93.8
>= 70	3	6.3	100.0

Table 27

Frequency Analysis of CHI Mothers' Health Status During 12 Month Period Prior to Time of Interview

	Absolute Frequency (n=48)	Relative Frequency (%)
Minor Illness:		
allergies	19	39.6
injury - minor	2	4.2
colds	26	54.2
dizziness/fainting	5	10.4
ear infections	5	10.4
headache	21	43.8
influenza	17	35.4
migraine	14	29.2
skin problems-minor	10	20.8
stomach problems-minor	9	18.8
other	5	10.4
Major Illness:		
arthritis/rheumatism	17	35.4
bladder/bowel problems	7	14.6
cancer	1	2.1
cardiovascular problems	11	22.9
intestinal/stomach	3	6.3
neurological	4	8.3
other	6	12.5

Table 28

Frequency Analysis of CHI Mothers' Health Indices

TOTILL[1] Index	Absolute Frequency (n=48)	Relative Frequency (%)	Cumulative Frequency (%)
0	1	2.1	2.1
1	5	10.4	12.4
2	9	18.8	31.3
3	6	12.5	43.8
4	11	22.9	66.7
5	5	10.4	77.1
6 - 7	5	10.4	87.5
8 - 9	4	8.4	95.8
10 - 11	2	4.2	100.0

---

[1] TOTILL: sum of minor and major illness types.

Maternal Ratings of Their Overall Physical Health

HRATING Index	Absolute Frequency (n=48)	Relative Frequency (%)	Cumulative Frequency (%)
Excellent	12	25.0	25.0
Very Good	18	37.5	62.5
Good	16	33.3	95.8
Fair	2	4.2	100.0
Poor/Very Poor	0	0.0	100.0

overall physical health as fair or better, and 62.5% rated their health as very good or excellent.

A second aim of this study, the quantification of parental coping behavior, was accomplished by means of the CHIP. Table 29 provides an item-by-item breakdown of maternal responses on the CHIP. Frequency data are based on the proportion of mothers who rated a particular coping behavior as moderately helpful or extremely helpful; these descriptive phrases correspond to individual item scores of 2 and 3, respectively.

The majority of CHIP items (84%) were rated as moderately or extremely helpful by at least half of the mothers. For this reason it seems more instructive to discuss the less frequently endorsed items. On the CHIP I subscale (Maintaining family integration, cooperation and an optimistic definition of the situation), only 2 items were endorsed by less than half of the mothers: only 48.9% reported that "Talking over personal feelings and concerns with my spouse" (item #41) was helpful, but this may be a result of the large number of widowed or single-parent mothers; "Taking good care of all the medical equipment at home" (#11) was endorsed by just 19.1% of the mothers and presumably reflects the lack of need for such devices in the home. In fact, only 1 patient was confined to bed, and 1 relied on a

Table 29

Frequency Analysis of CHIP Items (CHI Mothers)

CHIP I: Maintaining family integration, cooperation and an optimistic definition of the situation.

Item No.	Item Description	Relative Freq[1] (%)
1	Trying to maintain family stability	93.6
23	Believing that my child is getting the best medical care possible	91.5
6	Believing that my child(ren) will get better	89.4
18	Believing in God	89.4
44	Believing that things will always work out	89.4
16	Believing that the medical center/hospital has my family's best interest in mind	87.2
28	Telling myself that I have many things I should be thankful for	85.1
21	Doing things together as a family	83.0
38	Investing myself in my child(ren)	78.7
45	Doing things with my child(ren)	76.6
8	Showing that I am strong	74.5
36	Building a closer relationship with my spouse	72.3
31	Encouraging child(ren) with medical condition to be more independent	70.2
13	Getting other members of the family to help with chores and tasks at home	68.1
26	Doing things with family relatives	66.0
3	Trusting my spouse (or former spouse) to help support me and my child(ren)	63.8
43	Having my child with the medical condition seen at the clinic/hospital on a regular basis	59.6
41	Talking over personal feelings and concerns with my spouse	48.9
11	Taking good care of all the medical equipment at home	19.1

Table 29 (continued)

CHIP II: Maintaining social support, self esteem, and psychological stability.

Item No.	Item Description	Relative Freq[1] (%)
32	Keeping myself in shape and well-groomed	80.9
39	Talking to someone (not professional counsellor/doctor) about how I feel	80.9
2	Engaging in relationships and friendships which help me to feel important & appreciated	76.6
19	Develop myself as a person	74.5
27	Becoming more self-reliant and independent	72.3
17	Building closer relationships with people	70.2
42	Being able to get away from home care tasks and responsibilities for relief	68.1
22	Investing time and energy in my job	63.8
4	Sleeping	61.7
7	Working, outside employment	61.7
37	Allowing myself to get angry	61.7
14	Getting away be myself	55.3
29	Concentrating on hobbies (art, music, jogging, etc.)	51.1
33	Involvement in social activities (parties, etc.)	42.6
12	Eating	40.4
24	Entertaining friends in our home	40.4
34	Going out with my spouse on a regular basis	38.3
9	Purchasing gifts for myself and/or other family members	36.2

Table 29 (continued)

CHIP III: Understanding the medical situation through communication with other parents and consultation with medical staff.

Item No.	Item Description	Relative Freq[1] (%)
5	Talking with medical staff (nurses, social worker, etc.) when we visit the medical center	76.6
35	Being sure prescribed medical treatments for child(ren) are carried out at home on a daily basis	74.5
15	Talking with the doctor about my concerns about my child(ren) with the medical condition	72.3
20	Talking with other parents in the same type of situation and learning about their experiences	66.0
25	Reading about how other persons in my situation handle things	63.8
40	Reading more about the medical problem which concerns me	63.8
30	Explaining our family situation to friends and neighbors so they will understand us	53.2
10	Talking with other individuals/parents in my same situation	51.1

---

[1] Proportion of mothers who rated an item as Extremely Helpful ("3") or Moderately Helpful ("2").

wheelchair in the home.

On the CHIP II subscale (Maintaining social support, self esteem, and psychological stability), 6 items were endorsed by fewer than 50% of the mothers (#9, 12, 24, 33, and 34). Four of these behaviors ("Involvement in social activities...", Entertaining friends in our home", "Going out with my spouse on a regular basis", and "Purchasing gifts for myself and/or other family members") involved activities that may have required additional financial resources, and consequently may not be as likely an option in lower income homes. Three of the items ("Involvement in social activities", "Entertaining friends in our home", and "Going out with my spouse on a regular basis") may reflect a constriction in psychosocial activity for these parents. Other investigators have noted similar diminution of premorbid social activities in relatives caring for head-injured members (Rosenbaum & Najenson, 1977; Todd & Satz, 1980).

For the CHIP III subscale (Understanding the medical situation through communciation with other parents and consultation with medical staff), all items were endorsed by more than half the mothers. Three-fourths of the mothers found it very helpful to talk with medical staff during visits to the hospital, and 72.3% found it helpful to talk with the doctor about their concerns regarding the injured child. Fewer mothers (51.1%) found it helpful to talk with other parents in a similar situation. These results emphasize mothers' need for information about their child's post-injury status, and carry important implications when health-care services are considered for these families.

Descriptive statistics (i.e., means, S.D.'s) for the CHI sample, as well as normative data derived from mothers' ratings of chronically ill children (McCubbin & Patterson, 1981) have been presented in Table 30. Inspection of the data reveals considerable variation within each of the three subscales, both for the present sample, as well as for the normative group. Group comparisons by means of *t*-test revealed no significant group differences on any of three CHIP subscales.

Finally, family stress was evaluated by means of the Family Inventory of Life Events and Changes (FILE). Recall, that the FILE yields two scores: Recent Life Changes (RLC) are stressful events that have occurred to any family member within the preceeding 12 months; Past Life Changes (PLC) are stressful events that have occurred to any member at any time in the family's history *before* the last 12 months. Group comparisons

Table 30

Coping Health Inventory for Parents - Mothers Ratings

	Present Study Mothers with Head-injured Child (n=47)		McCubbin et al., 1979 Mothers with Chronically Ill Child (n=308)	
CHIP Scales:	X	S.D.	X	S.D.
CHIP I: (Integration, Cooperation, & Optimism)	40.53	9.29	40.00	15.00
CHIP II: (Support, Self-esteem, & Stability	30.85	10.71	28.00	12.00
CHIP III: (Medical Communication & Consultation	14.98	5.05	15.00	7.00

Note. Group comparisons for each of the 3 CHIP scales were evaluated by means of a *t*-test; no statistically significant differences emerged at the .05 level.

between the CHI families in the current study (including those in which the mother did not participate) and those of the McCubbin et al. normative sample reveal no significant differences with respect to RLC (Table 31). In contrast, CHI families reported a significantly greater number of stressful events occurring during the period preceding the last year (i.e., higher PLC scores).

Group Comparisons

Group means and S.D.'s for the mood, emotional distress, coping, physical health and family stress variables have been presented in Table 32. Comparisons of the CHI, ORTHO, and CONTROL groups were conducted by means of a MANOVA using Wilks' criterion with the following variables entered into the analysis: CAS, CRS, EDI, CHIP I, CHIP II, CHIP III, TOTILL, HRATING, RLC, and PLC. Results indicate that there was no overall group effect ($F(20,148) = 1.42$, $p>.10$). Mothers of head-injured offspring did not significantly differ from ORTHO and CONTROL mothers in their rating of mood, emotional distress, utilization of coping behaviors, physical health status, or history of prior stressful events.

Additional data on specific minor and major health problems have been summarized in Table 33. Upon gross

Table 31

Family Inventory of Life Events (FILE)

	CHI Families (n=53)		Normative Group[1] (n=322)		
FILE Scores:	Mean	S.D.	Mean	S.D.	*t*-test
Recent Life Changes	12.25	6.57	11.00	6.00	0.63
Past Life Changes	6.37	4.06	4.00	3.00	2.25*

---

[1] From McCubbin & Patterson (1981).

*$p<.05$ (see text).

Table 32

Group Comparisons of Mothers' Mood, Coping, & Health Variables

	CHI (n=45)		ORTHO (n=27)		CONTROL (n=14)	
Variable	X	S.D.	X	S.D.	X	S.D.
CAS (anxiety)	4.11	2.52	4.07	3.25	2.64	2.24
CRS (depression)	5.87	4.59	6.63	6.50	4.07	4.45
Emotional Distress	52.56	9.22	50.89	9.30	50.07	7.64
CHIP I	40.49	9.05	41.48	7.58	44.14	6.06
CHIP II	31.22	10.78	29.74	9.64	34.71	9.55
CHIP III	14.82	5.07	14.11	5.63	18.86	4.20
FILE: RLC	12.11	5.93	12.56	6.14	9.57	5.84
FILE: PLC	6.27	3.95	7.78	4.31	5.93	4.86
TOTILL	4.13	2.65	4.33	2.50	4.50	2.68
HRATING	2.18	0.86	2.00	0.68	2.00	0.78

Note. When group comparisons were evaluated by means of a MANOVA with Wilks' Criterion, no statistically significant group effect emerged ($F(20,148) = 1.42$, $p > .10$).

Table 33

Mothers' Health Status - Group Comparisons

Type of Illness	CHI (n=48) Freq (%)	ORTHO (n=28) Freq (%)	CONTROL (n=14) Freq (%)
Minor Illnesses			
allergy(ies)	39.6	46.4	50.0
accidental injury[1]	4.2	17.9	0.0
colds	54.2	71.4	50.0
dizziness/fainting	10.4	10.7	21.4
ear infection	10.4	0.0	0.0
flu	35.4	25.0	35.7
headache	43.8	57.1	64.3
migraine	29.2	25.0	7.1
skin (minor)	20.8	35.7	35.7
stomach (minor)	18.8	17.9	14.3
other minor illness	10.4	3.6	57.1
Major Illnesses:			
arthritis/rheumatism	35.4	25.0	21.4
bladder/bowel[2]	20.8	35.7	28.6
cancer	2.1	3.6	7.1
cardiovascular	22.9	10.7	21.4
diabetes	4.2	0.0	0.0
neurological	8.3	3.6	0.0
pulmonary	0.0	7.1	14.3
other	10.4	21.4	28.6

---

[1] Minor injury only, not requiring hospitalization

[2] Included intestinal disorders and ulcer.

inspection, the health status of mothers appears comparable across the three groups: colds, allergies, headaches, and flu were the most frequently reported minor illness events occurring in the year prior to interview, and were reported by at least 25% of the mothers in each group. With regards major illness, many mothers from all 3 groups reported symptoms of arthritis or rheumatism; however, more CHI mothers (35.4%) reported such symptoms than ORTHO (25.0%) or CONTROL mothers (21.4%). Although mothers of head-injured, orthopedically-injured, and non-injured offspring differed in their endorsement of specific health problems (e.g., migraine), virtually no differences were obvious when the number of illness types were compared across the 3 groups. When the number of illness events are considered, approximately equal proportions of CHI, ORTHO, and CONTROL mothers reported at least one minor illness type (CHI-93.7%, ORTHO-96.4%, CONTROL-100.0%), and 1 or more major illness types (CHI-60.4%, ORTHO-60.7%, CONTROL-64.3%).

Paternal Adjustment and Coping

Fathers of Head-injured Offspring

In this section, aspects of the fathers' mood, emotional distress, coping behavior, and health status are presented for the sample of fathers living with a head-injured son or daughter. Following this discussion, comparisons between the CHI, ORTHO, and CONTROL groups are conducted and summarized.

As shown in Table 34, three-fourths of the fathers obtained CAS scores between 1 to 4, indicating a low level of anxiety. When a cut-off score of 7 was used to identify individuals manifesting a clinically significant degree of anxiety, 12.6% of the fathers were so classifed, a proportion similar to that observed for mothers.

On the depression inventory, the median CRS score was 2.0, out of a possible total of 52 (Table 35). However, 11.4% of the fathers were found to have clinically significant depressive symptomatology (i.e., they had scores exceeding the cut-off of 10). The proportion of depressed fathers in the current study is only slightly higher than that reported for a normative sample (9%) (Carroll et al., 1981).

As with the mother's sample, the degree of emotional distress in fathers was evaluated by means of the EDI. The median EDI score for fathers was 49 (maximum = 104); indicating a level of distress comparable to that reported by the mothers' sample (Table 36).

Table 34

Frequency Analysis of CAS Scores
CHI Fathers (n=26)

CAS Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0	0	0.0	0.0
1	4	16.7	16.7
2	7	29.2	45.8
3	4	16.7	62.5
4	3	12.5	75.0
5	2	8.3	83.3
6	1	4.2	87.5
7[1]	0	0.0	87.5
8	0	0.0	87.5
>=9	3	12.6	100.0
Missing data	2	--	--

---

[1] Cut-off score used to screen patients with clinically significant anxiety (i.e., 12.6%).

Table 35

Frequency Analysis of CRS Scores

CHI Fathers (n=26)

CRS Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0	3	11.5	11.5
1	6	23.1	34.6
2	6	23.1	57.7
3	2	7.7	65.4
4	0	0.0	65.4
5	3	11.5	76.9
6	1	3.8	80.8
7	0	0.0	80.8
8	0	0.0	80.8
9	0	0.0	80.8
10[1]	2	7.7	88.5
>= 11	3	11.4	100.0

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[1] Cut-off score used to screen cases with clinically significant depression (i.e., 11.5%).

Table 36

Frequency Analysis of Emotional Distress Inventory (EDI)

CHI Fathers (n=26)

Total EDI Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
37 - 39	1	4.0	4.0
40 - 42	4	16.0	20.0
43 - 45	3	12.0	32.0
46 - 48	4	16.0	48.0
49 - 51	3	12.0	60.0
52 - 54	3	12.0	72.0
55 - 57	2	8.0	80.0
58 - 60	2	8.0	88.0
61 - 63	1	4.0	92.0
>=64	2	8.0	100.0
Missing data	1	--	--

Several aspects of the fathers' physical health status were assessed to determine the presence or absence of minor and major illness reported for the year prior to interview. Self-ratings of overall physical health were also obtained. These data have been summarized in Tables 37 and 38, and reveal that, by far, the minor illness event most likely to have occurred in the year prior to interview was a cold (68%). Other minor illnesses reported by more than 10% of the fathers included: minor skin problems (36%), headache (32%), influenza (32%), allergies (24%), minor accidental injury not requiring hospitalization (24%), and minor gastrointestinal distress (24%). For fathers, the most frequently reported medical concerns were arthritis/rheumatism (16%), cardiovascular disorders (16%), and neurological problems (12%). The median number of minor/major illness types (TOTILL) reported by fathers for the year prior to interview was 4 (Table 38). Yet, 96% rated their overall physical heatlh as good or better; none endorsed a rating less than fair.

As described earlier, fathers' coping behavior was evaluated by means of the CHIP. A frequency analysis of the 45-item inventory broken down by subscale has been presented in Table 39. As in the mothers' analyses,

Table 37

Frequency Analysis of CHI Fathers' Health Status

	Absolute Frequency (n=25)	Relative Frequency (%)
Minor Illness:		
allergies	6	24.0
injury - minor	6	24.0
colds	17	68.0
dizziness/fainting	2	8.0
ear infections	1	4.0
headache	8	32.0
influenza	8	32.0
migraine	2	8.0
skin problems-minor	9	36.0
stomach problems-minor	6	24.0
other	5	20.0
Major Illness:		
accidental injury	1	4.0
arthritis/rheumatism	4	16.0
bladder/bowel problems	1	4.0
cancer	0	0.0
cardiovascular problems	4	16.0
intestinal/stomach	2	8.0
neurological	3	12.0
other	4	16.0

Table 38

Frequency Analysis of CHI Fathers' Health Indices

TOTILL[1] Index	Absolute Frequency (n=25)	Relative Frequency (%)	Cumulative Frequency (%)
0	1	4.0	4.0
1	1	4.0	8.0
2	3	12.0	20.0
3	4	16.0	36.0
4	8	32.0	68.0
5	4	16.0	84.0
6	2	8.0	92.0
7	2	8.0	100.0

---

[1] TOTILL = sum of minor and major illness types.

Paternal Self-ratings of Overall Physical Health

HRATING Index	Absolute Frequency (n=25)	Relative Frequency (%)	Cumulative Frequency (%)
Excellent	8	32.0	32.0
Very Good	10	40.0	72.0
Good	6	24.0	96.0
Fair	1	4.0	100.0
Poor/Very Poor	0	0.0	100.0

Table 39

Frequency Analysis of CHIP Items - CHI Fathers (n=26)

CHIP I: Maintaining family integration, cooperation and an optimistic definition of the situation.

Item No.	Item Description	Relative Freq[1] (%)
44	Believing that things will always work out	100.0
6	Believing that my child(ren) will get better	96.2
1	Trying to maintain family stability	92.3
18	Believing in God	92.3
41	Talking over personal feelings and concerns with my spouse	88.5
45	Doing things with my child(ren)	88.5
3	Trusting my spouse (or former spouse) to help support me and my child(ren)	84.6
36	Building a closer relationship with my spouse	84.6
38	Investing myself in my child(ren)	84.6
16	Believing that the medical center/hospital has my family's best interest in mind	80.8
21	Doing things together as a family	80.8
23	Believing that my child is getting the best medical care possible	80.8
28	Telling myself that I have many things I should be thankful for	76.9
31	Encouraging child(ren) with medical condition to be more independent	65.4
26	Doing things with family relatives	61.5
43	Having my child with the medical condition seen at the clinic/hospital on a regular basis	61.5
8	Showing that I am strong	57.7
13	Getting other members of the family to help with chores and tasks at home	57.7
11	Taking good care of all the medical equipment at home	23.1

Table 39 (continued)

CHIP II: Maintaining social support, self esteem, and psychological stability.

Item No.	Item Description	Relative Freq[1] (%)
34	Going out with my spouse on a regular basis	76.9
42	Being able to get away from home care tasks and responsibilities for relief	76.9
4	Sleeping	73.1
17	Building closer relationships with people	73.1
22	Investing time and energy in my job	73.1
2	Engaging in relationships and friendships which help me to feel important & appreciated	69.2
19	Develop myself as a person	69.2
14	Getting away be myself	61.5
27	Becoming more self-reliant and independent	61.5
32	Keeping myself in shape and well-groomed	61.5
7	Working, outside employment	57.7
29	Concentrating on hobbies (art, music, jogging, etc.)	50.0
39	Talking to someone (not professional counsellor/doctor) about how I feel	46.2
12	Eating	42.3
24	Entertaining friends in our home	38.5
33	Involvement in social activities (parties, etc.)	38.5
37	Allowing myself to get angry	26.9
9	Purchasing gifts for myself and/or other family members	19.2

Table 39 (continued)

CHIP III: Understanding the medical situation through communication with other parents and consultation with medical staff.

Item No.	Item Description	Relative Freq[1] (%)
5	Talking with medical staff (nurses, social worker, etc.) when we visit the medical center	69.2
15	Talking with the doctor about my concerns about my child(ren) with the medical condition	65.4
10	Talking with other individuals/parents in my same situation	61.5
35	Being sure prescribed medical treatments for child(ren) are carried out at home on a daily basis	61.5
40	Reading more about the medical problem which concerns me	57.7
20	Talking with other parents in the same type of situation and learning about their experiences	53.8
30	Explaining our family situation to friends and neighbors so they will understand us	53.8
25	Reading about how other persons in my situation handle things	46.2

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[1] Proportion of fathers who rated an item as Extremely Helpful ("3") or Moderately Helpful ("2").

data are based on the proportion of fathers who rated a particular item as extremely helpful or moderately helpful, descriptive labels corresponding to individual scores of "3" and "2", respectively. As in the mothers' sample, the majority of items (82%) were endorsed as moderately or extremely helpful by at least half the fathers. For the majority of fathers, the most helpful coping behaviors were those that concerned maintainence of an optimistic attitude (as assessed by the CHIP I subscale), i.e., "Believing that things will always work out" (100%), "Believing that my child will get better" (96.2%), "Believing that the medical center has my family's best interest in mind" (80.8%), and "Believing that my child is getting the best medical care possible" (80.8%). On the other hand the item least endorsed by fathers, "Taking good care of all the medical equipment at home" (23.1%) presumbably reflects the lack of need or utilization of these devices in most homes.

For the CHIP II subscale (Maintaining social support, self esteem, and psychological stability), the most frequently endorsed items concerned activites that temporarily removed the parent from home-related responsibilities: "Going out with my spouse on a regular basis" (76.9%), "Being able to get away from home care tasks and responsibilities for relief" (76.9%), "Sleeping" (73.1%), and "Investing time and energy in my job (73.1%). Two of the less frequently endorsed items, "Entertaining friends in our home", and Involvement in social activities", suggest a constriction of parental psychosocial activity. Alternatively, these behaviors together with the infrequently endorsed item "Purchasing gifts for myself and/or other family members" may reflect the financial burden of a household providing care, lodging, or treatment of an injured member.

On the CHIP III subscale, the two most helpful coping behaviors involved direct interaction with medical personnel: "Talking with medical staff ... when we visit the medical center" was endorsed as helpful by 69.2% of the fathers, and "Talking with the doctor about my concerns about my child(ren) with the medical condition" was so rated by 65.4%. "Reading about how other persons in my situation handle things" (item #25) was not endorsed by a majority of fathers (46.2%).

Descriptive statistics, i.e., means, S.D.'s, minimum, and maximum values, and normative data are are presented in Table 40. Inspection of this table reveals considerable variation within each of the three subscales; this variability was evident for both the fathers in this study and those in the normative sample. When the present sample of fathers was compared to those

Table 40

Coping Health Inventory for Parents - Fathers' Ratings

	Present Study Fathers with Head-Injured Child (n=26)		McCubbin et al. (1979) Parents with Chronically Ill Child (n=308)	
CHIP Scales	X	S.D.	X	S.D.
CHIP I: (Integration, Cooperation, & Optimism)	40.85	9.49	36.00	20.00
CHIP II: (Support, Self-esteem, & Stability)	28.85	10.09	25.00	15.00
CHIP III: (Medical Communication & Consultation)	13.54	5.76	12.00	8.00

Note. Group comparisons for each of the 3 CHIP scales were evaluated by means of a *t*-test; no statistically significant group differences emerged at the .05 level.

of the normative group by means of a series of _t_-tests, no statistically significant group differences emerged for the CHIP I, CHIP II, or CHIP III subscales at the .05 level. These results are similar to those reported for mothers.

Since the FILE data analyses already have been presented in the mothers section, they will not be discussed here. Recall that the FILE was completed by one or both parents, and that RLC or PLC scores did not differ significantly across the CHI, ORTHO, and CONTROL groups.

Group Comparisons

Group comparisons on the mood, coping, and family stress variables were evaluated by means of a MANOVA using Wilks' criterion (Table 41). Entered into the analysis were scores from the following measures: CAS, CRS, EDI, CHIP1, CHIP2, CHIP3, FILE (RLC and PLC), TOTILL, and HRATING. No overall group effect emerged ($F(20,54) = 1.09$, $p > .30$). Similar results were noted for the mothers' sample and indicate that parents of CHI, ORTHO, or CONTROL offspring do not differ significantly in their self-ratings of emotional distress, utilization of coping behavior, overall physical health, nor in the number of stressful events reported to have occurred in the year prior to interview.

Table 41

Group Comparisons of Fathers' Mood, Coping, & Health Variables

	CHI (n=24)		ORTHO (n=10)		CONTROL (n= 5)	
Variable	X	S.D.	X	S.D.	X	S.D.
CAS (anxiety)	3.88	3.38	2.80	2.53	2.00	1.58
CRS (depression)	5.04	7.44	5.70	5.93	1.20	0.84
Emotional Distress	51.54	10.68	52.20	7.79	47.47	4.51
CHIP I	40.71	9.39	36.50	11.92	34.60	6.84
CHIP II	29.21	10.05	20.90	8.37	20.40	10.09
CHIP III	13.42	5.87	10.40	7.82	12.20	3.70
FILE: RLC	11.17	7.39	11.20	6.66	10.40	7.44
FILE: PLC	5.54	3.89	6.30	4.14	8.00	8.69
TOTILL	3.92	1.74	2.50	1.27	2.40	2.51
HRATING	2.00	0.88	2.20	1.32	2.40	0.55

Note. When group comparisons were evaluated by means of a MANOVA with Wilks' Criterion, no statistically significant group effect emerged, i.e., $F(20,54) = 1.09$, $p > .30$. Cases for which any data were missing were excluded from the analysis.

Additional health-related data on minor and major health problems have been summarized in Table 42. Colds, allergies, and headache were the most common type of minor illness suffered in the preceding 12 months across all three groups. Overall, CHI fathers appeared at greater risk than ORTHO and CONTROL fathers as regards minor illness, although there were a few exceptions. For example, more CONTROL (40%) than CHI fathers (24%) complained of minor stomach problems. As regards major illness, the most frequent complaint across groups was cardiovascular disorder. Fathers in the CHI and ORTHO groups appeared roughly equivalent with respect to the incidence of major illness, and both patient groups reported more major illness than the CONTROL groups. When number of major illness types were considered, there was a trend toward greater illness in the CHI group: only 28% of the CHI fathers denied having a major illness in the preceding year, whereas 36.4% of the ORTHO fathers and 40% of the CONTROL fathers did so. However, due to the small sample sizes on which the comparisons are based, these findings should be interpreted with caution and subjected to later replication.

Table 42

Fathers' Health Status - Group Comparisons

Type of Illness	CHI (n=25) Freq (%)	ORTHO (n=11) Freq (%)	CONTROL (n= 5) Freq (%)
Minor Illnesses			
allergy(ies)	24.0	18.2	20.0
accidental injury[1]	24.0	9.1	0.0
colds	68.2	90.9	60.0
dizziness/fainting	8.0	0.0	0.0
ear infection	4.0	0.0	20.0
flu	32.0	0.0	20.0
headache	32.0	36.4	20.0
migraine	8.0	0.0	0.0
skin (minor)	36.0	9.1	0.0
stomach (minor)	24.0	0.0	40.0
other minor illness	20.0	0.0	0.0
Major Illnesses:			
accidental injury[2]	4.0	0.0	0.0
arthritis/rheumatism	16.0	36.4	0.0
bladder/bowel[3]	12.0	18.2	0.0
cancer	0.0	0.0	0.0
cardiovascular	28.0	18.2	20.0
diabetes	8.0	9.1	0.0
neurological	12.0	9.1	0.0
pulmonary	4.0	9.1	0.0
other	16.0	0.0	40.0

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[1] Minor injury only, not requiring hospitalization

[2] Injury requiring brief hospitalization (ER visit)

[3] Includes intestinal disorders and ulcer.

Maternal Adjustment and Offspring Functional Status

The fourth objective of the study was to examine the relationship between the offspring's functional status and parental adjustment. To this end, a canonical correlation procedure was conducted for the entire mothers' sample (i.e., CHI, ORTHO, and CONTROL combined). An identical procedure was also conducted for the fathers' sample. and fathers. Canonical correlation was deemed appropriate as it accounts for the maximum amount of relationship between linear combinations of variables. The two sets of variables entered into the mothers' analysis were:

Patient Functional Status Measures (N=6)

1) mood and emotional distress indices: patients' scores on the CAS, CRS, and EDI;
2) degree of psychosocial functioning: SIP Psychosocial score as rated by mothers;
3) health status indices: patients' self-rating of overall physical health (HRATING), and SIP Physcial score as rated by mothers.

Maternal Adjustment Measures (N=9)

1) mood and emotional distress indices: mothers' scores on the CAS, CRS, EDI;

2 health status indices: maternal self-ratings of

overall physical health (HRATING), and a composite index of prior medical illness (TOTILL).

3) coping behavior subscales (CHIP I, CHIP II, and CHIP III) and one index of family stress (RLC)

Due to some cases with missing data, the analyses to be reported here are based on 79 offspring-mother sets for which complete data were available.

The results of the canonical correlation analysis indicate that no statistically significant canonical correlation emerged (p>.40). However, due to the relatively small sample size, and less than optimal subject-to-variable ratio (i.e., 5.3:1), power may have been compromised (Bruning & Kintz, 1977; Lindeman, Merenda, & Gold, 1980). Consequently, it was decided to consider the individual Pearson correlation coefficients for exploratory purposes. Although this strategy increases the risk of Type I error, it was considered important to minimize Type II error so that possible areas of significance for future research could be identified. Given the nature of these post-hoc comparisons, the analyses that follow should be interpreted with caution and subjected to replication.

Pearson correlation coefficients between measures of offspring functional status and maternal adjustment are presented in Table 436. These analyses reveal a

Table 43

Correlations Between Offspring Funtional Status Variables and Mothers' Mood, Emotional Distress, Coping, and Health Status

	Mothers (n=90[1])								
Offspring	CAS	CRS	EDI	CHIP I	CHIP II	CHIP III	Recent Life Events	TOTILL	HRATING
CAS	.22*	.40***	.30**	-.00	-.14	-.05	.16	.11	.03
CRS	.22*	.39***	.42***	-.00	-.01	-.08	.19	.20*	.15
EDI	.31**	.32**	.33**	-.06	.03	-.03	.18	.24*	.10
SIP:PSY	.12	.31**	.21*	-.12	-.14	-.07	.20	-.09	-.11
SIP:PHYS	-.01	.07	-.01	.10	.04	-.07	.02	-.17	-.14
HRATING	.14	.16	.23*	-.16	-.03	-.16	.19	.10	-.02

---

[1] Sample sizes varied because of missing data; however, all correlations were based on a minimum of 82 pairs.

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

postive association of maternal mood and emotional distress with the mood status and emotional well-being of their offspring. Specifically, maternal CAS, CRS, and EDI scores correlated with their offspring's CAS, CRS, and EDI scores; the magnitude of the correlation coefficients ranging from .22 to .42. As well, extent of maternal physical illness (TOTILL) correlated with their offspring's depression inventory scores (r=.22) and emotional distress (EDI) scores (r=.24). In contrast, maternal CHIP subscale scores and maternal self-ratings of physical health status showed no association (at the .05 level) with any of the 6 indices of offspring functional status.

Maternal ratings of the patients' psychosocial functioning showed modest association with mothers' reports of depressive symptoms (r=.31) and sense of emotional distress (r=.21), whereas mothers' ratings of the patient's physical functioning showed no correlation with any of the maternal mood, coping, or health indices. These results indicate that aspects of the patients personality (i.e., mood and emotional well-being) are perhaps more problematic for mothers than physical impairment, at least with respect to the mothers' emotional status at the time of interview.

To determine the nature of the relationship between specific coping patterns and parental adjustment, intercorrelations beteen the maternal coping subscales, and mood and emotional distress variables were further scrutinized. The results of this analysis indicate that none of the CHIP subscales correlated significantly with any of the maternal adjustment variables (Table 44). This is a surprising finding and suggests that maternal coping behavior patterns are unrelated to (i.e., independent of) current aspects of maternal adjustment.

Paternal Adjustment and Offspring Functional Status

Employing identical procedures as those described above, a canonical correlation procedure was employed to examine the relationship of offspring functional status with paternal adjustment. No statistically significant canonical correlations emerged, suggesting that paternal adjustment was not associated with any aspects of the offspring's functional status. These results are identical to those that emerged for the mothers. However, as noted above, the very small sample of fathers for which complete data were obtained (n=27), and the resulting low subject-to-variable ratio (1.7:1), may have resulted in insufficient power to detect subtle, albeit real relationships Bruning & Kintz, 1977;

Table 44

Correlations Between Coping Subscales and Maternal Mood, Emotional Distress, and Health Status Variables

	Mothers (n=90[1])					
Offspring	CAS	CRS	EDI	TOTILL	HRATING	Recent Life Changes
CHIP I	.07	-.05	-.14	.02	-.07	-.03
CHIP II	.19	-.02	.03	.09	-.05	-.04
CHIP III	.12	-.04	-.06	-.01	-.08	.02

Note: All correlations were nonsignificant at the .05 level.

[1] Sample sizes varied because of missing data; however, all correlations were based on a minimum of 88 pairs.

Lindeman et al., 1980). Consequently, it was decided to examine the intercorrelations among paternal and offspring variables. The intercorrelations of offspring functional status and father adjustment variables are presented in Table 45, and reveal that by and large, few apects of their offspring's functional status are associated with paternal adjustment, mood, coping, or health status. Although n's were small, this alone did not appear to account for the lack of significant correlation, as all but 3 of the nonsignificant coefficients ranged from -.21 to .17. Only 1 patient variable appeared to correlate consistently with several of the paternal measures. Specifically, the offspring's level of psychosocial dysfunction, as rated by the father, correlated with paternal anxiety (.49), depression (.40) and emotional distress (.63); all of which were significant at the .01 level. Recall that Psychosocial functioning also emerged as a significant variable in the mothers' analyses.

Additional analyses were conducted to examine the relationships between coping and paternal adjustment, mood, and health status. As revealed in Table 46, all but 1 of the intercorrelations between paternal CHIP scores and paternal adjustment measures failed to achieve statistical significance at the .05 level

Table 45

Correlations Between Offspring Funtional Status Variables and Fathers' Mood, Emotional Distress, Coping, and Health Status

Fathers (n=44[1])

Offspring	CAS	CRS	EDI	CHIP I	CHIP II	CHIP III	Recent Life Events	TOTILL	HRATING
CAS	-.07	.08	.08	.05	-.15	-.04	.07	-.12	-.05
CRS	.04	-.02	-.11	.04	.14	.04	.12	-.02	-.03
EDI	.09	.14	.10	-.06	-.02	.07	.14	-.03	-.04
SIP:PSY	.49***	.40**	.63***	-.26	.04	-.10	.34*	.24	.22
SIP:PHYS	.04	-04	-.06	.00	.14	-.20	.09	-.14	-.21
HRATING.	.17	.10	.17	-.14	-.04	-.11	.14	.13	.03

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[1] Sample sizes varied because of missing data; however, all correlations were based on a minimum of 36 pairs.

*$p<.05$ **$p<.01$ ***$p<.001$

Table 46

Correlations Between Coping Subscales and Paternal Mood, Emotional Distress, and Health Status Variables

	Paternal Variables					
Offspring Variables	CAS	CRS	EDI	TOTILL	HRATING	Recent Life Changes
CHIP I	.08	-.12	-.16	-.06	-.33*	-.19
CHIP II	-.01	-.07	-.04	.17	-.28	.06
CHIP III	.13	.02	.07	-.02	-.23	-.08

---

*$p < .05$

[1] Sample sizes varied because of missing data; however, all correlations were based on a minimum of 38 pairs.

(fathers' self-ratings of their overall physical health was negatively correlated with their scores on the CHIP I scale ($r=-0.33$, $p<.05$). These suggest that the extent of paternal coping behaviors as quantified by the CHIP are unrelated to, i.e., independent of, the degree of paternal mood disturbance, emotional distress, or physical health.

Supplemental Analyses

Mother-Offspring Agreement on Ratings of Offspring Dysfunction

Correlations between mothers' and offsprings' scores on the three SIP commposite scales exhibited less concordance than that noted between parents. Mother-offspring correlations were as follows: Overall dysfunction ($r=.50$), Physical dysfunction ($r=.60$), and Psychosocial dysfunction ($r=.34$).

To determine if the extent of agreement between offspring and mothers on the former's psychosocial and physical functioning was associated with maternal adjustment, analyses based on mother-offspring difference scores were conducted. First, difference scores were computed for each case by subtracting the offspring's SIP rating from that obtained from the mother (e.g., Mother Psychosocial Score minus Patient

Psychosocial Score). Then three groups were formed based on the magnitude and direction of the SIP score difference: Group 1 contained cases in which the mother-offspring difference score was -1.0 or less; Group 2 contained cases in which difference scores ranged from > -1.0 to <= 2.0; and Group 3 contained cases in which the mother-offspring difference exceeded 2.0. These three groups corresponded to situations whereby mothers perceived less dysfunction, approximately the same degree of dysfunction, and relatively greater dysfunction than their offspring, and have been referred to in the following discussion as the M<O, M=O, and M>O groups, respectively. A MANOVA using Wilks' criterion was then performed to determine if mothers varied in their degree of adjustment, coping, and physical health. Utilizing the SIP Physical scale score as a grouping variable, no overall group effect emerged ($\underline{p}>.30$). In contrast, when a second MANOVA was conducted with mothers grouped by means of the Psychosocial scale, a significant overall group effect emerged ($\underline{F}(16,144)=1.93$, $\underline{p}<.022$), and two univariate tests were significant - i.e., for the CRS ($\underline{p}<.008$) and TOTILL ($\underline{p}<.014$). These results have been summarized in Table 47. Pairwise group comparisons were then conducted by means of Duncan's Multiple Range test

Table 47

Mother-Offspring Agreement on the SIP Psychosocial Scale and Maternal Adjustment, Coping, and Health Status

Maternal Variables	M<0 (n=30)	M=0 (n=26)	M>0 (n=26)	Univ. ANOVA
CAS	4.23 (3.10)	3.42 (2.84)	3.77 (2.41)	ns
CRS	4.90^1 (5.04)	4.31^2 (3.79)	$8.42^{1,2}$ (5.95)	$p<.008$
EDI	52.47 (9.24)	48.12 (9.45)	53.65 (8.13)	$p<.069$
CHIP I	40.57 (8.55)	42.56 (7.09)	41.00 (8.61)	ns
CHIP II	33.47 (10.08)	29.92 (10.08)	29.54 (9.85)	ns
CHIP III	14.83 (5.46)	16.08 (5.50)	15.04 (5.15)	ns
TOTILL	5.30^1 (2.88)	3.31^1 (1.62)	4.19 (2.70)	$p<.014$
HRATING	2.17 (0.70)	2.15 (0.78)	1.96 (0.80)	ns

Note: MANOVA with Wilks' Criterion: $F(16,144) = 1.93$, $p<.022$.

^{1,2}Means with same number in superscript are significantly different according to Duncan's Multiple Range Test (adjusted for unequal n's).

(corrected for unequal n's). These analyses revealed that mothers in the M>0 group reported significantly more depressive symptoms than mothers in the M=0 ($p<.05$) or M<0 ($p<.05$) groups. That is, mothers who perceived greater psychosocial dysfunction in their offspring than that perceived by the offspring themselves, report greater depressive symptomatology than mothers who provided ratings less severe, or equal to their son/daughter's self-rating. Mothers in the M<0 group reported more health problems in the year prior to interview than mothers in the M=0 group ($p<.05$). In other words, mothers who perceived *less* psychosocial dysfunction than what their offspring perceived, reported on average more medical problems in the year prior to interview, than mothers whose ratings accorded with their offspring. Although univariate tests for the other variables were nonsignificant at the .05 level, there was a trend that just missed significance: emotional distress tended to vary across the M>0, M=0, and M<0 groups ($p<.069$) (exploratory pairwise group comparisons via Duncan's Multiple Range Test indicated that M>0 mothers were more depressed than M=0 mothers). Agreement between mothers and offspring did not significantly differ across the CHI, ORTHO, and CONTROL groups.

Father-Offspring Agreement on Ratings of Offspring Dysfunction

As with the mothers' sample, correlations between fathers' and offsprings' scores on the three SIP commposite scales exhibited less concordance than that noted between parents. Father-offspring correlations were as follows: Overall dysfunction (r=.53), Physical dysfunction (r=.59), and Psychosocial dysfunction (r=.32).

The relationship between paternal adjustment and degree of concordance between offspring and father ratings was analyzed in the same manner as that conducted for mothers. That is, father-offspring difference scores were computed for the SIP Physical, and Psychosocial scales. Three groups were formed employing the identical cut-off scores as that used previously for the mothers. These groups are referred to as F<0, F=0, and F>0, and correspond to fathers who reported less dysfunction, fathers who reported about the same degree of dysfunction, and fathers who reported greater dysfunction than reported by their offspring.

Separate MANOVA's using Wilks' criterion were conducted for each of the Physical and Psychosocial scales. Results of these analyses were similar to that reported for the mothers data in that no group effect emerged for the Physical scale, whereas a significant group difference was obtained for the Psychosocial scale ($F(16,52) = 2.14$, $p<.02$) (Table 48). In the latter analysis, only one significant univariate test emerged (EDI, $p<.024$), although two tests just missed significance at the .05 level (CAS: $p<.053$), and CHIP2 II: $p<.064$). Subsequent pairwise comparisons of group means reveal that fathers in the F>O group reported significantly more emotional distress than fathers in the F<O ($p<.05$) and F=O ($p<.05$) groups. That is, fathers who perceive greater psychosocial dysfunction than what their offspring reported, admitted to greater emotional distress than fathers whose ratings were similar to or less severe than their offspring. As described earlier the univariate tests for the CAS and CHIP II scales just missed significance. Exploratory pairwise comparisons of group means by means of Duncan's Multiple Range test indicated that fathers whose ratings accorded with their offspring reported less anxiety ($p<.05$) than fathers whose ratings were less severe than what their sons or daughters perceived, and that F=O fathers tended to report less reliance on coping behaviors directed at maintaining social support, self esteem, and psychological stability (CHIP II) than F<O fathers ($p<.05$). With the exception of the latter

Table 48

Father-Offspring Agreement on the SIP Psychosocial Scale and Paternal Adjustment, Coping, and Health Status

Paternal Variables	F<0 (n=10)	F=0 (n=16)	F>0 (n=10)	Univ. ANOVA
CAS	1.80^{1} (1.14)	3.13 (2.36)	5.10^{1} (4.58)	*p*<.053
CRS	4.10 (4.89)	3.63 (4.59)	8.00 (10.39)	ns
EDI	47.80^{1} (5.39)	49.38^{2} (6.94)	58.20^{1,2} (13.36)	*p*<.024
CHIP I	35.60 (13.61)	39.13 (6.97)	38.90 (10.30)	ns
CHIP II	29.30^{1} (7.79)	20.81^{1} (10.41)	27.30 (8.69)	*p*<.064
CHIP III	12.80 (8.04)	11.75 (5.35)	13.10 (6.19)	ns
TOTILL	3.60 (2.41)	2.75 (1.81)	4.00 (0.67)	ns
HRATING	2.10 (0.88)	2.19 (1.05)	2.10 (1.10)	ns

Note: MANOVA with Wilks' Criterion: *F*(16,52) = 2.14, *p*<.02.

^{1,2}Means with same letter in superscript are significantly different according to Duncan's Multiple Range Test (adjusted for unequal n's).

finding, these results are comparable to that reported for the mothers' sample.

DISCUSSION AND CONCLUSIONS

Before addressing the primary objectives of this study - parental adjustment and coping in families with a head-injured member, a brief summmary of patient and parent demographic characteristics will be presented. Following this, additional injury-related and descriptive information will be presented for the injured offspring in order to provide a context in which to understand the CHI patients' post-injury level of functioning.

Demographic Characteristics

Offspring

Overall, CHI patients in this study were young, single, predominantly male, with a 12th grade education or less. At the time of interview the most frequently noted occupational activity for CHI patients was school (47%), followed by full-time or part-time work (25%). Unemployment was a problem for 25%. Although patients were selected on the basis of age and domestic residence, these demographic data accord with findings from several epidemiological and large-scale descriptive investigations (Kerr, Kay & Lassman, 1971; Rimel, et al, 1981; Rimel et al., 1982; Klonoff, 1984).

Some characteristics of the current sample however, may not be typical of the head-injured population. First, as a result of the residence requirement for inclusion in the study, all patients were living either in the same household as their parent(s) or in semi-private quarters adjacent to, or owned by, their parents. Consequently, mood, adjustment and coping patterns for this sample of parents may not be applicable to parents who are not in day-to-day contact with, or providing care for, their head-injured offspring. Second, the median annual income level of families with a head-injured member was $20,000 to $29,000; figures that are comparable to those reported for a typical family in the Portland, Oregon metropolitan area. At first glance these findings are at variance with those of other investigators who note that a disproportionate number of CHI patients are from the lower socioeconomic classes (Kerr et al., 1971; Rimel et al, 1981; Rimel et al., 1982). For example, Rimel and her colleagues have reported mean household incomes of $6,000 and $8,500 for their patients with moderate and mild injuries, respectively (Rimel et al., 1982; Rimel et al., 1981). Yet, it is difficult to conduct between-study comparisons regarding family income because it is unclear from earlier reports as to what proportion of head-injured patients were living with their parents, with spouses, independently, or dependent upon public assistance at the time of follow-up. Presumbably, household incomes for individuals living alone would be lower, on average, than those of patients living with 1 or 2 wage-earning parents. Consequently, it is unclear as to what degree the mean annual income for this sample of families with a head-injured member is representative of the CHI population in general.

For the offspring, group comparisons were nonsignificant at the .05 level across all of the demographic variables. Specifically, CHI, ORTHO, and CONTROL offspring did not differ significantly with respect to age, years of education, marital status, family income, family size, religious preference, or race.

In summary, this sample of CHI patients appears to be similar to other samples of head-injured patients with regards to several demographic variables. Due to selection criteria that required all offspring to be living with, or cared for by their families of origin, the average family income for the current sample may be higher than that typically reported for CHI samples in general.

Parents

Detailed demographic information was obtained from both mothers and fathers in the current study. In general, parents were 40 to 50 year old caucasian high school graduates. Nearly all fathers were employed full-time, whereas approximately half the mothers were so employed. On average, each family was composed of 4 members, which included the particpating offspring.

Mothers of a head-injured offspring appeared closely matched to the ORTHO and CONTROL mothers with respect to all but one of the demographic variables; mothers of head-injured offspring were more likely to be widowed or divorced than those with orthopedically- or non-injured offspring. On the other hand, fathers of CHI, ORTHO, and CONTROL offspring did not differ on any of the eight demographic variables. These findings indicate that mothers (and fathers) in each group shared approximately equal educational, occupational, and financial resources. Thus it would not be expected that these variables alone would account for the group differences that emerged.

One finding of interest regards the differential rate of response of mothers and fathers. Specifically, in the 96 families that agreed to participate, 94% of the mothers consented to cooperate, whereas just 46% of the fathers did so. This sex difference in rate of participation has been found in other investigations as well. In the McKinlay et al. (1981) study, 49% of the sample were wives and 18% were mothers, whereas 9% were fathers and just 5% were husbands. Several hypotheses may be offered to account for this difference in rate of parental participation: First, a greater proportion of fathers (81%) were employed full-time compared to mothers (53%). Consequently, relatively more fathers than mothers were unavailable for participation due to schedule conflicts with work. Second, out of 25 single-parent families that were interviewed in this study, 88% were headed by a mother. Third, procedural bias tended to favor selection of mothers over fathers. When time constraints limited the family interview to just one parent and their offspring, it was the mother's participation that was sought first.

Injury-related Characteristics - Patients

CHI and ORTHO patients were compared on several injury-related variables to determine the extent that such variables may contribute to subsequent difference in patient functional capacity. These variables were time-since-injury (TSI), cause of injury, and length of hospital stay (LOS). As anticipated, no statistically significant group difference emerged for TSI, one of the criterion variables used to select patients. Group differences did emerge for the other two variables. First, cause of injury varied between the two groups. The majority of the CHI patients suffered their injuries as a result of a MVA, whereas sports and recreational activities were the frequent cauase of injuries in the ORTHO group. Approximately equal proportions of CHI and ORTHO patients suffered their injuries in accidents involving motorcycles, all-terrain-vehicles, or bicycles. These findings are in agreement with those of other investigators that have identified the automobile as a major mechanism of CHI, and that MVA-related trauma carries a disproportionately greater risk of severe head injury than do other causes of injury (Annegers, Grabow, Kurland, & Laws, 1980; Kalsbeek et al., 1980; Kerr et al., 1971; Klauber, Barrett-Connor, Marshall, & Bowers, 1981; Rimel et al., 1982). It is not surprising then that patient groups also differed with respect to injury severity as reflected by the overall length of hospitalization: on average CHI patients were hospitalized for longer periods than ORTHO patients, some with stays lasting up to 6 months.

Additional extracranial injuries were a problem for 90% of the CHI patients in this study. Although this figure is higher than that reported by others (Klonoff, 1984; Klauber et al., 1981) the use of broad, overlapping and non-equivalent categories makes strict comparisons between studies difficult. For the majority of patients additional injuries were limited to facial or scalp trauma or miscellaneous abrasions, contusions, or lacerations. Nonetheless, many of the CHI patients suffered leg and/or arm fractures, as well as abdominal and chest injuries. Conversely the most frequent type of injury for the ORTHO group was a lower limb fracture followed by fracture of the upper limb. Few patients in the latter group had suffered abdominal trauma, and none had incurred chest injuries. Overall, results indicate that as a group, CHI patients were at greater risk to sustain more severe injuries than ORTHO patients.

For CHI patients, the severity of head injury was assessed by means of a widely used instrument, the Glasgow Coma Scale (GCS). The distribution of GCS scores indicated that a wide range of head injury severity was obtained. When patients were divided into three groups based upon their GCS scores, approximately 40% were rated as severe, 24% were moderate, and 36% were mild. This U-shaped distribution of GCS scores, i.e., fewer patients classified as moderate relative to the other two categories, is comparable to that reported in other investigations utilizing heterogenous samples of CHI patients (Klonoff, 1984; Clifton, Grossman, Makela, Miner, Handel, and Sadhu, 1980). Frank loss of consciousness, even for a brief period of time, was reported by over 50% of the head-injured patients.

In summary, the CHI patients in this study comprise a heterogenous sample and represent a broad spectrum of injury severity and outcome. When descriptive characteristics of the current CHI sample are compared to those of prior studies, close concordance was observed for nearly all demographic and injury-related variables. Group comparisons conducted within the current study showed that CHI, ORTHO, and CONTROL offspring were well-matched across all demographic variables. Many of the CHI patients had suffered additional injuries, and results indicated that these individuals had more severe injuries than ORTHO patients.

CHI Patient Mood and Functional Status

In order to more fully describe the current status of the patients at the time of interview, several aspects of their post-injury functioning were evaluated. These areas included mood, emotional well-being, and health related impairment (physical and psychosocial). Each will be discussed briefly.

Clinically significant anxiety was assessed in 12.6% of the CHI sample. Of interest, no differences in mean levels, or in the incidence of individuals with clinically significant anxiety symptoms were found between the CHI, ORTHO, and CONTROL groups. Comparison of these findings with previous research is difficult since the incidence of depression and anxiety after head injury has not been studied systematically (Levin et al., 1982). Findings from three previous studies provide some preliminary estimates, however. In a very early paper, Denny-Brown (1945) noted that anxiety symptoms were present in 24% of his patient sample, most of whom had mild head injuries. Lezak et al. (1980) on the other hand, reported significant anxiety in over 46% of their sample when ratings were based on an inventory especially developed for longitudinal study of CHI patients. A similar figure (44%) was reported by Tyerman & Humphrey (1984) who evaluated severe head injury patients with a self-rating anxiety scale. None of the above studies provided normative data or scores for a suitably matched control group, so it remains uncertain to what degree these estimates of anxiety disturbance are characteristic of CHI patients per se, or to what degree the incidence of anxiety symptoms in CHI individuals deviates from population base-rates. Despite the lack of precise figures, some CHI patients appear at psychiatric risk. Yet without a detailed description of premorbid emotional, psychological, and personality characteristics, it is not possible to differentiate clearly between aspects of personality that are injury-related, developmentally-related, and those that reflect the patient's premorbid status.

Depressive symptomatology was noted in 14.7% of the CHI patients - a rate somewhat higher than that reported for the adult normative population to whom the CRS scale was initially administered (Carroll et al., 1981), but one comparable to that reported for a sample of normal adolescents (Yanchyshyn & Robbins, 1983). These results are similar to those reported by Hpay (1971) who found depression and moodiness in just 9% of her sample. However, other investigators have reported much higher rates of depression in their samples of head-injured persons. For example, using a self-rating scale, Tyerman & Humphrey (1984) found depression in 60% of their severely injured CHI patients. Lezak et al. (1980) employing a scale that used information from a variety of sources, including the patient, relatives, and a skilled interviewer found depressive symptoms in over 50% of their CHI patients with moderate to severe injuries. As noted earlier with regard to anxiety, previous studies have not utilized controls, so it is unclear to what extent the rate of depression in CHI samples is greater than that for the general population, or whether head-injured individuals are at greater risk than individuals who have recently suffered traumatic injury without involvement of the head.

Furthermore, a variety of methodological differences make it difficult to conduct strict comparisons between studies as to the rate of psychiatric or mood disturbance in CHI patients. For example, investigators have differed in their method of assessing depressive and anxiety symptomatology: some used the patients' self-ratings (Tyerman & Oddy, 1984), whereas others relied on the perception of relatives, friends, or an examiner (Kpay, 1971; Lezak et al., 1980). Use of different cut-off or screening scores may also result in disparate incidence figures. Second, estimates of the incidence of depression and anxiety may be influenced by characterstics of the sample. For example, it would be expected that the rate of depression would vary with the proportion of females in the sample, because the base-rate for depressive disorders is higher for women than it is for men (Hamilton, 1967; OBrien, 1981). A related problem is that investigators often fail to distinguish between presence of a specific symptom or cluster of symptoms and the presence of a frank psychiatric disorder. Most studies have relied on the reports of lay persons - e.g., the patient, relatives, or friends - to screen for depression or to quantify the severity of depressive symptomatology. Yet, self-rating scales alone do not allow for diagnostic classification; for this, a trained clinician is required. Finally, there is some evidence to suggest that the degree of emotional distress in patients varies with chronicity of injury. Fordyce, Roueche, and Prigatano (1983) found that CHI patients interviewed more than 6 months post-injury reported greater emotional distress (including depression) than patients interviewed less than 6 months after injury. Similar findings have also been reported by McKinlay and Brooks (1984).

The level of emotional distress of patients was evaluated by a questionnaire that included items covering a broad range of feelings and concerns. As noted in the preceding results section, a variety of problems were endorsed by many of the CHI patients.

These included: dissatisfaction with their lives, concerns regarding their physical health, and feelings of anxiety impatience, tension, frustration, fatigue, anger, and annoyance. Many of the subjective complaints cited above have been reported by others. For example, Oddy et al. (1978b) found that head-injured patients complained of somatic, sensory, cognitive, personality, and psychiatric problems for up to a year post-injury. However, when the ratings of all items were combined into a total score to serve as a gross index of emotional distress (i.e., the EDI), CHI, ORTHO, and CONTROL groups were not found to differ in their mean scores.

In summary, CHI patients did not differ from the ORTHO and CONTROL patients in their report of anxiety, depression, or emotional distress. In light of previous investigations that have found CHI patients to be at psychiatric risk, these results are unexpected. Two hypotheses may be offered to account for this state of affairs. First, over a third of the CHI patients had mild head injuries. Consequently, the extent of injury-related problems may have been less than that reported for samples of more severely injured patients. Second, over half of the entire patient sample were adolescents. Of these, many attributed at least some of their current emotional distress (if present) or and alterations in personality to normal age-related changes.

Examination of patient ratings of their current physical and psychosocial functioning revealed some interesting findings. For the SIP Psychosocial scale, there was a significant trend for dysfunction to be greatest in the CHI group, and least in the CONTROL group. The Physcial scale however, did not distinguish between patient groups. Overall, these data accord well with those of previous investigations that have conducted follow-up assessments of CHI patients at 6 to 18 months (Stampp, 1984) and 2 to 4 years (Klonoff, 1984) post-injury. In each of these studies, patients have reported greater psychosocial dysfunction than physical dysfunction. In the present study, CHI patients' psychosocial dysfunction encompassed areas having to do with Alertness Behavior, Emotional Behavior, Social Interaction, and Communication.

In summary, a variety of emotional and psychosocial problems were noted in this sample of CHI patients at 1 to 4 years post-injury. Many complaints were similar to those elicited in other follow-up studies of CHI patients. When CHI patients were compared to patients with orthopedic injuries and to offspring without any recent injuries, no group differences were found in their level of anxiety, depressive symptomatology, nor in their degree of emotional distress at the time of interview. Similarly, CHI, ORTHO, and CONTROL patients did not significantly differ with respect to their own ratings of physical dysfunction as assessed by the SIP. In contrast, patient groups were statistically different in their self-ratings of psychosocial functioning. Specifically, CHI patients rated themselves as more dysfunctional than either of the two control groups. This pattern of results accords with those of several authors in which psychosocial deficits have been found to be more problematic for the patient than physical problems (Bond, 1975; McKinlay et al., 1981). However, most of the patients in the current study had relatively minor physical disability when interviewed 2 to 4 years after their injuries, so these results may not be characteristics of patients with more severe or persisting physical handicap.

Offspring Functional Status - Parents' Ratings

Analyses of parent ratings of their offsprings' functional status yielded the following findings. First, the pattern of ratings from mothers and fathers was very similar for 10 of the 12 SIP subscales. Inter-parent agreement on the SIP composite scales was particularly high: With respect to their offspring's overall functioning, the percent of variance shared by mothers' and fathers' ratings was 81%, whereas the degree of overlap for the Physical and Psychosocial scales was 74% and 77%, respectively. These results indicate that responding parents share similar perceptions with regard to their offspring's health-related behavior.

Second, for all groups combined the number of subscales with mean elevations indicating more than 5% dysfunction was nearly equal for both parents: 8 of the mothers subscales and 9 of the fathers subscales exceeded this level. For both parent samples, elevations occurred on all subscales comprising the Psychosocial composite scale (i.e., Emotional Behavior, Social Interaction, Alertness Behavior, and Communication). In contrast, none of the 3 subscales contained in the Physical dimension (i.e, Body Care & Movement, Mobility, and Ambulation) had group means that exceeded 5%. These data indicate that parents of injured and non-injured offspring alike, rate psychosocial dysfunction as more severe than physical dysfunction, a pattern discussed earlier with respect to the patients' self-asessments.

Third, parental ratings of their offsprings' health-related dysfunction varied across the three groups. In general, CHI patients were rated as more dysfunctional than ORTHO patients who were rated as more severely impaired than noninjured controls. In particular, patient groups were distinguished in terms of psychosocial functioning, but not with respect to physical impairment. These relationships achieved statistical significance for the mothers' sample, but not for the fathers. Due to the very small number of fathers, sufficient power to detect "real" group differences may have been compromised. This hypothesis appears to be a reasonable one since mothers' and fathers' scores were highly correlated and the pattern of mean SIP subscale scores of the fathers closely followed that observed for mothers.

Parental Adjustment and Physical Health

Analyses of parental mood, emotional distress, and health status revealed that approximately 10-12% of the mothers and fathers suffered from clinically significant anxiety. These results suggest a much lower incidence of anxiety than the 33% rate reported by Livingston et al. (1985b). Differences in sample characteristics may account for some of the observed discrepancy. A larger proportion of patients in the Livingston et al. (1985b) study had sustained severe injuries when compared to the number of such cases in the current study.

Depressive symptomatology was evident in 19% of the mothers and 11% of the fathers, results that are comparable to that reported by others. Both the Oddy et al. (1978a) and Livingston et al. (1985b) investigations found that 24-26% of their relatives were depressed at follow-up 1-year post-injury. In the present study however, the rate of depression in parents of head-injured patients was not significantly different than that of ORTHO and CONTROL parents. These results suggest that parents of head-injured patients may not be at greater risk for depression than those of the general population. Most earlier studies have lacked adequate controls which prevented them from ascribing depression as a feature unique to, or characteristic of, parents of head-injured offspring. As well, many studies have not distinguished between mothers and fathers, although there is some evidence to suggest that family response to head-injury is differentially affected depending on the relationship of the intact member to the patient (Mauss-Clum & Ryan, 1981).

Mothers and fathers were also assessed as to their level of emotional distress. This was accomplished by a questionnaire (i.e., the EDI) comprised of items previously identified as characteristic of relatives caring for head-injured members. As described in the earlier discussion of the patients' adjustment at the time of interview, this index was employed to provide a gross index of emotional distress. As with the anxiety and depression measures, no differences were evident between the CHI, ORTHO, and CONTROL parents. This was a significant finding given that the EDI were specifically chosen to represent those complaints frequently attributed to CHI parents.

Health-related data for parents revealed that most had experienced some type of minor illness in the year before interview (e.g., colds, allergies, headaches). More significantly, many mothers and fathers reported at least one major health problem (e.g., cardiosvascular, arthritis/rheumatism) in the preceding 12 months. Little data has been reported on the physical health status of CHI parents, but the current findings suggest a much greater incidence of physical illness than that reported by previous investigators. For example, Oddy et al. (1978a) found that 25% of their relatives had experiences some type of illness within the preceding 6 months. However, it is difficult to reconcile the discrepancy between the latter study and the present investigation due to the broad classification of illness used by Oddy and his colleagues, but the following explanations may be offered: First, in the current study parents were asked several detailed questions regarding specific types of illness. Although detailed information is lacking regarding how physical health data were obtained, Oddy and his associates apparently relied on rather general inquiry into the relatives' state of health. Thus it may be possible that in the latter study relatives' spontaneous reports underestimated the true extent of their health problems. Second, in the current study parents' physical health was assessed for the 12 months period prior to interview, while Oddy et al. limited their scope to the preceding 6 months. Thus the rate of physical illness reported by Oddy and his colleagues may be lower simply as a function of a shorter sampling interval. In the current study when parents of head-injured offspring were compared to parents of orthopedically-injured and non-injured offspring with regards to the number of illness types (minor and major combined), no significant group differences emerged. These results indicate that while parents of CHI patients are at risk for a variety of health problems, their risk is about the same as that of other parents whose offspring do not have such injuries - at least for this sample of parents. Such findings underscore the need for appropriate control groups; only then can it be determined whether characteristics attributed specifically to families of head-injured offspring are indeed unique to such households.

Parental Coping after Head Injury

One of the objectives of this study was the description of parental coping behaviors in families with a head-injured member, and to determinie whether there were quantitative and qualitative aspects of coping unique to such parents. To this end, CHI parents were asked to rate the helpfulness of 45 coping behaviors on a recently developed instrument, the Coping Health Inventory for Parents (CHIP). Their responses were then compared to parents of two control groups: those with orthopedically-injured offspring and those with non-injured offspring. As described in the Methods section, the CHIP describes three dimensions of coping. These have been labelled as follows: maintaining family integration, cooperation and an optimistic definition of the situation; maintaining social support, self-esteem, and psychological stability; and understanding the medical situation through communication with other parents and consultation with medical staff. Frequency analyses of the scores from the three subscales of the CHIP indicated considerable variability in the extent to which various coping patterns were endorsed as helpful by the entire sample of parents. Yet, these data are comparable to that reported for the initial CHIP normative group, both with respect to mean scores and standard deviations. Recall that parents of the initial normative sample were mothers and fathers living with a chronically-ill child (McCubbin & Patterson, 1981).

Drawing from the previous literature on family response to head injury, it was postulated that having to care for and adjust to a member's head injury would place the family at risk for additional stress and that this would result in greater parental coping efforts which would be reflected in higher scores on one or more of the CHIP subscales. Results from the present study did not support this hypothesis. Specifically, neither mothers' nor fathers' mean coping scores on any of the three CHIP scales varied across the three patient groups. That is, parents with head-injured, orthopedicall-injured, or non-injured offspring did not differ in their mean ratings of the helpfulness of various coping patterns as measured by the three CHIP scales. CHI parents were compared to ORTHO and CONTROL parents to determine if there were patterns of coping unique to families of the head-injured. Emergence of such qualitative differences would be reflected by significantly higher scores on a particular scale or scales, or in statistical terms, by the emergence of a significant interaction effect in an analysis of variance. As indicated earlier, no such pattern emerged - CHI, ORTHO, and CONTROL parents endorsed each of the three coping patterns to a similar degree.

Relationship Between Patient Functioning and Parental Adjustment, Coping, and Health Status

A second objective of the current study was the evaluation of the relationship between patient functional status and parental adjustment, coping, and physical health. When the relationships between patient characteristics (i.e., mood, emotional distress, and health-related physical and psychosocial functioning) and features of parental adjustment, physical health, and coping behavior were examined by means of canonical correlation, no significant association emerged. Possible reasons to account for the lack of statistical significance were discussed. However, supplemental analyses revealed some interesting findings which will be discussed below.

In general, the nature of the relationships between offspring-parent variables varied with the sex of the parent. Specifically, fathers' status at time of interview seemed more independent of their offsprings' characteristics than that observed for mothers. Maternal adjustment (i.e., mood and emotional distress) was associated with certain aspects of their offspring's status at time of interview - in particular, their offsprings' degree of anxiety, depression, emotional distress, and psychosocial impairment. There was a modest association between mothers' physical health and their offsprings' degree of depressive symptomatology and emotional distress. In contrast to what was observed for the mothers' sample, paternal adjustment was not associated with their offspring's mood and emotional distress. However, paternal anxiety and emotional distress were significantly associated with their ratings of their offspring's psychosocial functioning. These findings confirm and expand upon results of earlier studies documenting the association between patients' personality/behavioral change and subjective complaints on the mood and emotional well-being of relatives (Brooks & McKinlay, 1983; McKinlay et al, 1981; Oddy et al., 1978a). Although correlational analyses do not allow for determination of causation, these results are consistent with the hypothesis that aspects of parental adjustment and mood are affected, or influenced by changes in their ofspring's personality and behavior.

As for parental coping behavior as measured by the CHIP, analyses revealed a uniform lack of association between parental coping scores and their offspring's degree of anxiety, depression, emotional distress, physical dysfunction, psychosocial dysfunction, and physical health. For both mothers and fathers, no association emerged between parental coping scores and their own degree of emotional distress, anxiety, and depression. Overall, the nearly uniform lack of statistical association between coping scores and parental adjustment, emotional distress, and (maternal) medical illness were unexpected findings. The lack of association between parental coping and aspects of their offspring's functional status as well as the lack of association between parental coping and parental adjustment and health indices may have been due to one or more of the following: First, there may be ambiguity in the interpretation of the CHIP subscale scores.

According to the model put forth by McCubbin and his associates, coping behaviors are utilized to eliminate stressors and manage the burdens of a situation, as well as to obtain and develop the psychological, social, and material resources necessary to maximize family adaptation (McCubbin & Patterson, 1981). Thus high CHIP subscale scores may reflect coping efforts to deal with a particular stressor event(s) ("real" or perceived), or they may reflect parental attempts to enhance development of family integrity, personal growth and development of individual members, or strengthening of the family's mastery and control over environmental or external influences in the absence of an obvious stressor or crisis-provoking event.

Second, endorsement of behaviors perceived as helpful may not be descriptive of those behaviors that are actually performed. A related issue concerns the outcome or efficacy of coping efforts. It seems likely that coping behaviors effective in handling a stressor event or managing hardships would minimize the risk of parental adjustment and/or physical health problems, while ineffective coping attempts would increase the risk of such disturbance. Independent evaluation of coping behavior was not obtained in the current study, nor was objective examination of coping efficacy performed, yet these areas represent promising avenues for future investigation.

Third, it may be that parents had difficulty with the inventory itself. Many parents denied that they were actually coping with aspects of their offsprings' injury _at the time of interview_, but reported instead, that they completed the CHIP based on behaviors that they had used previously, or during the acute period post-injury. Therefore, ratings may not have been representative of the parents' _current_ coping efforts.

Finally, coping behaviors themselves may be a source of stress (McCubbin & Patterson, 1981); for example, although a parent may cope by attempting to maintain a positive outlook of the patient's post-injury situation, overly idealistics expectations of the injured offspring could be counter-productive if they preclude efforts to seek appropriate treatment and rehabilitation. It is relevant to mention here a case described by Romano (1974) in which parental denial of the extent of disinhibition in a sexually mature daughter precluded their seeking appropriate contraception, which resulted in an unwanted pregnancy.

In this study both parents and offspring were requested to evaluate the offspring's health-related dysfunction using the same instrument - the SIP. This procedure provided a unique opportunity to assess the degree of concordance between offspring and parent report. Unlike the high degree of correlation found between mothers' and father's SIP ratings, correlations between parent and offspring ratings were much lower in magnitude. These findings indicate that although parents demonstrate high agreement in their rating of the injured member, much less agreement is evident between parent and patient perceptions - particularly with respect to the patient's health-related psychosocial dysfunction. This pattern of results, i.e., higher patient-parent agreement on the Overall or Physical scales than agreement on the Psychosocial scale, corroborates findings reported by Stampp (1984). As well investigators have noted that agreement between patients and relatives is generally high concerning motor and sensory impairment. Less agreement is observed in assessments of memory and concentration impairment, and the least agreement is in the rating of emotional and behavioral changes (McKinlay and Brooks, 1984).

Since denial (Bond, 1983; Romano, 1974) and relatives' personality (McKinlay & Brooks, 1984) have been identified as factors that may influence relatives' perceptions of the patient's post-injury condition, additional analyses were carried out based on parent-patient difference scores utilizing both the SIP Physical and SIP Psychosocial scales. Although no independent measures were employed to determine the precise nature of the difference score discrepancy (i.e., whether is was due to parental exaggeration of the patient's dysfunction or whether is was due to minimization of impairment by patients with diminished insight), it was hoped that such analyses would allow examination of the relationship between parent-offspring concordance in their assessment of the offspring's functional status and parental adjustment.

Specifically, these analyses were performed to examine the extent to which parental adjustment, coping, and health were associated with the degree of concordance between offsprings' and parents' ratings of the offsprings' physical, and psychosocial, post-injury functioning. Mothers' groups formed on the basis of maternal-offspring concordance as regards the offsprings physical impairment, did not differ in their degree of mood disturbance, emotional distress, or health problems. In contrast, mothers who rated their offspring as exhibiting more psychosocial impairment than what the offspring rated themselves, reported greater depressive symptomatology and emotional distress than mothers whose ratings of psychosocial impairment were comparable to or less than their offspring. These results are similar to those reported by McKinlay and Brooks (1984) who noted an association between relatives' personality and their perceptions of the patients' difficulties. Specifically, they found that relatives' Neuroticism scores (as measured by the Eysenck personality scale, Eysenck & Eysenck, 1975) were positively correlated with relatives' ratings of emotional changes in the patient, but only weakly associated with relatives' reports of physical changes in their head-injured member. Based on these results, McKinlay and Brooks postulated that more neurotic relatives may exaggerate the difficulties of the head-injured patient. Nonetheless, the authors concluded that the role of relatives' personality is not a dramatic one since subjective/emotional changes in the patient are still evident even when the relatives' personality is taken into account. If personality characteristics of the relative influence their assessment of the patient, such a bias would be expected to exaggerate all symptomatology - both emotional and physical. Although this does not appear to be the case in the present study, these results emphasize the need for caution in drawing causal inferences regarding patient characteristics and parental response.

Another pattern of interest concerned mothers who reported less psychosocial impairment than that of their offspring: these mothers reported more types of physical illness than mothers whose ratings accorded with the patient. The latter pattern of results - little or no depression but significant physical illness is consistent with a coping style based on denial, or somatization.

Analyses conducted for the fathers revealed a somewhat different pattern. As with the mothers, the extent of paternal-patient agreement on the SIP Physical scale was not associated with paternal mood, coping, or health status. On the other hand, agreement on the SIP Psychosocial scale was associated with aspects of the fathers adjustment and coping at the time of interview. First, fathers who perceived more psychosocial impairment than that perceived by their offspring, reported more emotional distress (and to a weaker degree, anxiety) than fathers in at least one of the other two groups.

A second, albeit weaker pattern emerged as well. Fathers who perceived less impairment relative to their offspring, obtained higher scores on the CHIP II subscale, reflecting a coping style that focusses on maintaining social support, self esteem, and psychological stability. Recall from the earlier discussion of the CHIP that the specific behaviors most often rated as helpful by fathers involved activies that temporarily removed them from home or care-taking responsibilities. As indicated above, this group of fathers also reported *less* anxiety and emotional distress than fathers in at least one of the other two groups.

The findings discussed above are significant in that they suggest that parental mood and emotional distress may be influenced by the degree to which parents and offspring agree with respect to the offspring's level of dysfunction. Since groups were formed using parents from the CHI, ORTHO, and CONTROL samples combined, the degree of parent-patient agreement was not simply due to lack of insight on the part of CHI patients, or exaggeration of relatives' reports. More detailed investigation of the nature of the parent-offspring discrepancy and its association with parental adjustment is called for.

Summary and Implications for Future Research

This study attempted to describe and evaluate parental adjustment, coping, and physical health in families with offspring who had sustained head injuries 2 - 4 years prior to interview. Based on previous research in the area, it was hypothesized that caring for, and living with, a head-injured offspring would place stress upon parents and that this would be reflected by an increased risk of mood disturbance, emotional distress, and physical illness. This hypothesis was not supported, as group comparisons failed to yield significant differences between parents of head-injured, orthodpedically-injured, and non-injured offsring.

Four reasons may be postulated to account for the discrepany between the results of the present study and those of earlier investigations:

1) All previous examinations of the impact of head injury on the family have reported on heterogenous samples of relatives. Yet evidence from a variety of sources suggests that the impact of the patient's injury on other family members may vary with the type of relationship that the intact member shares with

the patient (e.g., mothers versus wives) (Livingston et al., 1985a; Oddy et al., 1978b; Panting and Merry, 1972; Thomsen, 1974). As well, it is unclear from previous studies the extent to which the relative proportion of mothers, fathers, wives, or husbands in the samples under examination contributed to the overall findings of significant mood disturbance, subjective complaints, etc. in relatives living with a head-injured member. In the current study, results from post hoc correlational analyses suggested that mothers and fathers were differentially affected by their offsprings' injury. Thus the magnitude and pattern of relationships between patient characteristics and parental adjustment may vary with the proportion of females (i.e., mothers) in the sample. Consequently, these findings underscore the need for experimental designs that allow differential assessment of family members who vary in their relationship to the patient. Yet even in studies that have reported separate data for parents and spouses, sufficient demographic data have been lacking which enable determination of the degree to which these samples shared comparable educational and financial resources.

2) Variability within each of the parent samples may have compromised the ability to detect statistically

have compromised the ability to detect statistically significant group differences. This suggests that larger samples be used, and that future research should attempt to identify those subgroups of parents who are at particular risk for mood, adjustment, and health problems following an offspring's head injury.

3) In the present investigation, families were included only if the patient was living with, or cared for by, their parents. It may be that this selection criterion resulted in a biased sample - i.e., participating families may have represented households that were coping sufficiently well with the patient's head injury, or households whose coping patterns were consistent with participation in a study of this type. That is, this sample of parents may have been engaged in more adaptive and more efficacious coping efforts than parents who refused to participate. Alternatively, households in which the patient is still residing 2 - 4 years post-injury may represent more optimally functioning families than those in which the patient has left either voluntarily or subsequent to parental demands. Evaluation of family functioning and family environment characteristics in households with and without a residing head-injured offspring is clearly

an area worthy of future investigation. Furthermore, parents of families that continue to support or care for the patient may possess greater psychological resources than those in which the patient no longer resides. Detailed assessment of parental personality characteristics then, may also be a promising area for future research.

4) The length of post-injury follow-up may also be an important variable with respect to parental response and adjustment after an offspring's head-injury. While findings from several studies suggest that relatives attribute changes in the patient to their degree of emotional distress or subjective burden - particularly in the acute period post-injury (Bond, 1983; Oddy et al., 1978a; Livingston et al., 1985a), it may be that the relative contribution of the patients' status to family stress diminishes in time as other life events befall the family. Thus it may become more difficult to detect significant relationships between patients' status and parental adjustment at longer follow-up intervals. This suggests that serial longitudinal investigations may be helpful in distinguishing the relative impact of additional life events and stresses upon the adjustment of intact family members living with a

head-injured patient.

REFERENCES

Annegers, D.W., Grabow, J.D., Kurland, L.T., & Laws, E.R. (1980). The incidence, causes, and secular trends of head trauma in Olmsted County, Minnesota, 1935-1974. *Neurology*, *30*, 912-919.

Anthony, E.J. (1970). The impact of mental and physical illness on family life. *American Journal of Psychiatry*, *127(2)*, 138-146.

Beisser, A.R. (1979). Denial and affirmation in illness and in health. *American Journal of Psychiatry*, *136*, 1026-1030.

Bell, R.R. (1966). The impact of illness on family roles. In J.R. Folta & E.S. Deck (Eds.), *A sociological framework for patient care*. New York: John Wiley and Sons, Inc.

Bergner, M., Bobbitt, R.A., Pollard, W.E., Martin, D.P., & Gilson, B.S. (1976). The Sickness Impact Profile: Validation of a health status measure. *Medical Care*, *14*, 57-67.

Bergner, M., Bobbitt, R.A., Carter, W.B., & Gilson, B.S. (1981). The Sickness Impact Profile: Development and final revision of a health status measure. *Medical Care*, *15*, 787-805.

Bergner, M., & Gilson, B.S. (1980). The Sickness Impact Profile: The relevance of social science to medicine. In L. Eisenberg & A. Kleinman (Eds.), *The relevance of social science to medicine* (pp. 135-150). Holland: Reidel Publishing Co.

Biorn-Hansen, V. (1957). Social and emotional factors of aphasia. *Journal of Speech and Hearing Disorders*, *22(1)*, 53-59.

Bishop, D.S., Baldwin, L.M., Epstein, N.B., & Keitner, G. (1983). Assessment of family functioning. In C.V. Grange (Ed.). *Functional assessment in rehabilitation medicine*. Baltimore: Williams & Wilkins Company.

Bishop, D.S., Epstein, N.B., & Baldwin, L.M. (1981). Disability: A family affair. In D.S. Freeman & B. Trute (Eds.), *Treating families with special needs*. Ottawa, Ontario: Alberta Association of Social Workers & Canadian Association of Social Workers.

Blazyk, S. (1983). Developmental crisis in adolescents following severe head injury. *Social Work in Health Care*, *8(4)*, 55-67.

Bond, M.R. (1975). Assessment of the psychosocial outcome after severe head injury. *Ciba Foundation Symposium*, *34*, 141-157.

Bond, M.R. (1983). Effects on the family system. In M. Rosenthal, E.R. Griffith, M.R. Bond, & J.D. Miller (Eds.). *Rehabilitation of the head injured adult*. Philadelphia: F.A. Davis Company.

Borden, W.A. (1962). Psychological aspects of stroke: Patient and family. *Annals of International Medicine*, *57*, 689-692.

Brooks, D.N. (1976). Wechsler Memory Scale performance and its relationship to brain damage after severe closed head injury. *Journal of Neurology, Neurosurgery, and Psychiatry*, *39*, 593-601.

Brooks, D.N., & McKinlay, W. (1983). Personality and behavioral change after severe blunt head injury - a relatives's view. *Journal of Neurology, Neurosurgery, and Psychiatry*, *46*, 336-344.

Bruckner, P.E., & Randle, A.P.H. (1972). Return to work after severe head injuries. *Rheumatology and Physical Medicine*, *11(17)*, 344-348.

Bruning, J.L., & Kintz, B.L. (1977). *Computational handbook of statistics (2nd edition)*, Glenview, Illinois: Scott, Foresman and Company.

Burr, W.R. (1973). *Theory construction and sociology of the family*. New York:

Bursten, B. (1964). Family dynamics and illness behavior. *General Practitioner*, *29*, 142-145.

Bursten, B. (1965). Family dynamics, the sick role, and medical hospital admissions. *Family Process*, *4*, 206-215.

Carroll, B.J., Feinberg, M., Smouse, P.E., Rawson, S.G., & Greden, J.F. (1981). The Carroll Rating Scale for Depression: I. Development, reliability, and validation. *British Journal of Psychiatry*, *138*, 194-200.

Christopherson, V.A. (1960). Role modifications of the handicapped homemaker. *Rehabilitation Literature*, *21(4)*, 110-117.

Cleveland, M. (1979). Family adaptation to the traumatic spinal-cord injury of a son or daughter. *Social Work in Health Care*, *4*, 459-471.

Clifton, G.L., Grossman, R.G., Makela, M.E., Miner, M.E., Handel, S., & Sadhu, V. (1980). Neurological course and correlated computerized tomography findings after severe closed head injury. *Journal of Neurosurgery*, *52*, 611-624.

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*, 300-314.

Crain, A.J., Sussman, M.B., & Weil, W.B. (1966). Effects of a diabetic child on marital integration and related measures of family functioning. *Journal of Health and Human Behavior*, *7(2)*, 122-127.

Crewe, N.M., Athelstan, G.T., & Krumberger, J. (1979). Spinal cord injury: A comparison of pre-injury and post-injury marriages. *Archives of Physical Medicine and Rehabilitation*, *68*, 252-256.

Crocker, H.C., & Cullinane, M.M. (1972). Families under stress: The diagnosis of Hurler's syndrome. *Postgraduate Medicine*, *51(3)*, 223-229.

Croog, S.H., Lipson, A., & Levine, S. (1972). Help patterns in severe illness: The roles of kin network, non-family resources and institutions. *Journal of Marriage and the Family*, *34(1)*, 32-41.

Denny-Brown, D. (1945). Disability arising from closed head injury. The Journal of the American Medical Association, 127(8), 429-436.

Deutsch, C.P., Goldston, J.A. (1960). Family factors in home adjustment of the severely disabled. Marriage and Family Living, 22(4), 312-316.

Dhooper, S.S. (1983). Family coping with the crisis of heart attack. Social Work in Health Care, 9(1), 15-31.

Dikmen, S., Reitan, R.M., & Temkin, N.R. (1983). Neuropsychological recovery in head injury. Archives of Neurology, 40, 333-338.

Dorner, S. (1973). Psychological and social problems of families of adolsecent spina bifida patients: A preliminary report. Developmental Medicine and Child Neurology, 15(6), Supplement 29.

El-Ghatit, A.Z., & Hanson, R.W. (1975). Outcome of marriages existing at the time of male's spinal cord injury. Journal of Chronic Disease, 28, 383-388.

Epstein, N.B., Bishop, D.S., & Levin, S. (1978). The McMaster Model of Family Functioning. Journal of Marriage and Family Counseling, 4, 19-31.

Field, J.H. (1976). Epidemiology of head injuries in England and Wales: With particular application to rehabilitation. Leicester: Printed for H.M. Stationery Office by Willsons.

Fink, S.L., Skipper, J.K., & Hallenbeck, P.N. (1968). Physical disability and problems in marriage. Journal of Marriage and the Family, 30, 64-73.

Fodor, I. (1972). Improvement of memory functions after acute head injury. Journal of Neurology, Neurosurgery, and Psychiatry, 35, 818-824.

Fordyce, D., Roueche, J.R., & Prigatano, G.P. (1983). Enhanced emotional reactions in chronic head trauma patients. Journal of Neurology, Neurosurgery, and, Psychiatry, 46, 620-624.

Gartner, R.B., Fulmer, R.H., Weinshel, M., & Goldklank, S. (1978). The family life cycle: Developmental crises and their structural impact on families in a community mental health center. *Family Process*, *17*, 47-58.

Goldstein, V., Regnery, G., & Wellin, E. (1981). Caretaker role fatigue. *Nursing Outlook*, *29*, 24-30.

Gronwall, D., & Wrightson, P. (1974). Delayed recovery of intellectual function after minor head injury. *Lancet*, 1, 605-609.

Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, *32*, 50-53.

Hamilton, M. (1967). Development of a rating scale for primary depressive illness. *British Journal of Psychiatry*, *6*, 278-296.

Hawthorne, V.M. (1978). Epidemiology of head injuries. *Scottish Medical Journal*, *23*, 92.

Hill, R. (1949). *Families under stress*. New York: Harper and Row.

Hill, R. (1965). Generic features of families under stress. In H.J. Parad (Ed.), *Crisis intervention*. New York: Family Service Association of America.

Hinkle, L.E. (1974). The concept of "stress" in the biological and social sciences. *International Journal of Psychiatry in Medicine*, *5*, 335-357.

Holmes, T.H., & Rahe, R.H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research*, *11*, 213-218.

Hpay, H. (1971). Psychosocial effects of severe head injury. *Proceedings of an International Symposium on Head Injuries* (pp. 110-121), Edinburgh: Churchill Livingstone.

Humphrey, M., & Oddy, M. (1978). The social costs of head injury. *New Society*, *3(1)*, 452-453.

Jackson, R.W. (1972). Sex rehabilitation after cord injury. *Paraplegia*, *10*, 50-55.

Jacobs, H.E. (1984). The family as a therapeutic agent: Long term rehabilitation for traumatically injury patients. Unpublished manuscript.

Jennett, B. (1975). Who cares for head injuries? *British Medical Journal*, *iii*, 267-270.

Kalsbeek, W.D., McLaurin, R.L., Harris, B.S.H., & Miller, J.D. (1980). The national head and spinal cord injury survey: Major findings. *Journal of Neurosurgery*, *53*, S19-S31.

Kaplan, D.M., Smith, A., Grobstein, R., & Fischman, S.E. (1973). Family mediation of stress. *Social Work*, *18(4)*, 60-69.

Kapust, L.R. (1982). Living with dementia: The ongoing funeral. *Social Work in Health Care*, *7(4)*, 79-91.

Kerr, T.A., Kay, D.W.K., & Lassman, L.P. (1971). Characteristics of patients, type of accident, and mortality in a consecutive series of head injuries admitted to a neurosurgical unit. *British Journal of Preventative and Social Medicine*, *25*, 179-185.

Kinsella, G.J., & Duffy, F.D. (1979). Psychosocial readjustment in the spouses of aphasic patients. *Scandinavian Journal of Rehabilitation Medicine*, *11*, 129-132.

Klauber, M.R., Barrett-Connor, E., Marshall, L.F., & Bower, S.A. (1981). The epidemiology of head injury: A prospective study of an entire community - San Diego County, California, 1978. *American Journal of Epidemiology*, *113*, 500-509.

Klonoff, P.S. (1984). *Quality of life in patients with closed head injury: A comparison of patients with and without frontal lobe damage*. Unpublished doctoral dissertation. University of Victoria, Victoria, B.C.

Klonoff, P. & Prigatano, G.P. (in press). Reactions of family members in clinical intervention after traumatic brain injury. In M. Yvisaker & E.M. Gobble (Eds.), _Adult head injury rehabilitation: Community re-entry_. San Diego: College Hill Press.

Kramer, C.Y. (1956). Extension of multiple range tests to group means with unequal numbers of replications. _Biometrics_, _12_, 307-310.

Laird, J., & Allen, J.A. (1983). Family theory and practice. In A Rosenblatt and D. Waldfogel (Eds.), _Handbook of clinical social work_. San Francisco: Jossey-Bass Publishers.

Levin, H.S., Benton, A.L., & Grossman, R.G. (1982). _Neurobehavioral Consequences of closed head injury_. New York: Oxford University Press.

Levin, H.S., Grossman, R.G., & Kelly, P.J. (1976). Short-term recognition memory in relation to severity of head injury. _Cortex_, _12_, 175-182.

Lewin, W., Marshall, T.F.D.C., & Roberts, A.H. (1979). Long term outcome after severe head injury. _British Medical Journal_, 1535-1538.

Lezak, M.D. (1978). Living with the characterologically altered brain injured patient. _Journal of Clinical Psychiatry_, _39_, 592-598.

Lezak, M.D. (1979). Recovery of memory and learning functions following traumatic brain injury. _Cortex_, _15_, 63-72.

Lezak, M.D., Cosgrove, J., O'Brien, K., & Wooster, N. (1980, February). _Relationships between personality disorders, social disturbances, and physical disability following traumatic brain injury_. Paper presented at the Eighth Annual Meeting of the International Neuropsychological Society, San Francisco, CA.

Lindeman, R.H., Merenda, P.F., & Gold, R.Z. (1980). _Introduction to bivariate and multivariate analysis_. Glenview, Illinois: Scott, Foresman and Company.

Lishman, W.A. (1973). The psychiatric sequalae of head injury: A review. Psychological Medicine, 3, 304-318.

Litman, T.J. (1974). The family as a basic unit of health and medical care: A social-behavioral overview. Social Science and Medicine, 8, 495-519.

Livingston, M.G., Brooks, D.N., & Bond, M.R. (1985a). Three months after severe head injury: Psychiatric and social impact on relatives. Journal of Neurology, Neurosurgery, and Psychiatry, 48, 870-875.

Livingston, M.G., Brooks, D.N., & Bond, M.R. (1985b). Patient outcome in the year following severe head injury and relatives' psychiatric and social functioning. Journal of Neurology, Neurosurgery, and, Psychiatry, 48, 876-881.

Livsey, C.G., (1972). Physical illness and family dynamics. Advances in Psychosomatic Medicine, 8, 237-251.

Lockart, P.P. (1969). II. Social aspects of rehabilitation: The role of the social worker. Injury, 1, 147-150.

London, P.S. (1967). Some observations on the course of events after severe injury of the head. Annals of the Royal College of Surgeons of England, 41, 460-467.

London, R.W., & Smith, B. (1982). Living with chronicity; The family as a psychological reality. The Australian Journal of Clinical Hypnotherapy and Hypnosis, 3(2), 97-109.

Luterman, D. (1985). The denial mechanism. Ear and Hearing, 6, 57-58.

Mandleberg, I.A., & Brooks, D.N. (1975). Cognitive recovery after severe head injury: I. Serial testing on the WAIS. Journal of Neurology, Neurosurgery, and Psychiatry, 38, 1121-1126.

Mauss-Clum, N., & Ryan, M. (1981). Brain injury and the family. Journal of Neurosurgical Nursing, 13, 165-169.

Maybury, C.P., & Brewin, C.L. (1984). Social relationships, knowledge and adjustment to multiple sclerosis. Journal of Neurology, Neurosurgery, and Psychiatry, 47, 372-376.

Mayo, J.A., O'Connell, R.A., & O'Brien, J.D. (1979). Families of manic-depressive patients: Effect of treatment. American Journal of Psychiatry, 136, 1535-1539.

McCubbin, H.I., Joy, C.B., Cauble, A.E., Comeau, J.K., Patterson, J.M., & Needle, R.H. (1980). Family stress and coping: A decade review. Journal of Marriage and the Family, 42, 855-871.

McCubbin, H.I., McCubbin, M., & Nevin, R.S. (1983). CHIP: Coping Health Inventory for Parents. Madison, WI: University of Wisconsin-Madison.

McCubbin, H.I., McCubbin, M.A., Patterson, J.M., Cauble, A.E., Wilson, L.R., Warwick, W. (1983). CHIP: Coping Health Inventory for Parents: An assessment of parental coping patterns in the care of the chronically ill child. Journal of Marriage and the Family, 45, 359-370

McCubbin, H.I., & Patterson, J.M. (1981). Systematic assessment of family stress, resources and coping: Tools for research, education, and clinical intervention. St. Paul, MN: University of Minnesota.

McCubbin, H.I. & Patterson, J. (1983a). The family stress process: The double ABCX model of adjustment and adaptation. Marriage and Family Review, 6(1/2), 7-37.

McCubbin, H.I., & Patterson, J.M. (1983b). Stress: The Family Inventory Of Life Events and Changes. In E. Filsinger (Ed.). Marriage and family assessment: A sourcebook for family therapy. Beverly Hills, CA.

McCubbin, H.I., Patterson, J.M., & Wilson, L.R. (1981). *FILE: Family Inventory of Life Events and Changes*. St. Paul, MN: University of Minnesota.

McKinlay, W.W., & Brooks, D.N. (1984). Methodological problems in assessing psychosocial recovery following severe head injury. *Journal of Clinical Neuropsychology*, *6*, 87-99.

McLean, A., Dikmen, S., Temkin, N., Wyler, A.R., & Gale, J.L. (1984). Psychosocial functioning at 1 month after head injury. *Neurosurgery*, *14*, 393-399.

McSweeney, A.J., Grant, I., Heaton, R.K., Adams, K.M., & Timms, R.M. (1982). Life quality of patients with chronic obstructive pulmonary disease. *Archives of Internal Medicine*, *142*, 473-478.

Merskey, H., & Woodforde, J.M. (1972). Psychiatric sequelae of minor head injury. *Brain*, *95*, 521-528.

Molumphy, S.D., & Sporakowski, M.J. (1984). The family stress of hemodialysis. *Family Relations*, *33*, 33-39.

Moos, R.H. (1974). Psychological techniques in the assessment of adaptive behavior. In G. Coelho, D.A. Hamburg, & J.E. Adams (Eds.), *Coping and adaptation*. New York: Basic Books.

Moos, R.H., & Moos, B.S. (1981). *Family Environment Scale: Manual*. Palo Alto, CA: Consulting Psychologists Press, Inc.

Nasr, S.J., Altman, E.G., Rodin, M.B., Jobe, T.H., & Burg, B. (1984). Correlation of the Hamilton and Carroll Depression rating scales: A replication study among psychiatric outpatients. *Journal of Clinical Psychiatry*, *45*, 167-168.

New, P.K., Ruscio, A.T., Priest, R.P., Petritsi, D., & George, L.A. (1968). The support structure of heart and stroke patients: A study of the role of significant others in patient rehabilitation. *Social Science and Medicine*, *2*, 185-200.

Newcombe, F. (1982). The psychological consequences of closed head injury: Assessment and rehabilitation. *Injury*, *14*, 111-136.

O'Brien, K.P. (1981). Factorial structure of the Hamilton Rating Scale for Depression. Unpublished master's thesis, Portland State University, Portland, Oregon.

Oddy, M., & Humphrey, M. (1980). Social recovery during the year following severe head injury. Journal of Neurology, Neurosurgery, and Psychiatry, 43, 798-802.

Oddy, M., Humphrey, M., & Uttley, D. (1978a). Stresses upon the relatives of head-injured patients. British Journal of Psychiatry, 133, 507-513.

Oddy, M., Humphrey, M., & Uttley, D. (1978b). Subjective impairment and social recovery after head injury. Journal of Neurology, Neurosurgery, and Psychiatry, 41, 611-616.

Olson, D.H. (1975). Chapter 1: A critical overview. In A.S. Gurman & D.G. Rice (Eds.), Couples in conflict (pp.32-37). New York: Jason Aronson.

Olson, D.H., McCubbin, H.I., Barnes, H., Larsen, A., Muxen, M., & Wilson, M. (1983). Families: What makes them work. Beverly Hills, CA: Sage Publications.

Palmer, S.E., Canzona, L., & Wai, L. (1982). Helping families respond effectively to chronic illness: Home dialysis as a case example. Social Work in Health Care, 8(1), 1-14.

Parad, H.J., & Caplan, G. (1965). A framework for studying families in crisis. In H.J. Parad (Ed.), Crisis intervention. New York: Family Service Organization.

Parsons, T. (1951). Illness and the role of the physician: A sociological perspective. American Journal of Orthopsychiatry, 21, 452-460.

Panting, A., & Merry, P.H. (1972). The long-term rehabilitation of severe head injuries with particular reference to the need for social and medical support for the patient's family. Rehabilitation (Stuttgart), 38, 33-37.

Patterson, J.M., & McCubbin, H.I. (1984). Gender roles and coping. *Journal of Marriage and the Family*, *46*, 95-104.

Pollard, W.E., Bobbitt, R.A., Bergner, M., Martin, D.P., and Gilson, B.S. (1976). The Sickness Impact Profile: Reliability of a health status measure. *Medical Care*, *14*, 146-155.

Rahe, R.H. (1968). Life change measurement as a predictor of illness. *Proceedings of the Royal Society of Medicine*, *61*, 44-46.

Reiss, D., Costell, R., Jones, C., & Berkman, H. (1980). The family meets the hospital. *Archives of General Psychiatry*, *37*, 141-157.

Rimel, R.W., Giordani, B., Barth, J.T., Boll, T.J., & Jane, J. (1981). Disability caused by minor head injury. *Neurosurgery*, *9(3)*, 221-228.

Rimel, R.W., Giordani, B., Barth, J.T., & Jane, J.(1982). Moderate head injury: Completing the clinical spectrum of brain trauma. *Neurosurgery*, *11(3)*, 344-351.

Robbins, D.R., Alessi, N.E., Colfer, M.V., & Yanchyshyn, G.W. (1985). Use of the Hamilton Rating Scale for Depression and the Carroll Self-Rating scale in adolescents. *Psychiatry Research*, *14*, 123-129.

Romano, M. (1974). Family response to traumatic head injury. *Scandinavian Journal of Rehabilitation Medicine*, *6*, 1-4.

Rosenbaum, M., & Najenson, T. (1976). Changes in life patterns and symptoms of low mood as reported by wives of severely brain-injured soldiers. *Journal of Consulting and Clinical Psychology*, *44*, 881-888.

Rosin, A.J. (1977). Reactions of families of brain-injured patients who remain in a vegetative state. *Scandinavian Journal of Rehabilitation Medicine*, *9*, 1-5.

Ross, E.D. (1984). Right hemisphere's role in language, affective behavior, and emotion. *Trends in Neurosciences*, *7*, 342-245.

Russell, W.R. (1971). *The traumatic amnesias*. London: Oxford University Press.

Russell, W.R., & Smith, A. (1961). Post-traumatic amnesia in closed head injury. *Archives of Neurology*, *5*, 16-29.

Schacter, D.L., & Crovitz, H.F. (1977). Memory function after closed head injury: A review of the quantitative research. *Cortex*, *13*, 150-176.

Selye, H. (1966). The stress syndrome. In J.R. Folta & E.S. Deck (Eds.) *A sociological framework for patient care*. New York: John Wiley & Sons, Inc.

Shapiro, J. (1983). Family reactions and coping strategies in response to the physically ill or handicapped child: A review. *Social Science and Medicine*, *17*, 913-931.

Siegel, S. (1956). *Nonparametric statistics for the social sciences*. New York: McGraw-Hill Book Co.

Sluzki, C.E. (1983). Process, structure, and world view: Toward an integrated view of systemic models in family therapy. *Family Process*, *22*, 469-476.

Snaith, R.P., Baugh, S.J., Clayden, H.D., Husain, A., & Sipple, M.A. (1982). The Clinical Anxiety Scale: An instrument derived from the Hamilton Anxiety Scale. *British Journal of Psychiatry*, *141*, 518-523.

Snaith, R.P., & Taylor, C.M. (1985). Rating scales for depression and anxiety: A current perspective. *British Journal of Clinical Pharmacology*, *19*, 175-205.

Stampp, M. (1984, July). *Assessment of quality of life following head injury: A comparison of patient and relative ratings on the Katz Adjustment Scale and the Sickness Impact Profile*. Paper presented at the 13th annual meeting of the International Neuropsychological Society, San Diego, CA.

Sugarbaker, P.H., Barofsky, I., Rosenberg, S.A., & Gianola, F.J. (1982). Quality of life assessment of patients in extremity sarcoma clinical trials. *Surgery*, *91*, 17-23.

Thomsen, I.V. (1974). The patient with severe head injury and his family: A follow-up study of 50 patients. *Scandinavian Journal of Rehabilitation Medicine*, *6*, 180-183.

Thomsen, I.V. (1975). Evaluation and outcome of aphasia in patients with severe closed head trauma. *Journal of Neurology, Neurosurgery, and Psychiatry*, *38*, 713-718.

Todd, J., & Satz, P. (1980). The effects of long-term verbal memory deficits: A case study of an adolescent and his family. *Journal of Marital and Family Therapy*, *6*, 431-438.

Tyerman, A., & Humphrey, M. (1984). Changes in self-concept following severe head injury. *International Journal of Rehabilitation Research*, *7*, 11-23.

Vadasy, P.F., Fewell, R.R., Meyer, D.J., & Schell, G. (1984). Siblings of handicapped children: A developmental perspective on family interactions. *Family Relations*, *33*, 155-167.

van Zomeren, A.H., & Deelman, B.G. (1978). Long-term recovery of visual reaction time after closed head injury. *Journal of Neurology, Neurosurgery, and Psychiatry*, *41*, 452-457.

Watzlawick, P., & Coyne, J.C. (1980). Depression following stroke: Brief, problem-focused family treatment. *Family Process*, *19*, 13-18.

Weller, D.J., & Miller, P.M., (1977). Emotional reactions of patient, family, and staff in acute-care period of spinal cord injury: Part 2. *Social Work in Health Care*, *3*, 7-17.

Winer, B.J. (1971). *Statistical principles in experimental design (2nd Ed.)*. San Francisco, CA: McGraw-Hill.

Wolf, H.G., & Goodell, H. (1968). *Stress disease (2nd Ed.)*. Springfield, Illinois: C.C. Thomas.

Yanchyshyn, G.W., & Robbins, D.R. (1983). The assessment of depression in normal adolescents: A comparison study. *Canadian Journal of Psychiatry*, *28*, 512-526.

FOOTNOTES

[1] The three medical facilities that participated in the current study were: Emanuel Hospital (EH), Portland, Oregon; Good Samaritan Hospital and Medical Center (GSH), Portland, Oregon; and Kaiser Permanente Center for Health Research (KPCHR), Portland, Oregon.

[2] One CHI patient was a student who normally lived on campus at a local college. However, he kept in frequent contact with his parents and occasionally resided with them. At the time of interview, he had been living with his parents continually for approximately 24 days - just a few days short of the 30-day minimum. For this reason he was admitted to the study.

[3] Although detailed medical data was obtained from participants (both patients and parents), thorough questioning as regards the physical health of other family members was not possible due to time constraints. Consequently, only general information was obtained as to history of head or orthopedic injury in other family members.

[4] In the CONTROL group, no participating offspring had suffered a major fracture within 48 months of interview; however, one participant had suffered a fractured shoulder within 36 - 48 months of interview but denied any residual problems associated with this injury.

[5] In most cases, Glasgow Coma Scale (GCS) scores were obtained from the patient's medical records based on ratings from hospital or emergency care personnel. In some cases, scores were missing and these were estimated by the examiner based on information provided in the medical records, as well as information provided from the parent(s).

[6] Preliminary analyses of the EDI indicate that it possesses good internal consistency. Separate analyses for the mothers' and fathers' samples yielded Cronbach alphas of .81 and .83, respectively.

[7] Unlike the canonical correlation analyses that included cases only for which complete data were obtained, the intercorrelation matrices used in the Supplemental analyses included any case for which complete data was available for any particular pair of variables.

Appendix A

Family Function - Current Conceptualizations

It has been proposed that theories of family functioning may be classified into two philosophically distinct categories - the mechanistic and the organismic models (Ritterman, 1977 cited in Laird & Allen, 1983). The mechanistic model has been described as "a closed-system, nonholistic model based on linear or deterministic views of causality" (Laird & Allen, 1983, p. 176). Characteristic of this approach is an emphasis upon the individual as patient and primary focus of intervention, and the assumption that a person's behavior is determined by environmental factors (Kerr, 1981 cited in Shapiro, 1983). The organismic model on the other hand, may be described as an open-system, holistic model based on reciprocal (i.e., bidirectional) causality (Laird & Allen, 1983; Shapiro, 1983). The organismic approach, as manifested in family systems theory, focuses attention on the *relationships* between family members; individual members are not studied in isolation, but in the context of the whole family (Bavelas & Segal, 1982). Although there is at present no integrated body of knowledge or universally accepted model of the family, several authors have suggested that at present, the general systems theory represents the primary paradigm for several major orientations to family therapy (Laird & Allen, 1983; Sluzki, 1983). More specifically, it has been argued that seemingly disparate models may be viewed as "translations" of the more general systems paradigm into hypothese and components believed to be relevant to a particular "school" or type of family therapy (Sluzki, 1983).

Since family systems theory appears to be an important development in the conceptualization of family processes and dynamics and potentially useful in generating novel approaches to family intervention and treatment, it seems appropriate to highlight general details and assumptions of this view:

1. each member of the family is interdependent upon the other.
2. one cannot understand an individual member without considering the entire family.
3. family functioning is more than simply the sum of its individual members.
4. the structure and organization of the family are important in determining the behavior of its members.
5. transactional patterns are instrumental in shaping

behavior within the family (Bavelas & Segal, 1982; Epstein, Bishop, & Levin, 1978; Laird & Allen, 1983; Shapiro, 1983).

In a practical sense, a family systems view compels us to consider the possibility that marked changes in the intellectual, behavioral, and/or emotional status of one member may have significant consequences for the entire family. It is from this perspective that the current investigation has approached parental adjustment and coping after head injury.

Appendix B

International Classification of Diseases (9th Revision)

Diagnostic Codes Used in Patient Selection for Study

Group	Codes	Description
CHI:	850	Concussion
	851	Cerebral laceration and contusion
	852	Subaarachnoid, subdural and extradural hemorrhage, following injury
	853	Other and unspecified intracranial hemorrhage following injury
	854	Intracranial injury of other and unspecified nature
	800	Fracture of vault of skull
	801	Fracture of base of skull
	802	Fracture of face bones
	803	Other and unqualified skull fractures
	804	Multiple fractures involving skull or face with other bones
ORTHO:	808	Fracture of pelvis
	810	Fracture of clavicle
	811	Fracture of scapula
	812	Fracture of humerus
	813	Fracture of radius and ulna
	818	Ill-defined fractures of upper limb
	819	Multiple fractures involving both upper limbs, and upper limb with rib(s) ad sternum
	820	Fracture of neck of femur
	821	Fracture of other and unspecified parts of femur
	823	Fracture of tibia and fibula
	824	Fracture of ankle
	827	Other, multiple and ill-defined fractures of lower limb
	828	Multiple fracture involving both lower limbs, lower with upper limb, and lower limb(s) with rib(s) and sternum
	829	Fracture of unspecified bones
	887	Truamatic amputation of arm and hand (complete) (partial)
	896	Truamatic amputation of foot (complete) (partial)
	897	Traumatic amputation of leg(s) (complete) (partial)

Appendix C

Table C-1

Participant Recruitment - All Hospitals

A) Number of Head Injury Cases Identified . . = 588

B) Number of cases excluded after chart review[1] = 358

C) Number of letters sent . . . . = 230

1. Number of eligible families interviewed = 53
2. Number of families that refused . . = 40
3. Return Rate (53/93) . . . . = 57.0%
4. Number of families excluded after letter = 137

D) Disposition of excluded families (B + C4) (n=495):

1. Not living with parent(s) . . . . = 205
2. Unable to locate . . . . = 61
3. Living out of catchment area . . . . = 22
4. Medical exclusion[2] . . . . = 65
5. Deceased . . . . = 54
6. Miscellaneous[3] . . . . = 37
7. Missing Charts . . . . = 7
8. "MILD" CHI cases from KPCHR not used . . = 44

---

[1] Cases not meeting selection criteria (see D: 1 to 8) or lacking current address and telephone number.

[2] Includes pre-existing psychiatric conditions, prior brain injury/surgery, questionable or no CHI, severe spinal cord injury, or chronic illness/disability.

[3] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-1 (Continued)

A) Number of ORTHO Cases Identified . . . . = 688

B) Number of cases excluded after chart review = 191

C) Number of letters sent . . . . = 154

1. Number of eligible families interviewed. = 28
2. Number of families that refused . . . = 34
3. Return Rate (28/62)[1] . . . . = 45.2%
4. Number of families excluded after letter = 92

D) Disposition of excluded families (B + C4) (n=283):

1. Not living with parent(s) . . . . = 135
2. Unable to locate . . . . = 55
3. Living out of catchment area . . . . = 15
4. Medical exclusion[2] . . . . = 60
5. Deceased: . . . . = 5
6. Miscellaneous[3] . . . . = 13
7. Missing Charts . . . . = 3

---

[1] Computed as follows: # interviewed / (# interviewed + # refused

[2] Includes pre-existing psychiatric condition, prior brain injury/surgery, questionable CHI, severe spinal cord injury, or chronic illness/disability.

[3] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-1 (Continued)

Participant Recruitment - CONTROLS

A) Number of CONTROL Families Identified[1] . . = 49

B) Number of letters sent. . . . . = 49

1. Number of eligible families interviewed . = 21[2]
2. Number of families that refused . . . = 21
3. Participation Rate (21/42)[3] . . . . . . =50.0%
4. Number of families excluded after letter. = 7

C) Disposition of excluded families (n=7):

1. Living out of catchment area . . . . . = 3
2. Offspring suffered a CHI, or ORTHO injury within last 3 years, or reports injury-related problems . . . . = 4

---

[1] Represents families whose names were provided by CHI (N=6), ORTHO (N=2), as well as other CONTROL participants (41).

[2] Five families with a female participant were later excluded by a random procedure to insure that the male-to-female ratio was comparable to the CHI and ORTHO groups.

[3] Computed as follows: # interviewed / (# interviewed + # refused).

Table C-2

Participant Recruitment - Emanuel Hospital

A) Number of CHI Cases Identified . . . . . = 321

B) Number of cases excluded after chart review = 152

C) Number of letters sent (Certified Mail) . = 169

1. Number of eligible families interviewed = 46
2. Number of families who refused . . . . = 30
3. Return Rate (46/76) . . . . = 60.5%
4. Number of families excluded after letter = 93

D) Disposition of excluded families (B + C4) (n=245):

1. Not living with parents . . . . = 107
2. Unable to locate . . . . = 43
3. Living out of catchment area . . . . . = 16
4. Medical exclusion[1] . . . . = 20
5. Deceased: . . . . = 48
6. Miscellaneous[2]. . . . . = 9
7. Missing Charts . . . . = 2

---

[1] Includes pre-existing psychiatric condition, prior brain injury/surgery, questionable or no CHI, severe spinal cord injury, or chronic illness/disability.

[2] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-2 (Continued)

A) Number of ORTHO Cases Identified. . . . . = 187

B) Number of cases excluded after chart review = 95

C) Number of letters sent (Certified Mail) . = 92

1. Number of eligible families interviewed = 17
2. Number of families who refused . . . . = 18
3. Return Rate (17/35) . . . . = 48.6%
4. Number of families excluded after letter = 57

D) Disposition of excluded families (B + C4) (n=152):

1. Not living with parents . . . . = 77
2. Unable to locate . . . . = 40
3. Living out of catchment area . . . . . = 9
4. Medical exclusion[1] . . . . = 15
5. Deceased . . . . = 2
6. Miscellaneous[2]. . . . . = 6
7. Missing Charts . . . . = 3

---

[1] Includes pre-existing psychiatric condition, prior brain injury/surgery, questionable CHI, severe spinal cord injury, or chronic illness/disability.

[2] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-3

Participant Recruitment - Good Samaritan Hospital and Medical Center

A) Number of Head Injury Cases Identified . . = 83

B) Number of cases excluded after chart review . = 39

C) Number of letters sent (Certified Mail) . . = 44

1. Number of eligible families interviewed = 4
2. Number of families who refused . . . = 5
3. Return Rate (4/9) . . . . = 44.4%
4. Total excluded after letter sent. . . = 35

D) Disposition of excluded families (B + C4) (n=74)

1. Not living with parents. . . . . = 44
2. Unable to locate . . . . = 17
3. Living out of catchment area . . . . . . = 2
4. Medical exclusion[1] . . . . = 7
5. Deceased: . . . . = 4
6. Miscellaneous[2] . . . . = 0
7. Missing Charts . . . . = 0

---

[1] Includes pre-existing psychiatric condition, prior brain injury/surgery, questionable or no CHI, severe spinal cord injury, or chronic illness/disability

[2] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-3 (Continued)

A) Number of ORTHO cases identified . . . . = 86

B) Number of cases excluded after chart review = 36

C) Number of letters sent . . . . = 50

1. Number of eligible families interviewed = 11
2. Number of families who refused . . . = 13
3. Return Rate (11/24) . . . . = 45.8%
4. Number of families excluded after letter = 26

D) Disposition of excluded families (B + C4) (n=62):

1. Not living with parents . . . . = 36
2. Unable to locate . . . . = 11
3. Living out of catchment area . . . . . . = 5
4. Medical exclusions[1] . . . . = 8
5. Deceased . . . . = 1
6. Miscellaneous[2]. . . . . = 1
9. Missing Charts . . . . = 0

---

[1] Includes pre-existing psychiatric conditions, prior brain injury/surgery, questionable CHI, severe spinal cord injury, or chronic illness/disability.

[2] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-4

Participant Recruitment - Kaiser Permanente Center for Health Research

A) Number of Head Injured Cases Identified . . = 184

B) Number of cases excluded after chart review = 167

C) Number of letters sent (Regular Mail) . . = 17

1. Number of eligible families interviewed = 3
2. Number of families that refused . . = 5
3. Return Rate (3/8) . . . . = 37.5%
4. Number of families excluded after letter = 9

D) Disposition of excluded families (B + C4) (n=176):

1. Not living with parents . . . . = 54
2. Unable to locate . . . . = 1
3. Living out of catchment area . . . . = 4

4 Medical exclusion[1] . . . . = 38

5. Deceased . . . . = 2
6. Miscellaneous[2] . . . . = 28
9. Missing Charts . . . . = 5
10. "MILD" CHI cases (no letter sent) . . . = 44

---

[1] Includes pre-existing psychiatric conditions, prior brain injury/surgery, questionable or no CHI, severe spinal cord injury, or chronic illness/disability.

[2] Includes non-English speakers, families in which a member died in patient's accident, etc.

Table C-4 (Continued)

A) Number of ORTHO Cases Identified . . . . . = 75

B) Number of cases excluded after chart review = 63

C) Number of letters sent (Regular Mail) . . = 12

1. Number of eligible families interviewed = 0
2. Number of families that refused . . = 3
3. Return Rate (0/3) . . . . = --%
4. Number of families excluded after letter = 9

D) Disposition of excluded families (B + C4) (n=72)

1. Not living with parents . . . . = 22
2. Unable to locate . . . . = 4
3. Living out of catchment area . . . . = 1
4. Medical Exclusion[1] . . . . = 37
5. Deceased . . . . = 2
6. Miscellaneous[2] . . . . = 6
7. Missing Charts . . . . = 0

---

[1] Includes pre-existing psychiatric conditions, prior brain injury/surgery, questionable CHI, severe spinal cord injury, or chronic illness/disability.

[2] Includes non-English speakers, families in which a member died in patient's accident, etc.

Appendix D

Letters to Participants

Emanuel Hospital
A HealthLink Member

3001 N. Gantenbein Avenue
Portland, Oregon 97227
(503) 280-3347

Clinical Psychology
Emanuel Rehabilitation Center

Gregory T. Smith, Ph.D.
Ronald D. Duvall, Ph.D.
Elaine Greif, Ph.D.
Diane K. Pierce, Ph.D.
David R. Gostnell, Ph.D.

Dear _________:

Emanuel Hospital has arranged to participate in a study being performed to evaluate family adjustment and coping after accidental injury - specifically to the head or limbs. Although several books and published studies indicate that many families face some general difficulty follwoing a family member's injury, little is known about specific ways in which family members cope. In addition, not much is known of the affect that long-term coping has on the general mental and physical well-being of family members. It is the purpose of this investigation to examine these important areas in greater detail and to gain a greater understanding of the problems families with an accidentally-injured member must face. It is hoped that the results of such a study would allow us to explore ways in which patient care, and support for those providing it, can be improved.

Your involvement with this research will be strictly voluntary. If you choose to help out, you will participate in a brief interview and be requested to fill out some questionnaires. You will not be exposed to any hazardous or painful procedures and your consent will be requested before any information is obtained. You may withddraw from the study at any time. All information that you provide will kept strictly confidential, including from family members.

This letter is to introduce Kevin O'Brien, Ph.D. candidate from the University of Victoria who will be the primary researcher for this project at Emanuel Hospital. He will contact you by telephone after you have had time to review the enclosed information to determine if you are willing to participate in this project.

The total time committment of the interview and questionnaires will require about 2 1/2 hours of your time. Mr. O'Brien would like to meet wih you and one parent (both if living in same household) as well as with at least one brother or sister over the age of 12 (if liiving in same household). Ideally, he would like to see all participating members in the same visit; however, he can make any arrangement that is agreeable to you, such as meeting in your home, at work, or over the week-end. At the end of the visit he will be happy to discuss any questions you may have concerning the purpose of the study, or isses raised by the interview or inventories.

We certainly hope that you will find this study of interest and that you will choose to become involved. We look forward to receiving the results of Mr. O'Brien's research and to sharing them with you.

You may address any questions you may have to Mr. O'Brien at 280-3347 or myself at 280-3347.

Sincerely,

Elaine Greif, Ph.D.

Good Samaritan Hospital & Medical Center

Dear ________:

Good Samaritan Hospital has arranged to participate in a study being performed to evaluate family adjustment and coping after head injury. Although several books and published studies indicate that many families face some general difficulty follwoing a family member's injury, little is known about specific ways in which family members cope. In addition, not much is known of the affect that long-term coping has on the general mental and physical well-being of family members. It is the purpose of this investigation to examine these important areas in greater detail and to gain a greater understanding of the problems families with a head-injured member must face. It is hoped that the results of such a study would allow us to explore ways in which patient care, and support for those providing it, can be improved.

Your involvement with this research will be strictly voluntary. If you choose to help out, you will participate in a brief interview and be requested to fill out some questionnaires. You will not be exposed to any hazardous or painful procedures and your consent will be requested before any information is obtained. You may withddraw from the study at any time. All information that you provide will kept strictly confidential, including from family members.

This letter is also to introduce Good Samaritans's designated researcher, Kevin O'Brien, Ph.D. candidate from the University of Victoria. We have asked him to contact you by telephone after you have had time to review the enclosed information to determine if you are willing to participate in this project.

The total time committment of the interview and questionnaires will require about 2 hours of your time. Mr. O'Brien would like to meet wih you and one parent (both if living in same household) as well as with at least one brother or sister over the age of 12 (if liiving in same household). Ideally, he would like to see all participating members in the same visit; however, he can make any arrangement that is agreeable to you, such as meeting in your home, at work, or over the week-end. At the end of the visit he will be happy to discuss any questions you may have concerning the purpose of the study, or isses raised by the interview or inventories.

We certainly hope that you will find this study of interest and that you will choose to become involved. We look forward to receiving the results of Mr. O'Brien's research and to sharing them with you.

You may address any questions you may have to Mr. O'Brien at 229-7214 or myself at 229-7183.

Sincerely,

J.H. Kennedy, M.D.

An Episcopal Hospital of the Diocese of Oregon • 1015 N.W. Twenty-Second Avenue • Portland, Oregon 97210 • Phone (503) 229-7711

KAISER PERMANENTE

Dear ________:

The Center for Health Research is participating in a study being performed to evaluate family adjustment and coping after accidental injury - specifically to the head or limbs. Although several books and published studies indicate that many families face some general difficulty following a family member's injury, little is known about specific ways in which family members cope. In addition, not much is known of the affect that long-term coping has on the general mental and physical well-being of family members. It is the purpose of this investigation to examine these important areas in greater detail and to gain a greater understanding of the problems families with an accidentally-injured member must face. It is hoped that the results of such a study will provide information that will ultimately contribute to better patient care, and support for those providing it.

Your involvement with this research will be strictly voluntary. If you choose to help out, you will participate in a brief interview and be requested to fill out some questionnaires. You will not be exposed to any hazardous or painful procedures and your consent will be requested before any information is obtained. You may withdraw from the study at any time. All information that you provide will kept strictly confidential, including from other family members.

This study is being conducted by Mr. Kevin O'Brien, Ph.D. candidate from the University of Victoria. He will contact you by telephone after you have had time to review this information to determine if you are willing to participate in this project. Your medical health care or your health insurance will not be affected by whether or not you choose to participate in the study. The total time committment of the interview and questionnaires will require about 2 1/2 hours of your family's time (about 1 1/4 per person). Mr. O'Brien would like to meet wih you and one parent (both if living in same household) as well as with at least one brother or sister over the age of 12 (if living in same household). Ideally, he would like to see all participating members in the same visit; however, he can make any arrangement that is agreeable to you, such as meeting in your home, at work, or over the week-end. At the end of the visit he will be happy to discuss any questions you may have concerning the purpose of the study, or isses raised by the interview or inventories.

We certainly hope that you will find this study of interest and that you will choose to become involved. We look forward to the results of Mr. O'Brien's research.

You may address any questions you may have to Mr. O'Brien at 233-5631 ext. 2000 or myself at 233-5631 ext. 2000.

Sincerely,

Clyde Pope, Ph.D.
Associate Director

Kaiser Foundation Hospitals
Center for Health Research, 4610 S.E. Belmont Street, Portland, Oregon 97215-1795 (503) 233-5631

Emanuel Hospital
A HealthLink Member
3001 N. Gantenbein Avenue
Portland, Oregon 97227
(503) 280-3347

Clinical Psychology
Emanuel Rehabilitation Center
Gregory T. Smith, Ph.D.
Ronald D. Duvall, Ph.D.
Elaine Greif, Ph.D.
Diane K. Pierce, Ph.D.
David R. Gostnell, Ph.D.

Dear _________:

Emanuel Hospital has arranged to participate in a study being performed to evaluate family adjustment and coping after head injury. Although several books and published studies indicate that many families face some general difficulty following a family member's injury, little is known about specific ways in which family members cope. In order to better understand factors which are important to families adjusting to an injured member, we are comparing these families to normal families - that is, families in which no serious injury has occurred in the last 2 year period. It is hoped that the results of such a study would allow us to explore ways in which patient care, and support for those providing it, can be improved.

We have asked families with an accidentally-injured member, and others, to provide us with names of friends who may be willing to participate in this study. As a result your name was provided by
_______________.

Your involvement with this research will be strictly voluntary. If you choose to help out, you will participate in a brief interview and be requested to fill out some questionnaires. You will not be exposed to any hazardous or painful procedures and your consent will be requested before any information is obtained. You may withddraw from the study at any time. All information that you provide will kept strictly confidential, including from family members.

This letter is to introduce Kevin O'Brien, Ph.D. candidate from the University of Victoria who will be the primary researcher for this project at Emanuel Hospital. He will contact you by telephone after you have had time to review the enclosed information to determine if you are willing to participate in this project.

The total time committment of the interview and questionnaires will require about 2 1/2 hours of your families time (about 45 minutes per person). Mr. O'Brien would like to meet wih you and one parent (both if living in same household) as well as with at least one brother or sister over the age of 12 (if liiving in same household). Ideally, he would like to see all participating members in the same visit; however, he can make any arrangement that is agreeable to you, such as meeting in your home, at work, or over the week-end. At the end of the visit he will be happy to discuss any questions you may have concerning the purpose of the study, or isses raised by the interview or inventories.

We certainly hope that you will find this study of interest and that you will choose to become involved. We look forward to receiving the results of Mr. O'Brien's research and to sharing them with you.

You may address any questions you may have to Mr. O'Brien at 280-3347 or myself at 280-3347.

Sincerely,

Elaine Greif, Ph.D.

Appendix E

REHABILITATION CENTER - EMANUEL HOSPITAL

CONSENT TO PARTICIPATION IN RESEARCH PROJECT

Participant's Name: ____________________

Title of Research Project: Family Coping 2 - 4 Years After Head Injury.

I. I hereby agree and consent to my participation in the study designed to assess the relationship between stress, and coping behaviors and the physical health and psychological well-being of families with a member who is 2 - 4 years post-trauma.

I understand the goals of the study to be as follows:

The purpose of the study is to assess whether living with a traumatically injured member is associated with increased stress, physical illness, and changes in psychological well-being of other family members, and to describe the types of coping behaviors and strategies that families find useful. Additionally, the goal of the study is to assess whether the level of stress and type of coping behaviors used by families vary with the degree of functional impairment and type of trauma suffered by the affected member.

II. I understand that stress will be measured by the Family Inventory of Life Events (FILE), that coping behaviors will be assessed by either the Coping Health Inventory for Parents (CHIP), or the Adolescent Coping Orientation for Problem Experiences (A-COPE) inventories. Physical health and psychological adjustment will be assessed by an inventory and structured interview designed specifically for the study. I understand that the time to complete the tests and interview will be approximately 2 1/2 hours and that my name will not be used to identify the results of these tests.

III. I understand that the only risk involved in my participation in this study are possible stress-related consequences related to answering questions on the inventories and in the interview. I understand that some of the information is of a personal nature and will concern such areas as my financial situation and life-style. However, many psychological tests are routinely given to many patients not involved in this study who come to the Rehabilitation Center at Emanuel Hospital. To date, there has been no known adverse reaction to these tests.

IV. I understand that the benefits of this study include the hope that the findings will contribute to the understanding of the impact that traumatic injury has on the family as a whole, and that such information may be useful in developing better ways to assist such families in the future.

V. I understand that the results of this study may be disseminated to other clinicians or researchers, however, precautions will be made to insure the confidentiality of my participation in this study. I understand that no names will be used and that my anonymity will be protected.

VI. I understand it is not the policy of Emanuel Hospital or any other agency cooperating with the research project in which I am participating to compensate or provide medical treatment for human subjects in the event the research results in physical injury. I further understand that should I suffer any injury from the research project, compensation would be available only if established that the injury occurred through the fault of the hospital, its officers, or employees or my physician. I understand that further information regarding this policy may be obtained from the Chairman of the Human Research Committee at 280-4154.

VII. Dr. Elaine Greif or Mr. Kevin O'Brien have agreed to answer any questions I might have.

Elaine Greif, Ph.D. Clinical Psychologist Rehabilitation Center Emanuel Hospital 3001 N. Gantenbein Ave. Portland, OR 97227 (503) 280-3347	Kevin O'Brien, M.S Principal Investigator c/o Rehabilitation Center Emanuel Hospital 3001 N. Gantenbein Ave. Portland, OR 97227 (503) 280-3347

VIII. The alternative of not participating in this study has been explained to me. I can, at any time before or during the study, decide not to participate and it will in no way influence my relationship with, or treatment at the Rehabilitation Center at Emanuel Hospital. None of the information collected in the study will be shared with treatment and evaluation staff, or with other family members, unless I provide explicit written consent authorizing its release. I have read the foregoing.

________________________ (Witness)	________________________ (Participant)
	________________________ (Parent/Guardian - if applicable)
________________________ (Date / Time)	________________________ (Date / Time)

GOOD SAMARITAN HOSPITAL & MEDICAL CENTER

CONSENT TO PARTICIPATION IN RESEARCH PROJECT

Participant's Name: ______________________________

Title of Research Project: Family Coping 2 - 4 Years After Head Injury.

I. I hereby agree and consent to my participation in the study designed to assess the relationship between stress, and coping behaviors and the physical health and psychological well-being of families with a member who is 2 - 4 years post-trauma.

I understand the goals of the study to be as follows:

The purpose of the study is to assess whether living with a traumatically injured member is associated with increased stress, physical illness, and changes in psychological well-being of other family members, and to describe the types of coping behaviors and strategies that families find useful. Additionally, the goal of the study is to assess whether the level of stress and type of coping behaviors used by families vary with the degree of functional impairment and type of trauma suffered by the affected member.

II. I understand that stress will be measured by the Family Inventory of Life Events (FILE), that coping behaviors will be assessed by either the Coping Health Inventory for Parents (CHIP), or the Adolescent Coping Orientation for Problem Experiences (A-COPE) inventories. Physical health and psychological adjustment will be assessed by an inventory and structured interview designed specifically for the study. I understand that the time to complete the tests and interview will be approximately 2 1/2 hours and that my name will not be used to identify the results of these tests.

III. I understand that the only risk involved in my participation in this study are possible stress-related consequences related to answering questions on the inventories and in the interview. I understand that some of the information is of a personal nature and will concern such areas as my financial situation and life-style. However, many psychological tests are routinely given to many patients not involved in this study who come to the Rehabilitation Institute of Oregon at Good Samaritan Hospital. To date, there has been no known adverse reaction to these tests.

IV. I understand that the benefits of this study include the hope that the findings will contribute to the understanding of the impact that traumatic injury has on the family as a whole, and that such information may be useful in developing better ways to assist such families in the future.

V. I understand that the results of this study may be disseminated to other clinicians or researchers, however, precautions will be made to insure the confidentiality of my participation in this study. I understand that no names will be used and that my anonymity will be protected.

VI. I understand it is not the policy of Good Samaritan Hospital or any other agency cooperating with the research project in which I am participating to compensate or provide medical treatment for human subjects in the event the research results in physical injury. I further understand that should I suffer any injury from the research project, compensation would be available only if established that the injury occurred through the fault of the hospital, its officers, or employees or my physician. I understand that further information regarding this policy may be obtained from the Office of Research Administration at 229-7218.

VII. Mr. Kevin P. O'Brien has agreed to answer any questions I might have.

c/o Rehabilitation Institute of Oregon
2010 N.W. Kearney.
Portland, OR 97210
(503) 229-7214

VIII. The alternative of not participating in this study has been explained to me. I can, at any time before or during the study, decide not to participate and it will in no way influence my relationship with, or treatment at the Rehabilitation Institute of Oregon at Good Samaritan Hospital. None of the information collected in the study will be shared with treatment and evaluation staff, or other family members, unless I provide explicit written consent authorizing its release. I have read the foregoing.

_______________ (Witness)

_______________ (Participant)

_______________ (Parent/Guardian - if applicable)

_______________ (Date / Time)

KAISER PERMANENTE - CENTER FOR HEALTH RESEARCH

CONSENT TO PARTICIPATION IN RESEARCH PROJECT

Participant's Name: ________________________________

Research Project Title: Family Coping 2 - 4 Years After Head Injury

I. I hereby agree and consent to my participation in this study designed to assess the relationship between stress, and coping behaviors and the physical health and psychological well-being of families with a member who is 2 to 4 years post-accident.

I understand the goals of the study to be as follows:

The purpose of the study is to assess whether living with an accidentally injured member is associated with increased stress, physical illness, and changes in psychological well-being of other family members, and to describe the types of coping behaviors and strategies that families find useful. Additionally, the goal for the study is to assess whether the level of stress and type of coping behaviors used by families vary with the degree of functional impairment and type of injury suffered by the affected member.

II. I understand that physical health, psychological adjustment, and coping behavior will be assessed by a structured interview as well as by some inventories and questionnaires. These include: the Family Inventory of Life Events and Changes (FILE), the Coping Health Inventory for Parents (CHIP) or the Adolescent Coping Orientation for Problem Experiences (A-COPE). I understand that the time to complete the tests and interview will be approximately 2 1/2 hours and that my name will not be used to identify the results of these tests.

III. I understand that the only risk involved in my participation in this study are possible stress-related consequences related to answering questions on the inventories and in the interview. I understand that some of the information is of a personal nature and will concern such areas as my financial situation, life-style, and mood. To date, there has been no known adverse reaction to these tests.

INFORMED CONSENT - PAGE 2

IV. I understand that the benefits of this study include the hope that the findings will contribute to the understanding of the impact that accidental injury has on the family as a whole, and that such information may be useful in developing better ways to assist such families in the future.

V. I understand that the results of this study will be used for a doctoral dissertation and may otherwise be disseminated to other clinicians or researchers. However, information will be reported anonymously or in statistical form only. I understand that no names will be used and that my anonymity will be protected.

VI. Research Rights Statement: If you have any questions about this research, your rights and responsibilities as a research subject, or about research-related injuries, you may contact M.R. Greenlick, Ph.D., Vice-President for Research, Kaiser Foundation Hospitals, 233-5631.

VII. Dr. Pope from the Center of Health Research and Mr. Kevin O'Brien have agreed to answer any questions I might have.

Dr. Clyde Pope
Associate Director
Center for Health Research
4610 S.E. Belmont Street
Portland, OR 97215-1795
(503) 233-5631, ext-2000

Kevin O'Brien, M.S.
Principal Investigator
c/o Center for Health Research
4610 S.E. Belmont Street
Portland, OR 97215-1795
(503) 233-5631, ext-2000

VIII. The alternative of not participating in this study has been explained to me. I can at any time before or during the study decide not to participate and it will in no way influence my relationship with, or treatment at, Kaiser Permanente or elsewhere. None of the information collected in the study will be shared with treatment and evaluation staff, or with other family members unless I so desire and provide explicit written consent authorizing its release. I have read the foregoing.

______________________	______________________
(Witness)	(Participant)
	______________________
	(Parent/Guardian - if applicable)
	______________________
	(Date / Time)

Appendix F

Table F-1

Structured Interview Part I - Demographic Data

Name: ____________________ Hospital ID: . . . . . ________
Date: ___/___/___ Group ID: . . . . . . ________

1a) Address of residence: ______________________________
____
b) Telephone Number: . ____________________
c) Number of years at current residence . . . . . . ______
d) Number of people sharing residence. . . . . . . ______
e) How many times have you moved in the last 2 years? ______

2a) Relation to patient: ________ Age: ____ Education: ______
b) Are you currently employed? (circle one) Yes / No
c) If employed, what is your occupation? ____________________
d) Do you work: ( ) Full time ( ) Housewife
(check one) ( ) Part time {Hours per week: }
( ) At home {Describe: __________________}
e) How long have you been at present position? ______
f) If you are <u>not</u> working now, how long unemployed? ______
(Retired? Medically disabled? SSD/SSI?)

3a) Relation to patient: ________ Age: ____ Education: ______
b) Is spouse (if living with you) currently employed? Yes / No
c) If employed, what is your spouse's occupation? ____________
d) Does spouse work: ( ) Full time ( ) Housewife
(check one) ( ) Part time {Hours per week: }
( ) At home {Describe: ________________}
e) How long has your spouse been at present position? ________
f) If spouse unemployed now, for how long? ________
(Retired? Medically disabled? SSD/SSI?)

4a) Is the patient currently employed? (circle one) Yes / No
b) If employed, what is the patient's occupation? __________
c) Does patient work: ( ) Full time ( ) School
(check one) ( ) Part time {Hours per week: }
( ) Other {Describe: ________________}
d) How long has patient been at present position? __________
e) If patient unemployed now, for how long? ________
(Retired? Medically disabled? SSD/SSI?)

Part I (continued)

5) Total family income (all sources) last year (1985)*:

$ 0 - 9,999 ( )
$10,000 - 19,999 ( )
$20,000 - 29,999 ( )
$30,000 - 39,999 ( )
$40,000 - 49,999 ( )
$50,000 - 59,999 ( )
$ 60,000 - 69,999 ( )
$ 70,000 - 79,999 ( )
$ 80,000 - 89,999 ( )
$ 90,000 - 99,999 ( )
$100,000 + ( )

*Include SSD, SSI, Workers Compensation, Alimony, Child Support, Welfare, and Pensions.

6) What is your race? (check one)

Caucasian (White) ( )
Black ( )
American Indian ( )
Asian (Oriental) ( )
Hispanic ( )
Other (specifiy:)

7) What is your religious preference? (check one)

( ) Roman Catholic
( ) Protestant
( ) Judaism
( ) Eastern
( ) None
( ) Other: ________________

8a) Current marital status (check one):

Married ( ) # of times: Mother ____ & Father ____
Single ( )
Divorced ( )
Separated ( )
Widowed ( )
Remarried ( )

8b) Number of years in present marriage? __________

8c) Number of children now living at home? __________

Name (First)	Age	Sex

Comments:

Table F-2

Structured Interview Part II - Assessment of Emotional Distress

A) How often do you feel:	Very Often	Often	Once in Awhile	Rarely
-angry?	____	____	____	____
-annoyed?	____	____	____	____
-content with your current situation?	____	____	____	____
-anxious?	____	____	____	____
-"burned out"?	____	____	____	____
-hopeful about future?	____	____	____	____
-concern for patient's future?	____	____	____	____
-concern for other family members' future?	____	____	____	____
-happy?	____	____	____	____
-depressed?.	____	____	____	____
-fatigued?	____	____	____	____
-hopeful about the patient's future?	____	____	____	____
-trapped or socially isolated?	____	____	____	____
-frustration?	____	____	____	____
-satisfied with patient's situation?	____	____	____	____
-guilty concerning the patient's situation?	____	____	____	____
-guilty concerning some other family member's situation?	____	____	____	____
-satisfied with support from friends?	____	____	____	____
-impatient?.	____	____	____	____
-irritable?.	____	____	____	____
-close as a family?.	____	____	____	____
-tension?	____	____	____	____
-concern about patient's health? (*)	____	____	____	____
-satisfied with patient's medical care?.	____	____	____	____
-concern about other family member's health?	____	____	____	____
-concern about own health?	____	____	____	____

Table F-3

Structured Interview Part III - Assessment of Physical Health

A) Physical Health History

1) Minor Illnesses last 12 months:		Number of Times
. allergies?	Y / N	____
. colds?	Y / N	____
. dizziness or fainting spells?.	Y / N	____
. ear infection?	Y / N	____
. flu?	Y / N	____
. headache?.	Y / N	____
. migraine?.	Y / N	____
. skin problems?	Y / N	____
. stomach problems?.	Y / N	____
. Other? Describe ( )	Y / N	____

2) Major Illness(es) last 12 months:		When first diagnosed?
. accidental injury (work/school/home)?.	Y / N	____
. arthritis/rheumatism ?	Y / N	____
. bladder problems ?	Y / N	____
. bowel problems ?	Y / N	____
. cancer or tumors ?	Y / N	____
. cardiovascular problems, heart disease or stroke ?.	Y / N	____
. chemical dependency (alcohol &/or drugs)?	Y / N	____
. diabetes ?	Y / N	____
. high blood pressure ?.	Y / N	____
. intestinal prblms, gastritis, ulcers ?	Y / N	____
. lung problems/disease ?	Y / N	____
. neurological diseases (e.g., parkinson's, multiple sclerosis, epilepsy, convulsions, prior CHI) ?	Y / N	____
. other (describe:)	Y / N	____

B) Self-rating of overall physical health (Circle one which BEST describes your health over last 12 months):

1-Excellent 2-Very Good 3-Good 4-Fair 5-Poor 6-Very Poor

Appendix G

Carroll Rating Scale or Depression (CRS)*

Carroll rating scale items grouped by the corresponding items of the Hamilton Rating Scale. 'Positive responses indicated in parenthese.

Depression:

32 I feel in good spirits (no)
16 I am miserable or often feel like crying (yes)
34 I think my case is hopeless (yes)
48 There is only misery in the future for me (yes)

Guilt:

44 I think I am as good a person as anybody else (no)
20 I feel worthless and ashamed about myself (yes)
24 Things which I regret about my life are bothering me (yes)
14 I am being punished for something bad in my past (yes)

Suicide:

29 I feel that life is still worth living (no)
17 I often wish I were dead (yes)
46 I have heen thinking about trying to kill myself (yes)
12 Dying is the best solution for me (yes)

Initial Insomnia:

22 I take longer than usual to fall asleep at night (yes)
9 Getting to sleep takes me more than half an hour (yes)

Middle Insomnia:

27 My sleep is restless and disturbed (yes)
19 I wake up often in the middle of the night (yes)

Delayed Insomnia:

35 I wake up before my usual time in the morning (yes)
11 I wake up much earlier than I need to in the morning (yes)

Work and Interests:

25 I get pleasure and satisfaction from what I do (no)_
42 I still like to go out and meet people (no)
3 I have dropped many of my interests and activities (yes)
7 I am still able to carry on doing the work I am supposed to do (no)

Retardation:

28 My mind is as fast and alert as always (no)
30 My voice is dull and lifeless (yes)
47 I get hardly anything done lately (yes)
21 I am so slowed down that I need help with bathing and dressing (yes)

Agitation:

43 I think I appear calm on the outside (no)
10 I am restless and fidgety (yes)
6 It must be obvious that I am disturbed and agitated (yes)
37 I have to keep pacing around most of the time (yes)

Psychological Anxiety:

8 I can concentrate easily when reaing the papers (no)
31 I feel irritable or jittery (yes)
23 Much of the time I am afraid but don't know the reason (yes)
38 I am terrified and near panic (yes)

Somatic Anxiety:

18 I am having trouble with indigestion (yes)
33 My heart sometimes beats faster than usual (yes)
13 I have a lot of trouble with dizzy and faint feelings (yes)
41 My hands shake so much that people can easilty notice (yes)

Gastrointestinal:

36 I still enjoy measl as much as usual (no)
50 I have to force myself to eat even a little (yes)

General Somatic:

1 I feel just as energetic as always (no)
51 I am exhausted much of the time (yes)

Libido:

15 My sexual interest is the same as before I got sick (no)
4 Since my illness began I have completely lost interest in sex (yes)

Hyponchondriasis:

49 I worry a lot about my bodily symptoms (yes)
5 I am especially concerned about how my body is functioning (yes)
45 My trouble is the result of some serious internal disease (yes)
39 My body is bad and rotten inside *yes)

Loss of Insight:

26 All I need is a good rest to be perfectly well again (yes)
40 I got sick because of the bad weather we ave been having (yes)

Loss of Weight:

2 I am losing weight (yes)
52 I can tell that I have lost a lot of weight (yes)

*Carroll, Feinberg, Smouse, Rawson, & Greden (1981)

Appendix H

Clinical Anxiety Scale (CAS)*

Instruction for use of the CAS

The scale is an instrument for the assessment of the present state of anxiety; therefore the emphasis on eliciting information for the ratings should be on how the patient feels at the present time. However, the interview itself may raise, or lower, the severity of anxiety and the interviewer should inform the patient that he should describe how has felt during the period of the past two days.

1) **Psychic Tension** (care should be taken to distinguish tension from muscular tension-see next item)

Score 4: Very marked and distressing feeling of being 'on edge', 'keyed-up', 'wound up', or 'nervous' which persits with little change throughout the waking hours.

Score 3: As above, but with some fluctuation of severrity during the course of the day.

Score 2: A definite experience of being tense which is sufficient to cause some, although not severe distress.

Score 1: A slight feeling of being tense which does not cause distress.

Score 0: No feeling of being tense apart from the normal degree of tension experienced in response to stress and which is acceptable as normal for the population.

2) **Ability to relax** (muscular tension)

Score 4: The experience of severe tension throughout much of the bodily musculature which may be accompanied by such symptoms as pain, stiffness, spasmodic contractions, and lack of control over movements. The experience is present throughout most of the waking day and there is no ability to produce relaxation at will.

Score 3: As above, but the muscular tension may only be experienced in certain groups of muscles and may fluctuate in severity throughout the day.
Score 2: A definite experience of muscular tension in some part of the musculature suficient to cause some, but not severe distress.
Score 1: Slight recurrent musculr tension of which the patient is aware but which does not cause distress. Very mild degrees of tension headache or pain in other groups of muscles should be scored here.
Score 0: No subjective muscular tension of of such degree which, when it occurs, can easily be controlled at will.

3) Startle Response (hyperarousability)
Score 4: Unexpected noise causes severe distress so that the patient may complain in some such phrase as "I jump out of my skin". Distress is experienced in psychgic and somatic modalities so that, in addition to the experience of fright, there is muscular activity and autonomic symptoms such as sweating or palpitation.

Score 3: Unexpected noise cause severe distress in psychic OR somatic, but not in both modalities.
Score 2: Unexpected noise casues definite but not severe distress.
Score 1: The patient agrees that he is slightly 'jumpy', but is not distressed by this.
Score 0: The degree of startle response is entirely acceptable as normal for the population.

4) Restlessness
Score 4: The patient is unable to keep still for more than a few minutes and engages in restless pacing or other purposeless activity.
Score 3: As above, but he is able to keep still for an hour or so at a time.
Score 2: There is a feeling of "needing to be on the move" which cause some, but not severe distress.

Score 1: Slight experience of restlessness which cause no distress.
Score 0: Absence of restlessness.

5) **Worrying** (The assessment must take into account the degree to which worry is out of proportion to actual stress).
Score 4: The patient experiences almost continuous preoccupation with pain-ful thoughts which cannot be stopped voluntarily and the distress is quite out of proportion to the subject matter of the thoughts.
Score 3: As above, but there is some fluctuation of intensity throughout the waking hours and the distressing thoughts may cease for an hour or two, especially if the patient is distracted by activity requiring his attention.
Score 2: Painful thoughts out of porportion to the patient's situation keep intruding into consciousness but he is able to dispel or dismiss them.
Score 1: The patient agrees that he tends to worry a little more than necessary about minor matters but this does not cause much distress
Score 0: The tendency to worry is accepted as being normal for the population; for instance even marked worrying over a severe financial crisis or unexpected illness in a relative should be scored as 0 if it is judged to be entirely in keeping with the degree of stress.

6) **Apprehension**
Score 4: The experience is that of being on the brink of some disaster which cannot be explained. The experience need not be continuous and may occur is short bursts several times a day.
Score 3: As above, but the experience does not occur more than once a day.
Score 2: A sensation of groundless apprehension of disaster which is not severe although it causes definite distress. The patients may not use strong terms as "disaster" or

"catastrophe" but may express his experience in some such phrase a "I feel as if something bad is about to happen".

Score 1: A slight degree of apprehensiveness of which the patient is aware but which does not cause distress.

Score 0: No experience of groundless anticipation of disaster.

END OF SCALE*

* The following item may be rated if required, but it is not added to the CAS Score.

** Panic Attacks

Score 4: Episodes, occurring several times a day, of the sudden experience of groundless terror accompanied by marked autonomic symptoms, feelings of imminent collapse or loss of control over reason and self-integrity.

Score 3: As above, but the episodes do not occur more than once a day.

Score 2: The episodes may occur only once or twice a week; they are generally less severe than described above but still cause distress

Score 1: Episodic slight increases in the level of anxiety which are only precipitated by definite events of activities. For instance, the experience of a patient who is recovering from agoaphobia and who experiences a perceptible rise of anxiety on leaving the house would be scored here.

Score 0: No episodic sudden increase in the level of anxiety.

*Snaith, Baugh, Clayden, Husain & Sipple (1982)

Appendix I

Sickness Impact Profile* - Scales and Subscales

Dimension	Category	Item Content
1. Physical Dysfunction	A	Ambulation
	M	Mobility
	BCM	Body Care & Movement
2. Psychosocial Dysfunction	SI	Social Interaction
	AB	Alertness Behavior
	EB	Emotional Behavior
	C	Communication
3. Independent	SR	Sleep and Rest
	E	Eating
	W	Work
	HM	Home Management
	RP	Recreation & Pasttimes

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*(Bergner, Bobbitt, Pollard, Martin, & Gilson, 1976)

Appendix J

Coping Health Inventory for Parents

FAMILY STRESS COPING AND HEALTH PROJECT
1300 Linden Drive
University of Wisconsin-Madison
Madison, WI 53706

CHIP

FORM D
1983
© H. McCubbin

COPING-HEALTH INVENTORY FOR PARENTS

Family Health Program

Hamilton I. McCubbin Marilyn A. McCubbin Robert S. Nevin Elizabeth Cauble

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PURPOSE

CHIP – The Coping-Health Inventory for Parents was developed to record what parents find helpful or not helpful to them in the management of family life when one or more of its members is ill for a brief period *or* has a medical condition which call for continued medical care. Coping is defined as personal or collective (with other individuals, programs) efforts to manage the hardships associated with health problems in the family.

DIRECTIONS

- To complete this inventory you are asked to read the list of "Coping behaviors" below, one at a time.
- For each coping behavior you used, please record how helpful it was.

  HOW HELPFUL was this COPING BEHAVIOR to you and/or your family: Circle ONE number

  3 = *Extremely* Helpful
  2 = *Moderately* Helpful
  1 = *Minimally* Helpful
  0 = *Not* Helpful
- For each Coping Behavior you did *Not* use please record your "Reason."

  Please RECORD this by *Checking* ☑ *one* of the reasons:

  Chose not to use it   Not Possible
  ☐   or   ☐

PLEASE BEGIN: Please read and record your decision for EACH and EVERY Coping Behavior listed below.

COMPUTER CODES: IID ☐☐☐☐ GID ☐☐☐ FAMID ☐☐☐☐

	COPING BEHAVIORS	Extremely Helpful	Moderately Helpful	Minimally Helpful	Not Helpful	I do not cope this way because		For Computer Use Only		
						Chose Not To	Not Possible	F	S	M
1	Trying to maintain family stability	3	2	1	0	☐	☐ 12	○		☐
2	Engaging in relationships and friendships which help me to feel important and appreciated	3	2	1	0	☐	☐	☐	○	
3	Trusting my spouse (or former spouse) to help support me and my child(ren)	3	2	1	0	☐	☐	○	☐	
4	Sleeping	3	2	1	0	☐	☐		○	☐
5	Talking with the medical staff (nurses, social worker, etc.) when we visit the medical center	3	2	1	0	☐	☐		☐	○
6	Believing that my child(ren) will get better*	3	2	1	0	☐	☐	○	☐	
7	Working, outside employment	3	2	1	0	☐	☐	☐	○	
8	Showing that I am strong	3	2	1	0	☐	☐	○		☐
9	Purchasing gifts for myself and/or other family members	3	2	1	0	☐	☐	☐	○	
10	Talking with other individuals/parents in my same situation	3	2	1	0	☐	☐		☐	○
11	Taking good care of all the medical equipment at home	3	2	1	0	☐	☐	○		☐
12	Eating	3	2	1	0	☐	☐		○	☐
13	Getting other members of the family to help with chores and tasks at home	3	2	1	0	☐	☐	○	☐	
14	Getting away by myself	3	2	1	0	☐	☐	☐	○	
15	Talking with the Doctor about my concerns about my child(ren) with the medical condition*	3	2	1	0	☐	☐	☐		○
16	Believing that the medical center/hospital has my family's best interest in mind	3	2	1	0	☐	☐	○	☐	
17	Building close relationships with people	3	2	1	0	☐	☐	☐	○	
18	Believing in God	3	2	1	0	☐	☐	○		☐
19	Develop myself as a person	3	2	1	0	☐	☐	☐	○	
20	Talking with other parents in the same type of situation and learning about their experiences	3	2	1	0	☐	☐		☐	○
21	Doing things together as a family (involving all members of the family)	3	2	1	0	☐	☐	○	☐	
22	Investing time and energy in my job	3	2	1	0	☐	☐		○	☐
23	Believing that my child is getting the best medical care possible*	3	2	1	0	☐	☐	○		☐
24	Entertaining friends in our home	3	2	1	0	☐	☐ 34	☐	○	
25	Reading about how other persons in my situation handle things	3	2	1	0	☐	☐ 35		☐	○
26	Doing things with family relatives	3	2	1	0	☐	☐	○	☐	
27	Becoming more self reliant and independent	3	2	1	0	☐	☐		○	☐
28	Telling myself that I have many things I should be thankful for	3	2	1	0	☐	☐	○	☐	
29	Concentrating on hobbies (art, music, jogging, etc.)	3	2	1	0	☐	☐	☐	○	
30	Explaining our family situation to friends and neighbors so they will understand us	3	2	1	0	☐	☐		☐	○
31	Encouraging child(ren) with medical condition to be more independent*	3	2	1	0	☐	☐	○	☐	
32	Keeping myself in shape and well groomed	3	2	1	0	☐	☐		○	☐
33	Involvement in social activities (parties, etc.) with friends	3	2	1	0	☐	☐	☐	○	
34	Going out with my spouse on a regular basis	3	2	1	0	☐	☐	☐	○	
35	Being sure prescribed medical treatments for child(ren) are carried out at home on a daily basis	3	2	1	0	☐	☐		☐	○
36	Building a closer relationship with my spouse	3	2	1	0	☐	☐	○	☐	
37	Allowing myself to get angry	3	2	1	0	☐	☐		○	☐
38	Investing myself in my child(ren)	3	2	1	0	☐	☐	○		☐
39	Talking to someone (not professional counselor/doctor) about how I feel	3	2	1	0	☐	☐	☐	○	
40	Reading more about the medical problem which concerns me	3	2	1	0	☐	☐		☐	○
41	Talking over personal feelings and concerns with spouse	3	2	1	0	☐	☐	○	☐	
42	Being able to get away from the home care tasks and responsibilities for some relief	3	2	1	0	☐	☐		○	☐
43	Having my child with the medical condition seen at the clinic/hospital on a regular basis*	3	2	1	0	☐	☐	○	☐	
44	Believing that things will always work out	3	2	1	0	☐	☐	○	☐	
45	Doing things with my children	3	2	1	0	☐	☐	○		☐

FAM ☐☐ 58

PLEASE Check all 45 items to be sure you have either circled a number or checked a box for each one. This is important.

SUP ☐☐ 60

MED ☐☐ 62

Appendix K

Family Inventory of Life Events & Changes (FILE)

University of Minnesota
Family Social Science
290 McNeal Hall
St. Paul, MN 55108
Medical Education and Research
Association of
Gillette Children's Hospital

Family Health Program
FORM C
1983
© H. McCubbin

IID ☐☐☐☐
GID ☐☐☐☐
FID ☐☐☐☐

FILE

Family Inventory of Life Events and Changes

Hamilton I. McCubbin **Joan M. Patterson** **Lance R. Wilson**

PURPOSE

Over their life cycle, all families experience many changes as a result of normal growth and development of members and due to external circumstances. The following list of family life changes can happen in a family at any time. Because family members are connected to each other in some way, a life change for any one member affects all the other persons in the family to some degree.

> "FAMILY" means a group of two or more persons living together who are related by blood, marriage or adoption. This includes persons who live with you *and* to whom you have a long term commitment.

DIRECTIONS

"DID THE CHANGE HAPPEN IN YOUR FAMILY?"
Please read each family life change and decide whether it happened to any member of your family—**including you**.

- DURING THE LAST YEAR
  First, decide if it happened any time **during** the last 12 months and check YES or NO.

During Last 12 Months Yes	No
☐	☐

- BEFORE LAST YEAR
  Second, for *some family changes* decide if it happened any time **before** the last 12 months and check YES or NO. It is okay to check YES twice if it happened both times—before last year and during the past year.

Before Last 12 Months Yes	No
☐	☐

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY?			
	During Last 12 Months		Before Last 12 Months	
	Yes	No	Yes	No
I. INTRA-FAMILY STRAINS				
1 Increase of husband/father's time away from family	☐	☐	☐	☐
2 Increase of wife/mother's time away from family	☐	☐	☐	☐
3 A member appears to have emotional problems	☐	☐	☐	☐
4 A member appears to depend on alcohol or drugs	☐	☐	☐	☐
5. Increase in conflict between husband and wife	☐	☐		
6. Increase in arguments between parent(s) and child(ren)	☐	☐		
7 Increase in conflict among children in the family	☐	☐		
8. Increased difficulty in managing teenage child(ren)	☐	☐		
9 Increased difficulty in managing school age child(ren) (6-12 yrs.)	☐	☐		
10 Increased difficulty in managing preschool age child(ren) (2½-6 yrs.)	☐	☐		
11 Increased difficulty in managing toddler(s) (1-2½ yrs.)	☐	☐		

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY?			
	During Last 12 Months		Before Last 12 Months	
	Yes	No	Yes	No
12. Increased difficulty in managing infant(s) (1-2½ yrs.)	☐	☐		
13. Increase in the amount of "outside activities" which the child(ren) are involved in	☐	☐		
14 Increased disagreement about a member's friends or activities	☐	☐		
15. Increase in the number of problems or issues which don't get resolved	☐	☐		
16. Increase in the number of tasks or chores which don't get done	☐	☐		
17 Increased conflict with in-laws or relatives	☐	☐		
II. MARITAL STRAINS				
18. Spouse/parent was separated or divorced	☐	☐	☐	☐
19. Spouse/parent has an "affair"	☐	☐	☐	☐
20 Increased difficulty in resolving issues with a "former" or separated spouse	☐	☐		
21. Increased difficulty with sexual relationship between husband and wife	☐	☐		

Please turn over and complete ➧

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY?			
	During Last 12 Months		**Before** Last 12 Months	
	Yes	No	Yes	No
III. PREGNANCY AND CHILDBEARING STRAINS				
22 Spouse had unwanted or difficult pregnancy	☐	☐	☐	☐
23 An unmarried member became pregnant	☐	☐	☐	☐
24 A member had an abortion	☐	☐	☐	☐
25 A member gave birth to or adopted a child	☐	☐		
IV. FINANCE AND BUSINESS STRAINS				
26 Took out a loan or refinanced a loan to cover increased expenses	☐	☐	☐	☐
27 Went on welfare	☐	☐	☐	☐
28 Change in conditions (economic, political, weather) which hurts the family business	☐	☐	☐	☐
29 Change in Agriculture Market, Stock Market, or Land Values which hurts family investments and/or income	☐	☐	☐	☐
30 A member started a new business	☐	☐	☐	☐
31 Purchased or built a home	☐	☐	☐	☐
32 A member purchased a car or other major item	☐	☐		
33 Increasing financial debts due to over use of credit cards	☐	☐		
34 Increased strain on family "money" for medical/dental expenses	☐	☐		
35 Increased strain on family "money" for food, clothing, energy, home care	☐	☐		
36 Increased strain on family "money" for child(ren)'s education	☐	☐		
37 Delay in receiving child support or alimony payments	☐	☐		
V. WORK-FAMILY TRANSITIONS AND STRAINS				
38 A member changed to a new job/career	☐	☐	☐	☐
39 A member lost or quit a job	☐	☐	☐	☐
40 A member retired from work	☐	☐	☐	☐
41 A member started or returned to work	☐	☐	☐	☐
42 A member stopped working for extended period (e.g. laid off, leave of absence, strike)	☐	☐		
43 Decrease in satisfaction with job/career	☐	☐		
44 A member had increased difficulty with people at work	☐	☐		
45 A member was promoted at work or given more responsibilities	☐	☐		
46 Family moved to a new home/apartment	☐	☐		
47 A child/adolescent member changed to a new school	☐	☐		

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY?			
	During Last 12 Months		**Before** Last 12 Months	
	Yes	No	Yes	No
VI. ILLNESS AND FAMILY "CARE" STRAINS				
48 Parent/spouse became seriously ill or injured	☐	☐	☐	☐
49 Child became seriously ill or injured	☐	☐	☐	☐
50 Close relative or friend of the family became seriously ill	☐	☐	☐	☐
51 A member became physically disabled or chronically ill	☐	☐	☐	☐
52 Increased difficulty in managing a chronically ill or disabled member	☐	☐	☐	☐
53 Member or close relative was committed to an institution or nursing home	☐	☐	☐	☐
54 Increased responsibility to provide direct care or financial help to husband's and/or wife's parent(s)	☐	☐		
55 Experienced difficulty in arranging for satisfactory child care	☐	☐		
VII. LOSSES				
56 A parent/spouse died	☐	☐	☐	☐
57 A child member died	☐	☐	☐	☐
58 Death of husband's or wife's parent or close relative	☐	☐	☐	☐
59 Close friend of the family died	☐	☐	☐	☐
60 Married son or daughter was separated or divorced	☐	☐	☐	☐
61 A member "broke up" a relationship with a close friend	☐	☐		
VIII. TRANSITIONS "IN AND OUT"				
62 A member was married	☐	☐		
63 Young adult member left home	☐	☐		
64 A young adult member began college (or post high school training)	☐	☐		
65 A member moved back home or a new person moved into the household	☐	☐		
66 A parent/spouse started school (or training program) after being away from school for a long time	☐	☐		
IX. FAMILY LEGAL VIOLATIONS				
67 A member went to jail or juvenile detention	☐	☐	☐	☐
68 A member was picked up by police or arrested	☐	☐	☐	☐
69 Physical or sexual abuse or violence in the home	☐	☐	☐	☐
70 A member ran away from home	☐	☐	☐	☐
71 A member dropped out of school or was suspended from school	☐	☐	☐	☐

Appendix L

Table L-1

Frequency Analysis of Sex - CHI Patients

(n=53)

Sex	Absolute Frequency	Relative Frequency
Male	42	79.2%
Female	11	20.8%

Note. Male-to-female ratio = 3.8:1.

Table L-2

Marital Status at Time of Follow-up - CHI Patients

(n=53)

Sex	Absolute Frequency	Relative Frequency
Single	51	96.2%
Divorced	2	3.8%

Table L-3

Frequency Analysis of Patient Age at Time of Interview

(n=53)

Age (years)	Absolute Frequency (%)	Relative Frequency (%)	Cumulative Frequency (%)
13	2	3.8	3.8
14	1	1.9	5.7
15	4	7.5	13.2
16	4	7.5	20.7
17	7	13.2	33.9
18	2	3.8	37.7
19	2	3.8	41.5
20	7	13.2	54.7
21	1	1.9	56.6
22	4	7.5	64.1
23	3	5.7	69.8
24	2	3.8	73.6
25	6	11.3	84.9
26	2	3.8	88.7
27	3	5.7	94.4
28	2	3.8	98.2
29	1	1.9	100.0

Table L-4

Frequency Analysis of Patient Education at Follow-up

(n=53)

Years of Education	Absolute Frequency (%)	Relative Frequency (%)	Cumulative Frequency (%)
7	1	1.9	1.9
8	2	3.8	5.7
9	5	9.4	15.1
10	5	9.4	24.5
11	8	15.1	39.6
12	18	34.0	73.6
13	4	7.5	81.1
14	8	15.1	96.2
15	0	0.0	96.2
16	2	3.8	100.0

Table L-5

Frequency Analysis of CHI Patient Occupation

(n=53)

Employment	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Full-time	9	17.0	17.0
Part-time	4	7.5	24.5
School (PT/FT)	20	37.7	62.2
School + work	5	9.4	71.6
Unemployed	13	24.5	96.1
Sheltered work	2	3.8	100.0

Appendix M

Table M-1

Frequency Analysis of Clinical Anxiety Scale Scores

CHI Patients (n=53)

CAS Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0	1	2.1	2.1
1	3	6.3	8.3
2	6	12.5	20.8
3	10	20.8	41.7
4	9	18.8	60.4
5	5	10.4	70.8
6	6	12.5	83.3
7[1]	2	4.2	87.5
8	3	6.3	93.8
9	2	4.2	97.9
>= 10	1	2.1	100.0
Missing data	5	---	----

---

[1] Cut-off score used to screen patients with clinically significant anxiety (12.6%).

Table M-2

Frequency Analysis of Carroll Rating Scale Scores

Patients (n=53)

CRS Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0	1	2.1	2.1
1	5	10.4	12.5
2	5	10.4	22.9
3	5	10.4	33.3
4	4	8.3	41.7
5	6	12.5	54.2
6	3	6.3	60.4
7	4	8.3	68.8
8	2	4.2	72.9
9	4	8.3	81.3
10[1]	2	4.2	88.5
11	2	4.2	89.6
12	1	2.21	91.7
13	0	0.0	91.7
>=14	4	8.4	100.0
Missing data	5	---	---

---

[1] Cut-off score used to screen patients with clinically significant depressive symptomatology (14.6%).

Table M-3

Frequency Analysis of Emotional Distress Inventory Patients (n=53)

EDI Score	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
37 - 39	3	5.9	5.9
40 - 42	4	7.9	13.7
43 - 45	2	4.0	17.6
46 - 48	9	17.7	35.3
49 - 51	6	11.8	47.1
52 - 54	9	17.7	64.7
55 - 57	6	11.8	76.5
58 - 60	1	2.0	78.4
61 - 63	4	7.8	86.3
64 - 66	3	5.9	92.2
67 - 69	2	4.0	96.1
>= 70	2	4.0	100.0

Appendix N

Table N-1

Frequency Analysis of CHI Mothers' Age (n=48)

Age (Years)	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
34 - 39	10	22.7	22.7
40 - 44	15	34.1	56.8
45 - 49	6	13.6	70.5
50 - 54	4	9.1	79.5
55 - 59	6	13.6	93.2
60 - 69	3	6.8	100.0
Missing data	4	---	---

Table N-2

Frequency Analysis of Marital Status - CHI Mothers

(n=48)

Marital Status	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Married	32	66.7	66.7
- once	19	--	--
- 2 or more	11	--	--
- freq. unknown	2	--	--
Divorced/ Separated	11	22.9	89.6
Widowed	5	10.4	100.0

Table N-3

Frequency Analysis CHI Mothers' Education

(n=48)

Years of Education	Absolute Frequency (%)	Relative Frequency (%)	Cumulative Frequency (%)
8	1	2.2	2.2
9	3	6.7	8.9
10	2	4.4	13.3
11	1	2.2	15.6
12	17	37.8	53.3
13	7	15.6	68.9
14	6	13.3	82.2
15	2	4.4	86.7
16	3	6.7	93.3
17	3	6.7	100.0
Missing data	3	---	---

Table N-4

Frequency Analysis of CHI Mother's Race

(n=48)

Race	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Caucasian	44	91.7	91.7
Hispanic	1	2.1	93.8
Asian	1	2.1	95.8
Native American	1	2.1	97.9
Other	1	3.8	100.0

Table N-5

Frequency Analysis of CHI Mother's Religious Preference

(n=48)

Religious Preference	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Roman Catholic	7	14.6	14.6
Protestant	20	37.7	56.3
Christian	5	10.4	66.7
Other	4	8.3	75.0
None	5	25.0	100.0

Table N-6

Frequency Analysis of Mother's Occupation

(n=48)

Employment	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Full-time	22	45.8	45.8
Part-time	8	16.7	62.5
School (PT/FT)	1	2.1	64.6
Housewife	13	27.1	91.7
Retired	1	2.1	93.8
Unemployed	3	6.3	100.0

Table N-7

Frequency Analysis of Family Income - CHI Mothers

(n=48)

Cumulative Income Level	Absolute Frequency	Relative Frequency (%)	Frequency (%)
$ 0 - 9,999	2	4.2	4.2
$10,000 - 19,999	12	25.0	29.2
$20,000 - 29,999	13	27.1	51.3
$30,000 - 39,999	9	18.8	75.0
$40,000 - 49,999	2	4.2	79.2
#50,000 - 59,999	6	12.5	91.7
$60,000 - 69,999	1	2.1	93.8
$70,000 +	3	6.3	100.0

Table N-8

Frequency Analysis of Family Size - CHI Mothers

(n=48)

Family Size1	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
2	5	10.4	10.4
3	17	35.4	45.8
4	12	25.0	70.8
5	10	20.8	91.7
6	2	4.2	95.8
7	1	2.1	97.9
8	1	2.1	100.0

Appendix O

Table O-1

Frequency Analysis of CHI Fathers' Age

(n=26)

Age (Years)	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
34 - 39	3	13.0	13.0
40 - 44	6	26.1	39.1
45 - 49	7	30.4	69.6
50 - 54	1	4.3	73.9
55 - 59	3	13.0	87.0
60 - 69	3	13.0	100.0
Missing data	3	---	---

Table O-2

Frequency Analysis of Marital Status - Fathers

(n=26)

Marital Status	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Married	23	88.5	88.5
- once	13	--	--
- 2 or more	9	--	--
- freq. unknown	1	--	--
Divorced/ Separated	3	11.5	100.0

Table O-3

Frequency Analysis CHI Fathers' Education

(n=26)

Years of Education	Absolute Frequency (%)	Relative Frequency (%)	Cumulative Frequency (%)
8	1	4.0	4.0
9	0	0.0	4.0
10	0	0.0	4.0
11	0	0.0	4.0
12	9	36.0	40.0
13	1	4.0	44.0
14	7	28.0	72.0
15	1	4.0	76.0
16	6	24.0	100.0
Missing data	1	---	---

Table O-4

Frequency Analysis of Father's Race

(n=26)

Race	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Caucasian	25	96.2	96.2
Other	1	3.8	100.0

Table O-5

Frequency Analysis of Father's Religious Preference

(n=26)

Religious Preference	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Roman Catholic	2	7.7	7.7
Protestant	14	53.8	61.5
Christian	2	7.7	69.2
Other	3	11.5	80.8
None	5	19.2	100.0

Table O-6

Frequency Analysis of Father's Occupation

(n=26)

Employment	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Full-time	21	80.8	80.8
Part-time	0	80.8	81.8
School (PT/FT)	1	3.8	84.6
Retired	4	15.4	100.0

Table O-7

Frequency Analysis of Family Income - CHI Fathers

(n=26)

Cumulative Income Frequency Level	Absolute Frequency	Relative Frequency (%)	(%)
$ 0 - 9,999	0	0.0	0.0
$10,000 - 19,999	2	7.7	7.7
$20,000 - 29,999	7	26.9	34.6
$30,000 - 39,999	7	26.9	61.5
$40,000 - 49,999	3	11.5	73.1
#50,000 - 59,999	4	15.4	88.5
$60,000 - 69,999	1	3.8	92.3
$70,000 +	2	7.7	100.0

Table O-8

Frequency Analysis of Family Size - CHI Fathers

(n=26)

Family Size1	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency (%)
2	1	3.8	3.8
3	8	30.8	34.6
4	9	34.6	69.3
5	7	26.9	96.2
6	1	3.8	100.0

VITA

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O'Brien, K., & Glaudin, V. (to be published). Factorial structure and factor reliability of the Hamilton Rating Scale for Depression. ACTA Psychiatrica Scandinavica.

Lezak, M.D., & O'Brien, K. (1981). Long-term improvement in intellectual function following brain injury. Paper presented at the Fourth European Meeting of the International Neuropsychological Society, Bergen, Norway, June.

Lezak, M.D., Cosgrove, J.N., O'Brien, K., & Wooster, N. (1980). Relationships between personality disorders, social disturbances, and physical disability following traumatic brain injury. Paper presented at the Eighth Annual Meeting of the International Neuropsychological Society, San Francisco, February.

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Title of Dissertation:

PARENTAL MOOD, EMOTIONAL DISTRESS, AND COPING IN FAMILIES WITH A HEAD-INJURED OFFSPRING.

Author [redacted]

Kevin Page O Brien

November 21, 1986