

Sexual Satisfaction of Individuals Whose Spouses  
Have Incurred a Traumatic Brain Injury

Kristina J. Jackson

A Dissertation Submitted to the Faculty of  
The Chicago School of Professional Psychology  
In Partial Fulfillment of the Requirements  
For the Degree of Doctor of Psychology

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Kristina J. Jackson

2013

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## Abstract

### Sexual Satisfaction of Individuals Whose Spouses Have Incurred a Traumatic Brain Injury

Kristina J. Jackson

Trauma Brain Injury (TBI) has been labeled a silent epidemic by the Center for Disease Control. However, relatively little research has focused on the impact of TBI on the sexual satisfaction of an uninjured spouse. **Objective:** Explore gender and severity differences in marital and sexual satisfaction of individuals whose spouse has incurred a TBI. **Design:** Between-group design using correlation and multivariate analysis of variance. **Participants:** Married adults (n =99) who have a spouse with a TBI (n=38) or a spouse who has never experienced a TBI (n=61). **Measures:** Surveys and the Marital Satisfaction Inventory-Revised (MSI-R). **Results:** The TBI group endorsed significantly less marital and sexual satisfaction, with no significant differences between genders or TBI severities. **Conclusions:** Spouses of individuals with TBI experience less marital and sexual satisfaction. Moreover, variables associated with less sexual satisfaction include frequency of sexual intercourse, frequency of sexual activity (other than sexual intercourse), and age of injured partner.

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## **Chapter 1: Nature of the Study**

### **Overview of Traumatic Brain Injury**

The brain is an integral part of the human body and is at the center of an individual's ability to control motor activity, display and understand emotion, make decisions, and complete many other important functions that human beings rely on in their daily lives. When the integrity of the brain is compromised, the individual's functioning can be impacted on many levels. An acquired brain injury (ABI) is any brain damage that occurs after birth, either internally (e.g., stroke, infection, tumor) or externally (e.g., fall, motor vehicle accident, assault). External injuries are the most prevalent form of ABI, accounting for a large percent of all acquired brain injuries and are commonly referred to as traumatic brain injuries (TBIs).

A TBI, as defined by the Center for Disease Control and Prevention (CDC), is "...caused by a bump, blow or jolt to the head or a penetrating head injury that disrupts the normal functioning of the brain" (Faul, Xu, Wald, & Coronado, 2010, p. 8). Severity of a TBI can range from mild, in which there is only a brief state of unconsciousness or change in consciousness, to severe, in which there is an extended period of unconsciousness or post-injury amnesia. The severity of a TBI is commonly assessed by level of consciousness, which is determined by evaluating the ocular, motor, and language responses of a patient. Using assessment tools (e.g., The Glasgow Coma Scale), a clinician can evaluate these responses, yielding a numerical value that correlates with a severity diagnosis and likely prognosis. Thornhill et al. (2000) suggest that the vast majority of TBIs are mild in severity (90%), with few being moderate (5%) or severe

(3%). However, mild TBIs may make up greater than 90% of all incurred TBIs (National Institute of Health [NIH], 1999), as they are thought to be significantly under-diagnosed.

### **Epidemiology of Traumatic Brain Injury**

The NIH (1999) refers to TBI as a disorder of major public health significance and is termed a “silent epidemic” by the CDC (Faul et al., 2010). It is estimated that 1.7 million TBIs occur annually in the United States, causing emergency department visits, hospitalizations, and deaths. TBIs account for 4.8% of all injuries seen in an emergency department, occurring most often with individuals 0 to 4 years old and 15 to 19 years old (Faul et al., 2010). Conversely, hospitalization and death due to a TBI occur most often with individuals 75 years and older. Overall, recent research suggests that TBI has played a role in 30.5% of all injury-related deaths in the United States between 2002 and 2006, accounting for approximately 52,000 deaths per year (Faul et al., 2010). It is projected that the annual cost for acute care and rehabilitation for new head injury cases in the United States is between 9 and 10 billion dollars, with the lifetime care cost of an individual suffering from a severe TBI between \$600,000 and \$1,875,000 (NIH, 1999). The impact of such costs is burdening not only to the individual, but also family members and society.

Faul et al. (2010) report that the most common identifiable causes of TBIs in the United States are falls (35.2%), motor vehicle accidents (17.3%), and being struck by/against an object (16.5%). Individuals most likely to incur a TBI by fall are ages 0 to 14 years old (50.2%) and 65 years and older (60.7%). Faul et al. (2010) also report gender differences in the occurrence of TBIs, stating that males are more likely to incur a TBI at all ages and that approximately 1.4 times more TBIs occur in males than females

overall. Socioeconomic status (SES) is also correlated with TBI instances, with TBI occurring most often in lower SES groups (Ivins et al., 2003).

### **Disability Following Traumatic Brain Injury**

TBIs also pose a serious and prevalent health concern due to the disabilities acquired post-injury. For instance, of the annual survivors of TBI, it is estimated that 70,000 to 90,000 individuals will have lasting neurobehavioral difficulties that require rehabilitation (NIH, 1999). Thurman et al. (1999) estimated that 2% of the United States population, or approximately 5.3 million people, live with a disability caused by a TBI. This staggering number highlights the necessity of preventative and rehabilitative services informed by evidence-based practices.

An array of deficits in functioning following a TBI have been the focus of scholarly work, including difficulties in motor functioning, perceptual functioning, social functioning, cognition, personality, and language (Brooks & McKinlay, 1983; Crick & Dodge, 1994; Fakhry, Trask, Waller, & Watts, 2004; NIH, 1999; Prigatano, 1992; Wood, 2001). Interestingly, severity of a TBI is not found to positively correlate with level of disability. A study in England by Thornhill et al. (2000) reveals that increased severity of a TBI was correlated positively with rate of death/vegetative state and negatively with good recovery after one year in a population of young people and adults; however, severity of TBI did not correlate with the level of disability sustained (e.g., moderate disability or severe disability) at one year post-injury. Furthermore, Thornhill et al. (2000) suggest that incidence of moderate to severe disability following mild, moderate, and severe TBI was comparable (48%, 46%, and 48%, respectively). Nonetheless,



severity has been correlated with predicting other sequelae, such as resulting personality traits (Brooks & McKinlay, 1983).

Common long-term sequelae of TBI that affect daily functioning encompass a broad range of areas including: physical maladies (e.g., headaches, fatigue, pain, balance difficulties); cognitive decline (e.g., decreases concentration and executive functioning); and psychological changes (e.g., increased irritability and anxiety) (Carlson, 2010; Griffin et al., 2009). Many of these resulting difficulties negatively impact the individual's ability to remain a social human being.

### **Traumatic Brain Injury and Social Functioning**

Within the current social milieu, understanding the deficits in social functioning seems to be at the forefront of research. The majority of those who have suffered a TBI are likely to experience some level of social dysfunction (Worthington & Wood, 2009), which tends to heal more slowly than physical injuries (Zasler, Katz, & Zafonte, 2007). Limitations in social ability can make it difficult to develop and maintain interpersonal relationships and avoid social isolation, which may lead to a poor quality of life (Zasler et al., 2007).

Social functioning is the focus of many scholarly articles exploring post-TBI sequelae, as it proves to affect many critical areas of functioning (e.g., successful occupational functioning; interaction with and maintenance of primary and secondary support groups) (Brooks & McKinlay, 1983; Fakhry et al., 2004; Wood, 2001). Thomsen (1992) asserts that the long-term psychosocial outcome of an individual with a TBI is highly variable, with the most negative consequences being severely disturbed behavior and lack of insight. Furthermore, those who have experienced a TBI are more prone to

experiencing psychosocial stressors, which can lead to psychopathology (Granacher, 2007), thus highlighting the importance of a strong social support structure. Longitudinal studies seem to agree that the injured need to rely on established relationships for financial, housing, and behavioral support, as they experience continued difficulty holding a job, living independently, and controlling behaviors resulting from personality changes (Thomsen, 1984, 1992). Moreover, family members of those who have experienced a TBI are often relied upon to report changes in functioning to health professionals tracking rehabilitation progress, as an individual who has sustained a TBI may have decreased awareness of any changes that have occurred.

Unfortunately, research asserts that TBI causes continuing difficulty in one's marriage, other close relationships, and some of the qualities that support the relationships (e.g., personality and socioemotional functioning), leaving the injured at a disadvantage in the social arena. For example, change in personality is positively associated with a relative experiencing the injured individual as increasingly burdensome through the first year post-injury (Brooks & McKinlay, 1983). This decreased ability to maintain relationships results in the majority of TBI sufferers having little social contact and a poor psychosocial outcome (Burridge, Williams, Yates, Harris, & Ward, 2007; Hoofien, Gilboa, Vakil, & Donovan, 2001; Thomsen, 1984, 1992). Individuals who sustain a TBI endorse that a lack of social contact is the most concerning social sequelae of TBI (Morton & Wehman, 1995), indicating that, though they may want to engage in social interaction, they may lack the faculties to do so. This seems to be a valid concern, as approximately 50% to 60% of adults experiencing a severe TBI also experience long-term social isolation (Hoofien et al., 2001).

It is clear that, with all of the negative sequelae of TBI and their impact on social and independent living, it is important for an individual who has suffered a TBI to have adequate social support. The current dissertation seeks to provide an overview of the prevalence of TBI and discuss psychosocial sequelae associated with TBI, particularly the impact of a TBI on marital functioning, relationship satisfaction, and sexual satisfaction. Many early studies have examined the psychosocial impact of a TBI, with focus on the injured individual and his or her acquired deficits. Early studies tend to focus on severe TBIs in males, whereas more recent studies have attempted to include less severe injuries and female participants. Still, most research has been limited to small sample sizes, diverse methods, and differing inclusion criteria (e.g., severity, age), making comparison difficult.

Research on family impact, and spousal impact in particular, has been present in the past few decades; however, the research is often limited to perceived burden experienced by the caregiver, rates of separation/divorce, and factors that lead to marital dissatisfaction such as loss of emotional support, empathy, and companionship. Little research has been done on sexual satisfaction, and even fewer studies have taken the perspective of the uninjured spouse; furthermore, the majority of research focuses only on male TBI individuals and their female spouses. The literature review discusses research in the following areas: global impact of TBI on social functioning; impact of TBI on the family; and impact of TBI on a marriage, including relationship satisfaction and sexual dysfunction and satisfaction. The review concludes with a discussion of the current problem, as well as attempts to overcome prior studies' limitations.

## **Chapter 2: Review of the Literature**

Traumatic Brain Injury (TBI) affects many social dimensions and it is often difficult for others to adjust to the entirety of the injury. There seems to be a global impact on social functioning that is not limited to severe TBI that includes: changes in personality, maladaptive coping strategies, reduced socioemotional functioning, and reduced ability to return to work. The literature on this subject is vast and provides a general consensus of difficulty in many arenas. When narrowing the scope of social functioning to the immediate family, research has taken multiple perspectives, including that of the parent, sibling, child, and spouse. In the past, much of the focus has been on the burden placed on caregivers (e.g., spouse and parent of injured individual); however, more current literature has moved toward other aspects impacting spouses and the marriage that lead to higher rates of separation and divorce. With the increasing openness of American culture to discuss sexuality, sexual dysfunction and sexual satisfaction are now being targeted as important aspects of a marriage that are affected by the social and physical deficits caused by TBI. In the past, much of the research has focused on pinpointing the sexual dysfunctions common in the TBI population, with little research focusing on the sexual experience of an individual with TBI and his or her spouse. The following literature review will examine the past and current literature related to social, family, and marital functioning following TBI. The chapter will close with a statement of the problem, research questions, and hypotheses.

### **Global Impact of TBI on Social Functioning**

There are many theories regarding factors that contribute to difficulty maintaining and initiating relationships, as well as avoiding social isolation following a TBI. Some

researchers focus on factors existing pre-injury; for example, Wood (2006) reports that successful community integration can be correlated with gender and relationship status at the time of injury. Others suggest that it is more important to explore the negative sequelae caused by the TBI and how they further affect social functioning. Longitudinal studies report that many TBI sufferers have little social support outside of family members (Thomsen, 1984), with approximately 8% having no social support at all (Hoofien et al., 2001); these results emphasize the difficulty individuals with TBI may have maintaining social support.

Common in the existing literature are changes in daily functioning, occupational functioning, personality and behavior, coping skills, socioemotional functioning and emotional intelligence, and social integration. These areas, discussed in the following paragraphs, may collectively contribute to the overall decreased ability to function socially and maintain important social support structures.

**Daily functioning.** The inability to complete activities of daily living (ADLs; e.g., bathing, grooming, toileting) and independent activities of daily living (IADLs; e.g., grocery shopping, meal preparation, managing finances) for oneself can be hugely problematic. Dawson and Chipman (1995) found that their sample of individuals who had incurred a TBI (n=454) included those who needed daily assistance (30%), were unable to complete ADLs (15%), and were unable to complete various IADLs (30%). With the burden of such activities falling on caregivers, the ability to maintain positive social relationships and avoid increasing the perceived burden on those integral to daily functioning is highlighted.

**Occupational functioning.** Social integration is often measured in conjunction with occupational integration in adults, as a school environment is no longer applicable and, thus, it is assumed that the work environment is a large part of one's social interaction. Longitudinal studies five to 20 years post-injury suggest that approximately 60% of adults who have suffered a moderate-to-severe TBI can and/or do hold a job (Asikainen, Kaste, & Sarna, 1998; Hoofien et al., 2001), leaving the other 40% dependent on government assistance and the support of family and friends. Another longitudinal study was less optimistic, finding that only 25% of a community-based sample held employment approximately 13 years post-injury, with one third of those being unpaid and only 10% in full-time competitive employment (Dawson & Chipman, 1995). Individuals who have experienced a mild TBI have shown a better outcome, returning to work at a higher rate six-months post-injury, as compared to others with an injury of similar severity but not involving the head (Kraus, Schaffer, Stenehjem, Shen, & Afifi, 1995); however, level of difficulty reintegrating was not explored. It has also been found that employment status post-injury is correlated with age of injury, predicting a better outcome for those sustaining a TBI earlier rather than later in life (Wood, 2006). Overall, the inability to support oneself financially can cause a huge impact on both society and those supporting the injured. Furthermore, separation from a work setting may limit social interaction and reintegration.

**Personality and behavior.** In contrast with their injured relatives, family members state that the most concerning social sequelae of a TBI is a change in their loved one's personality (Morton & Wehman, 1995; Thomsen, 1984). In fact, change in personality may be an important target of concern, as studies suggest that personality changes may

lead to social withdrawal (Oddy, Coughlan, Tyerman, & Jenkins, 1985), which can directly affect social contact.

Agitation is often the most commonly exacerbated behavior in the first two weeks of hospitalization, but multiple changes have been reported during the life course of an individual following a TBI (Granacher, 2007; Prigatano, 1992). In some cases, the patient may develop characteristics typical of clinical personality disorders, such as antisocial personality disorder or borderline personality disorder (Granacher, 2007). A review of the literature by Prigatano (1992) reveals that more commonly reported exacerbated traits include anger, agitation, impatience, inappropriate social responses, emotional lability, anxiety, asponaneity, loss of drive, depression, manic-like states, and paranoia/delusions, among others. Furthermore, Prigatano (1992) notes syndromes commonly reported, including childishness (e.g., euphoric and self-centered behavior), helplessness (e.g., in need of constant support to achieve goals) and lack of insight or awareness of behavioral limitations. Prigatano (1992) classifies the personality disturbances into three groups: emotional (e.g., agitation, irritability, anger); motivational (e.g., apathy, loss of interest in the environment); and altered self-awareness (e.g., lack of insight or awareness to appropriate behavior, denial).

**Coping strategies.** A large portion of those individuals experiencing a TBI manifests high levels of emotional distress (Curran, Ponsford, & Crowe, 2000) and relies on coping strategies to deal with the difficulties. Good coping strategies have been implicated as a factor related to relationship strength within a couple in which one spouse has experience a TBI (Gill, Sander, Robins, Mazzei, and Struchen, 2011).

Research suggests that coping strategies following a TBI drastically change (as

measured by a friend or family member), and can lead to a decline in emotional adjustment (Dawson, Cantanzaro, Firestone, Schwartz, & Stuss, 2006). Commonly adopted coping strategies following a TBI include “avoidance, worry, wishful thinking, self-blame, and substance abuse” (Granacher, 2007, p. 342). Coping strategies have also been shown to impact mood and anxiety. Specifically, coping strategies involving worry, wishful thinking, and self-blame can lead to heightened levels of depression and anxiety, while problem solving and maintaining a positive outlook are associated with a lower level of anxiety (Curran et al., 2000). Furthermore, marital vulnerability has been shown to correlate negatively with self-esteem and positively with pathology (Kravetz et al., 1995), both of which seem to be indirectly affected by coping strategies.

**Socioemotional functioning and emotional intelligence.** Deficits in socioemotional functioning and emotional intelligence, (i.e., difficulties in recognition of emotions in self and others, management of emotions, and self motivation), have been shown to be present in a majority of individuals affected by a TBI (Williams & Wood, 2009; Wood & Williams, 2008). Although a single neurological process has not been implicated, research suggests that certain TBIs can release the amygdala from the influencing effects of the cortex, thus severing the tie between intellectual control and emotions (Starkstein & Robinson, 1991).

Reduced socioemotional functioning tends to leave the injured individuals experiencing more difficulty maintaining social support systems. For example, research conducted by Burrige et al. (2007) reports that partners of individuals post-TBI who rate the individual as having more socioemotional functioning difficulties experience less satisfaction in their relationship. Therefore, we would expect those TBI individuals



experiencing decreased socioemotional functioning to have a decline in social functioning due, in part, to the dissatisfaction of those in their social support system.

Research has also focused on social awareness (i.e., the ability to interpret social cues and evaluate the social impact of possible response behaviors) and social judgment (i.e., the ability to take into account past experiences and the present circumstances to make a decision towards the best outcome) deficits following injury, as they are said to occur in the majority of individuals with TBI (Eames & Wood, 1984; Wood, 2001; Worthington & Wood, 2009) and lead to poor long-term social functioning (Brooks & McKinnlay, 1983). Moreover, it has been shown that deficits in social awareness and judgment are more prognostic of a social functioning deficit than other global constructs (e.g., individual perspective or communication deficits) (Crick & Dodge, 1994).

**Social integration.** Social integration can be used to measure one's ability to participate in normal social relationships. Social integration can involve both maintaining social contacts (i.e., friendships, relationships) and participation in leisure activities. Past literature is generally commensurate, suggesting that there is a high prevalence of social isolation. For example, in a population of 454 individuals with TBI, only 10% were deemed to be "social integrated" (i.e., considering both participation and satisfaction); it was reported that 27% never socialize with friends and family at home, 20% never visit friends and family, and 47% never talk on the telephone (Dawson & Chipman, 1995). High prevalence of social integration again underscores the importance of family members understanding and compensating for the injured individual's deficits in order to maintain positive social outcomes.

## **Impact of TBI on the Family**

The impact of the diagnosis of a TBI on the family system has been the focus of many scholarly articles (Dawson & Chipman, 1995; Florian & Katz, 1991; Gossling & Oddy, 1999; Hoofien et al., 2001; Karpman, Wolfe, & Vargo, 1985; Lezak, 1978; London, 1967; Oddy, Humphrey, & Uttley, 1978; Rosenbaum & Najenson, 1976; Tarter, 1990; Willer, Durnan, & Ferry, 1990). Changes in personality, coping skills, socioemotional functioning, and the ability to hold a job can create changes in family roles and, therefore, the entire family system. Research has viewed the familial impact of a TBI from the perspective of parents (Karpman et al., 1985; Tarter, 1990; Willer et al., 1990), spouses (Brooks, 1984; Dawson & Chipman, 1995; Gossling & Oddy, 1999; Lezak 1988; Rosenbaum & Najenson, 1976; Thomsen 1974, 1984), children and siblings (Willer et al., 1990) of the injured. Nonetheless, the majority of the literature tends to focus on the impact experienced by the injured and/or their caregiver, which is most often found to be a parent or spouse.

**Burden on family members.** Studies have reported high rates of cohabitation following a severe TBI. Hoofien et al. (2001) indicated that in a large male population in Israel (n=76), only 14% of individuals with a TBI lived alone approximately 14 years after their injury. Some participants in their 30s and 40s were found to be living with parents, indicating the need of both functional and financial support. Though these rates were not compared to the general population of the time, there is indication that these individuals often rely on other family members or spouses for certain needs.

London (1967) published a scholarly article reporting on the burden placed on the families of TBI individuals experiencing emotional and behavioral sequelae. It was soon

followed by a litany of articles in the 1970s documenting both the frequency of personality changes following severe TBI and the effects felt by family members (Lezak, 1978; Oddy et al., 1978; Rosenbaum & Najenson, 1976). Though loved ones may experience what they refer to as a personality change, it is more likely that previously held traits have been exacerbated by the injury (Granacher, 2007). The literature indicated increasingly reported impact felt by spouses and parents of individuals with TBI due to behavior and personality changes.

Almost three decades later, following a number of scholarly research articles, Perlesz, Kinsella, and Crowe (1999) conducted a meta-analysis of 37 family outcome studies. They discovered a bias in the literature, indicating that family outcome was most often viewed in terms of stress and burden placed on relatives. While stress and burden have been shown to be a significantly concern for caregivers over the two decades of research, the authors recommended that future research provide an expanded view of psychosocial outcomes.

**Personality and behavior.** In the 1980s, McKinlay, Brooks, Bond, Martinage, and Marshall (1981) and Brooks and McKinlay (1983) were among the first to track the progression of behavioral and personality changes over the first year following a severe TBI. McKinlay et al. (1981) described more emotional and subjective symptoms rather than physical complaints. A few years later, Brooks and KcKinlay sought to better understand the behavioral and personality changes by looking at 46 male patients in the United Kingdom who had experienced either post traumatic amnesia (PTA) for at least 48 hours or were in a coma for at least six hours through the perspective of a close relative. Relatives were interviewed and asked to complete surveys, including

retrospective and current assessments of behaviors and personality adjectives at 3, 6, and 12 months post injury. Results indicated that relatives increasingly saw personality changes over time, with half reporting a personality change three months post injury and almost two-thirds reporting personality change at the 6 and 12 month marks. Of the 18 personality adjectives used, 11 traits were endorsed as being negatively impacted (e.g., being out of touch or unreasonable) at three months post-injury.

By 12 months post injury, 14 traits were endorsed as being negatively impacted. Traits such as coldness, cruelty, and disliking company tended to emerge at 12 months post-injury. While denial towards the occurring change in their injured relative was considered as a factor of the increasing number of reported negative traits, it could not adequately explain the personality change over the first year as there was no significant difference in reported negative personality changes between the three time intervals. Relatives feeling elevated levels of burden at six months report traits of low emotional control, coldness, disliking company, unhappiness, low energy, cruelty, meanness, and unreasonableness. At 12 months post-injury, relatives reporting high burden also include traits of irritability, listlessness, childishness, and insensitivity. Brooks and McKinlay (1983) report that the increased experience of burden over time may reflect a decreased ability to cope with negative personality changes as they unfold. The researchers' results indicate that personality change may take time to emerge, during which time family members may become less able to deal with these negative changes.

Personality changes are reported by family members to be the most concerning sequelae following a relative's TBI (Prigatano, 1992). The negative impact on a TBI sufferer's personality can often result in verbal and physical aggression towards

caretakers, who most often are spouses and parents (Lezak, 1978; Mauss-Clum & Ryan, 1981). After conducting a review of past literature, Prigatano (1992) classified the personality disturbances of TBI individuals into three categories: emotional (i.e., agitation, irritability, anger), motivational (i.e., apathy, loss of interest in the environment), and altered self-awareness (i.e., lack of insight or awareness to appropriate behavior, denial). Emotional changes are often felt by many individuals with TBI, and account for many secondary symptoms. A lessened acceptance of the disability has been associated with higher psychological symptomology in individuals with long-term severe TBI (i.e., hostility, depression, and anxiety) (Hoofien et al., 2001).

**Mood.** In addition to reported changes in personality, individuals with TBI may also experience mood alterations, which significantly impact psychosocial functioning. For example, the majority of individuals with severe TBI experience long-term major depression (61%) (Hoofien et al., 2001), though the emotional consequences seem to penetrate family members as well. Emotional responses experienced by the family due to the sequelae of TBI include: depression, anger, grief, denial, disturbances in social functioning, and psychosomatic symptoms. Though the symptoms are often dependent on the relationship that the family member has with the injured individual, the symptoms seem to be consistent across families. Hoofien et al. (2001) noted the psychiatric symptomology of the relatives of severe TBI sufferers approximately 14 years post-injury in Israel. Using the Symptoms Checklist 90 Revised (SCL-90-R; Derogatis, 1994), it was found that a significant ( $p < 0.001$ ) percentage scored above the 95<sup>th</sup> percentile in domains of Anxiety (35.3%), Hostility (32.4%), Somatization (29.4%), and Depression (26.5%).

## **Impact of TBI on a Marriage**

A TBI often affects many facets of the marital relationship, including marital satisfaction. It has been found that wives of men who have experienced a TBI tend to have more difficulties with the resulting disability than other family member (Brooks, 1984; Lezak, 1988; Rosenbaum & Najenson, 1976; Thomsen, 1974, 1984).

Unfortunately, many areas of difficulty following TBI have been also indicated as areas related to relationship strength within the TBI community, including commitment, communication, spending time together, social support, and coping skills. Past research has discussed many changes that occur in a marriage following one spouse incurring a TBI. The following areas will be examined as an addition to the family impact discussed above: role changes, separation and divorce, and occupational/financial changes.

**Role change.** The role of the uninjured spouse often changes and may include more financial responsibility, as well as a more parental role towards the injured spouse due to the behavioral and personality changes. When an individual has a spouse who has incurred a TBI, they can feel as though they are the only grown-up in the family (Thomsen, 1984). In a study of 18 couples in which the husband had a TBI, all of the women studied reported an increase in responsibility, with 72.2% feeling that they had total responsibility, in the relationship (Gossling & Oddy, 1999). Injured women tend to report higher levels of handicap; however, Dawson and Chipman (1995) suggest that this may be due to the traditional roles that they assumed pre-TBI (i.e., homemaking).

**Separation and divorce.** Unfortunately, separation and divorce occur in many marriages in which one spouse incurs a TBI. When observing rates five to eight years post-injury, separation occurs in around 40% of the TBI population (Oddy et al., 1985),

while divorce occurs in between 11% to 55% of marriages (Hoofien et al., 2001; Kreuter et al., 1998; Tate et al., 1989; Wood & Yurdakul, 1997). In two of the more recent studies, rates differ vastly. Kreuter et al. (1998) found that 56% of their population (n=92) of TBI individuals, including all levels of severity, had divorced post-injury, a number not significantly different from a comparison population who had experienced a spinal cord injury (48%). Hoofien et al. (2001) experienced a more positive outcome in Israel when studying severe TBI, although still statistically more negative than the general population. The long-term marriage rate was 64.4% (national average = 86%) and the divorce rate was 11.8%, with 5.2% occurring post injury. These results may be seen as an increasing trend of more supportive spouses, more effective and comprehensive medical and rehabilitation treatment, or cultural differences in marriage and treatment.

Overall, it has been thought that the psychosocial sequelae have the most serious impact on divorce rate (Thomsen, 1984). Wood, Liossi, and Wood (2005) gave a 12-item measure to spouses and ex-spouses (n=48) of “serious” TBI individuals to assess for neurobehavioral characteristics that had negatively affected their relationship. Responses suggest that relationship stability is not determined solely by severity of the injury, patient’s age, or length of relationship. Instead, the authors assert that mood swings (i.e., unpredictable behavior and quick temper), specifically anger and aggression, are key neurobehavioral symptoms of an injured spouse that contribute to higher rates of separation and divorce. There are varying results on whether married individuals with TBI experience more mood symptoms than their single counterparts. Moore, Stambrook, Gill, and Lubusko (1992) found that married individuals who had experienced a TBI

(varying severity) reported more depression, anxiety, fatigue, confusion, and overall mood disturbance at an average of four years post-injury; however, Kreuter et al. (1998) found no differences in mood symptoms between these populations.

**Occupational functioning and financial changes.** Research in the past 12 years has reported highly variable unemployment rates following a more severe TBI, likely between 25% and 60% (Dawson & Chipman, 2005; Hoofien et al., 2001). Nonetheless, these rates represent a decline from earlier research conducted in 1978 that indicates that approximately 64% of TBI individuals who had worked pre-injury had returned to work part- to full-time four to six months post-injury, with those suffering a less severe injury returning more quickly (Oddy et al., 1978). The higher rate in the earlier study may reflect the younger population used (80% were under 25 years of age) and the inclusion of less-severe injuries. For example, when targeting mild TBI alone, Kraus et al. (1995) found that affected individuals are more likely to have returned to work six months post-injury than a cohort of patients with physical injuries of equal severity, thus supporting the idea that less severe injuries have a more mild impact on work status. With limited ability in vocational functioning, it is no surprise that spouses of these individuals begin to feel a financial burden as the sole financial provider and see their spouse more as a child than as a partner. These feelings may be less prevalent for spouses whose injured partner only incurred a mild TBI.

### **Relationship Satisfaction**

**From the perspective of the injured spouse.** Research indicates that the majority of individuals with TBI experience no decrease in relationship satisfaction. Using the Psychosexual Assessment Questionnaire (PAQ), Kreutzer and Zasler (1989)



found that in a sample of 16 married men who had experienced varying severities of TBI, approximately two-thirds rated their marriage as good or very good, as compared to pre-injury. Echoing these results, Ponsford (2003) found that 36% of TBI individuals experienced a decrease in quality of their relationship with their sexual partner. These rates of satisfaction are relatively high considering the host of difficulties reported. The lack of insight experienced by the individuals with TBI may contribute to the reduced ability to notice negative changes in the relationship, compared to that reported by their spouses. Research by Gosling and Oddy (1999) support this idea, reporting a large difference in the ratings of marital satisfaction between a male spouse with a TBI and his wife, with the wife reporting much more dissatisfaction.

**From the perspective of the uninjured spouse.** Research from the perspective of the spouse is limited, but emerging. General findings indicate that the uninjured spouse of an individual with a brain injury report that their marriage has worsened since the injury. Decreased satisfaction points to multiple factors such as their partner's lack of empathy, companionship, relationship skills, insight, and socioemotional capacity.

Gosling and Oddy (1999) published a study examining the marital relationships of 18 males who had incurred a TBI and their wives. All couples had been married prior to the TBI and had been married for an average of 16.2 years. The female partners reported significantly worse marital relationship, with the average rating indicating a marriage with 'severe problems.' Additionally, the wives qualitatively expressed a change or loss of companionship.

Burridge et al. (2007) conducted a more recent retrospective study comparing the relationship satisfaction of three groups of couples in the United Kingdom. The first

group included a member of a couple who had experienced an acquired brain injury (ABI) (n=20), the second included a member of a couple who was experiencing chronic pain (n=20), and the third was a healthy group (n=20). The ABI group included injured males (n=12) and females (n=8) who had experienced a range of mild to severe injuries at least one year prior to the study. Multiple measures were used, including the Relationship Questionnaire (RQ) and Socio-Emotional Questionnaire (SEQ).

Results indicated that relationship satisfaction was related to empathy, relationship skills, and SEQ total score. Couples in the ABI group rated their current relationship satisfaction significantly lower than the healthy group and partners of ABI individuals reported a greater decrease in relationship satisfaction than the partners of healthy individuals. The low relationship satisfaction of the partners of ABI individuals was associated with their partner's poorer functioning in overall socioemotional skill and reduced insight into their deficit. Unfortunately, no gender differences were reported. This study specifically implicates the ABI individual's reduction in empathy in the low relationship satisfaction reported by their partners. Although this dissertation's target population (i.e., partners of individuals with a TBI) is a subset of the ABI population, similar outcomes may be anticipated.

Recent research by Cassidy (2012) tried to qualify the experiences of partners of Iraq combat veterans who sustained a TBI. The study examined seven women whose husbands had sustained a moderate to severe TBI more than two years ago. Ages of injured husbands ranged from 31 to 54 and the majority (n=6) had Post Traumatic Stress Disorder (PTSD) comorbidity. In terms of the marital relationship, all participants spoke to some degree of alienation from "the husband they once knew," which "seemed to

contribute to their sense of solation and abandonment” (Cassidy, 2012 p. 140). The participants described many feelings, including feeling pushed away and “apart” from their husband. Nonetheless, a theme of commitment to their injured partner was reported.

Altogether, there is no general consensus as to what factors are most liable for reduction in the uninjured spouse’s relationship satisfaction. However, marital satisfaction is likely to be individualistic and multifaceted, drawing influence from many dynamics.

### **Sexual Dysfunction and Satisfaction**

Although sexual satisfaction is seen as one of the many domains contributing to overall marital satisfaction, much of the past literature on marital impact post-TBI does not discuss sexual problems. It is widely accepted that sexual dysfunction is common following a TBI (Hibbard, Gordon, Flanagan, Haddad, & Labinsky, 2000; Lezak, 1978; Mauss-Clum & Ryan, 1981; Rosenbaum & Najenson, 1976). Furthermore, demographic variables may impact the severity of the sexual impact; for example, individuals sustaining a TBI at an older age tend to experience worse post-injury sexual adjustment than their younger counterparts (Kreuter et al, 1998). Both primary (i.e., organic) and secondary (i.e., emotional after-effects) sexual problems have been identified as contributing to the resulting sexual dysfunction, though the literature cannot fully differentiate the difficulties resulting from the two domains (Aloni & Katz, 1999).

Much of the literature is dedicated to the specific sexual deficits experienced following a TBI. Furthermore, most literature has concentrated on establishing the common symptoms experienced by men, with small sample sizes. Early studies have suggested that a decrease in sexual activities was seen just as often as an increase in

sexual activities following a TBI (Oddy et al., 1978), pointing to a lack of inhibition as the reason behind increases. However, more recent studies show an increase in reporting sexual difficulties. This increase may be due to an increased openness to discussing sexuality in present-day culture or the increasing number of female subjects included, as the female sex tends to report both a higher prevalence of difficulties and a broader ranged of dysfunction.

**From the perspective of the injured spouse.** Kruetzer and Zasler (1989) found that 57% of their male subjects with TBI (n=21) experienced decreased sex drive and 62% indicated a decrease in sexual intercourse after the injury. A decade later, Crowe and Ponsford (1999) found more profound experiences of reduced sex drive (89%) and decreased sexual intercourse in men (86%) (n=14). They also suggest that sexual arousal disturbances may not be explained by physiological factors alone and that imagery may contribute to deficits in sexual arousal.

In 1990, Garden, Bontke, and Hoffman examined the sexual functioning of men (n=11) and women (n=4) who had experienced “relatively mild” TBI at least two months prior to the study. All injuries occurred after marriage to their current spouse, with an average length of marriage being 11.47 years. Additionally, spouses filled out surveys regarding various aspects of their sexual and marital functioning. Results, as reported by the individuals with TBI, found that 75% of the females (n=3) indicated a decrease in intercourse frequency, compared to only 55% of males. A total of 47% of the couples expressed dissatisfaction with the frequency of intercourse in their relationship. Overall, results suggest similar percentages of reduction in sexual intercourse frequency in the male TBI population as compared to Kruetzer and Zasler (1989) just a year earlier. The

study served to highlight the gender discrepancies in sexual experiences following TBI.

Hibbard et al. (2000) published one of the most comprehensive retrospective studies to date examining sexual difficulty post-TBI. The study served to increase data on women who have experienced a TBI, adding a large population of female subjects (n=193 men; 129 women) and a control group (n=152 men; 112 women). The study focused on individuals between the ages of 16 and 64 years who were residents of New York and experienced TBI more than one year prior ( $M=9$  years). TBI severity ranged from moderate to severe. Subjects were assessed using the Quality of Life Interview (QOLI; Lehman, 1988), which included dimensions of sexual functioning, mood, health, and quality of life. Mild TBI severity, higher levels of depression, and older age of injury onset were all correlated with higher reporting of sexual dysfunction. A correlation between a man's age at the time of the interview and the reporting of sexual dysfunction was discovered (i.e., older TBI males reported greater sexual dysfunction). Unlike prior literature, there was no correlation between time post-TBI and sexual dysfunction. Furthermore, the study found that race and level of education were unrelated to sexual dysfunction.

Differences in gender of the injured individual revealed interesting results. For instance, women reported an equal and higher incidence of sexual dysfunction in all gender-neutral categories, but less difficulty in their relationship and increased involvement in sexual activity (Hibbard et al., 2000), contrary to previous research. As past literature would predict, men experienced a decreased involvement in sexual activity post-TBI. The authors propose a few phenomena that may be occurring. First, women may be more willing and open to discussing sexual difficulties or, conversely, men may

be more resistant. Second, women may be able to hide sexual difficulties more effectively from their partners than men post-TBI.

In Australia, Ponsford (2003) attempted to expand on the past work of Kreuter et al. (1998) and Kreutzer and Zasler (1989) by adapting a similar assessment tool while using language appropriate for both sexes, allowing for the use of injured female participants. Additionally, the author used a larger study group (i.e., 208 patients) and a control group while maintaining a severity profile of moderate to severe TBI. The study examined the changes in many domains of sexuality one to five years post injury, as well as the perceived reasoning for the changes as seen by the injured patient. The study reported sexual changes in over 50% of TBI individuals with many domains deviating significantly from the control group including: decreased importance of sexuality (36%); fewer opportunities to engage in sexual activities (39%); decreased sex drive (41%); decrease in frequency of engaging in sexual activities (54%); decreased ability to give partner sexual satisfaction (39%); reduced ability to engage in sexual intercourse (38%); less enjoyment of sexual activity (38%); decreased self-confidence (52%), decreased sex appeal (47%); and increased preoccupation with problems (45%). The results echoed those of Kreuter et al. (1998) and Kreutzer and Zasler (1989) demonstrating statistically significant decreases in sexual functioning, sexual desire, and self-esteem and affect. Although the study included females (31%), the results suggested that there was no significant difference in reporting between genders. Commonly reported reasons for a change in sexual behavior and enjoyment included physical (i.e., fatigue, decreased mobility, pain, loss/decrease of sensitivity) and psychological factors (i.e., low self confidence, difficulties communicating, feeling unattractive).

Altogether, results suggest a general decrease in the sexual domain of the injured individual's relationship. Though past studies disagree as to whether TBI women tend to experience an increase vs. decrease in sexual activity, it is generally agreed that TBI women do experience a greater frequency and breadth of negative sexual sequelae. These results call into question other gender differences that may result in such discrepancies (e.g., reporting difference, biological differences, behavioral differences).

**From the perspective of the uninjured spouse.** In one of the first studies to look at the sexual satisfaction of a spouse, Rosenbaum and Najenson (1976) interviewed wives of Israeli soldiers 12 months after they returned from war. The husbands had either: sustained a TBI (n=10); sustained a physical injury resulting in paralysis (n= 6); or returned with no injuries (n=14). Although the paraplegic group reported more sexual difficulties in the relationship, both the TBI and paraplegic groups reported significantly more difficulties than the non-injured group. There was no correlation found between the location of the injury and sexual functioning; however, the study points to other possible causes, including the direct result of the interpersonal relationship between the spouses. This hypothesis is supported by the tendency of wives of the TBI group to report adverse feelings towards physical contact with their injured spouse, possibly due to the increased childlike dependency and self-orientation that was prominently reported in this group. Later research by Maus-Clum and Ryan (1981) report similar feelings of female spouses of TBI men, who indicated that they felt like they were married to a "stranger" (32%), were "married without a husband" (50%), and had no sexual outlet (47%).

Articles in the 1990s echoed the concerns of female spouses of TBI husbands. Wives reported reduced sexual satisfaction, described their sexual relationship as "feeling

wrong,” and saw their husband as a “stranger” (Gosling & Oddy, 1999). Although female spouses reported a higher incidence of anorgasmy (64%) after their husband’s TBI, uninjured male spouses rarely reported problems with sexual functioning (Garden et al., 1990).

Similarly, Aloni, and Katz (2003) suggest that, based on reports to professionals, sexual dysfunction is not a priority for spouses of individuals with a TBI, whereas emotional, behavioral, and personality changes are more concerning. Views of sexual satisfaction seem to greatly differ between the perspective of the individual with a TBI and that of the spouse. When looking at the perspective of the individual with a TBI, 89% of those with partners (n=53) were satisfied with the sexual aspects of their relationship and 75% were satisfied with the frequency of sexual activity (Kreuter et al., 1998). Although these rates seem relatively high, similar studies focusing on the uninjured spouses reveal vastly lower levels of sexual satisfaction, suggesting a difference in subjective experience and needs.

Recently, Gill et al. (2011) attempted to qualitatively explore the experience of intimacy of those who had experienced a TBI and their intimate partners. Participants included 18 couples, with only two-thirds of the couples being married. Marriages occurred both prior to and after the TBI. Gender of injured partner was predominantly male (n=12) and the mean time since injury was 4.78 years. The couples were asked 25 questions regarding changes in intimacy post-TBI. The two major themes that emerged were “barriers to intimate relationships” and “factors related to relationship strength” (p. 60). Main factors leading to relationship difficulty and distress included: role strain, financial problems, emotional distress related to isolation, and the feeling that the injured



partner had changed as a person.

Overall, past literature seems to suggest that an uninjured spouse's satisfaction within the sexual domain of their marriage is related to their spouse's socioemotional role and personality changes, which cause a reduction in intimacy (i.e., closeness, companionships) and desire. Nonetheless, the majority of uninjured spouses were females, so the perspectives are likely to be highly gender-biased.

### **Review of Gender Differences**

A difference in prevalence rates of TBI often makes men the focus of TBI literature. Research comparing general differences in TBI between genders is scarce and contradictory. A metaanalysis by Farace and Alves (2000) reported that women fared worse in 17 out of 20 research studies reviews across all types of TBI, including outcome domains of: death, length of hospitalization, memory, dizziness, fatigue, irritability, concentration, insomnia, vision, headache, anxiety, and depression. Factors such as verbal ability, brain functioning, sex hormones, treatment effects, and symptom reporting have been proposed to influence some of the differences.

As previously mentioned, women are reported to be more likely to experience a higher frequency and greater breadth of sexual dysfunction by some (Hibbard et al., 2000), while others note no gender differences in facets of sexual functioning (Ponsford, 2003). While both studies included a relatively large population size and similar TBI severity criteria, they utilize populations from two different continents (i.e., United States and Australia, respectively) that differ in time since TBI. Nonetheless, discrepancies warrant further investigation in future research.

Also bearing emphasis, the majority of the uninjured perspective was that of

females with husbands impacted by TBI. Therefore, reporting is likely to be gender biased in some facets.

### **Statement of the Problem**

The majority of those who have suffered from a TBI will experience some level of social functioning deficit. Social functioning deficits can negatively impact spousal, family, and social relationships and can lead to an overall poorer quality of life (Zasler, Zatz, & Zafonte, 2007). Married individuals with a TBI rely on their spouse for day-to-day emotional and physical care, making the relationship a crucial source of social interaction and support. Unfortunately, at such a vulnerable time in which it is important for the injured to maintain close relationships, a marriage can deteriorate after one of the spouses experience a TBI.

One of the areas of a marriage that is affected by TBI is the couple's sexual interaction, which may contribute to the deterioration of the marriage. Of particular interest is the perspective of the spouse of the injured individual and the sexual satisfaction experienced post-injury. Much of the current literature on sexual functioning and satisfaction focuses on the injured spouse who is often a male, leaving a poverty of data on the experience of an uninjured male spouse. There is limited research that highlights the differences in sexual satisfaction of non-injured wives versus non-injured husbands. Furthermore, severity of injury, as it relates to sexual satisfaction of one's spouse, has been vastly understudied and lacks gender differences. This information may be critical in the individualized psychological treatment and support of the spouses of individuals sustaining a TBI.

## **Research Questions**

In order to address these concerns and fill the gaps in the current literature, this study poses the following questions:

1. Is there a significant relationship between marital dissatisfaction and sexual dissatisfaction?
2. Is there a significant difference in marital dissatisfaction between individuals with injured spouses and individuals with non-injured spouses?
3. Is there a significant difference in sexual dissatisfaction between individuals with injured spouses and individuals with non-injured spouses?
4. Is there a relationship between the gender of an individual with an injured spouse and their sexual dissatisfaction?
5. Is there a relationship between the severity of an individual's TBI and their spouse's sexual dissatisfaction?

## **Hypotheses**

1. Marital dissatisfaction will be correlated with sexual dissatisfaction. This assertion is based on the definition of marital dissatisfaction, encompassing sexual aspects of the relationship.
2. Individuals who have injured spouses will report higher rates of marital dissatisfaction than those who have non-injured spouses. This assertion is based on past research, finding that psychosocial consequences of a general injury may be more indicative of marital problems (Kreuter et al., 1998).
3. Individuals who have injured spouses will report higher rates of sexual dissatisfaction than those who have non-injured spouses. This assertion is

based on results of past literature comparing the sexual experiences of individuals with spouses who have incurred a TBI vs. a control group (Rosenbaum & Najenson, 1976), as well as research that describes the negative sexual experiences of the uninjured spouse in general (Aloni & Katz, 2003; Gill et al., 2011; Gosling & Oddy, 1999; Maus-Clum, 1981).

4. Gender of injured spouse will be related to sexual dissatisfaction. Specifically, husbands of injured women will report lower sexual dissatisfaction than wives of injured men, given results of Hibbard et al. (2000) and the authors' hypotheses that women may be able to hide sexual difficulties more effectively from their partners than men post-TBI.
5. Severity of injury reported will not be correlated to sexual dissatisfaction, given that severity does not correlate with the level of disability sustained (e.g., moderate disability or severe disability) (Thornhill et al., 2000).

## **Chapter 3: Method**

### **Research Design**

The present study used a quantitative survey correlation design. A between-group design was utilized to examine the research questions. The study had two categorical variables: (a) traumatic brain injury (TBI; four levels include no TBI, mild TBI, moderate TBI, and severe TBI) and (b) gender (two levels include male and female). The study had two continuous dependent variables: (a) sexual satisfaction and (b) marital satisfaction. Given the moderate relationship between the two dependent variables (Pearson's correlation), research questions and exploratory analyses were evaluated using multiple multivariate analyses of variance tests (MANOVAs) which each included one independent variable on both dependent variables. The MANOVA is a powerful inferential statistic that allows the researcher to reject the null hypothesis and analyze differences between groups when such differences are present.

### **Participants**

Participants included: (a) heterosexual married individuals whose spouse had incurred a medically diagnosed TBI and (b) heterosexual married individuals whose spouse had never incurred a TBI. All participants were recruited through advertising via the Internet, word of mouth, and flyers sent to various rehabilitation programs across the United States. Of the 225 individuals who accessed the survey, 44% met inclusion criteria, completed the survey, and were included in the analysis ( $n = 99$ ). A total 38.4% of the eligible participants were determined to be in the TBI group ( $n = 38$ ).

**Inclusion criteria.** Cohabiting heterosexual married individuals between the ages of 18 and 80 were eligible to participate. Due to the limited literature assessing

sexual satisfaction in this population and the exploratory nature of this study, the age parameters considered were based on age limits provided by the instrument assessing marital and sexual dissatisfaction in the current study. The participants had to have knowledge of the severity of the TBI diagnosed by a medical professional, either by a rating scale or severity level (i.e., mild, moderate, or severe). The participants were also required to have a sixth grade reading level.

**Exclusion criteria.** Through self-report, the participants must not have been diagnosed with any sexual dysfunction. In the control group, any individuals who (a) had incurred a TBI themselves or (b) had been diagnosed with a sexual disorder or dysfunction were excluded from the study.

**Participant compensation.** No compensation was offered for participation.

### **Operational Definitions**

**Independent variables.** Independent variables were identified as TBI and gender.

*Traumatic Brain Injury (TBI).* A TBI is defined using the Center for Disease Control and Prevention's (CDC) definition as "a bump, blow or jolt to the head or a penetrating head injury that disrupts the normal functioning of the brain" (Faul et al., 2010, p. 8). This variable was measured either as reported level of severity (i.e., mild, moderate, or severe) or reported GCS rating, depending on the individual's knowledge of the spouse's injury as diagnosed by a medical physician. For the purpose of this study, the severity of a TBI is categorized as one of the following: no TBI; mild TBI (GCS  $\geq 13$ ); moderate TBI (GCS = 9-12); or severe TBI or (GCS  $\leq 8$ ).

*Gender.* Gender is defined as the subjective categorization of physical sex (i.e., male or female).

**Dependent variables.** Dependent variables were identified as marital dissatisfaction and sexual dissatisfaction.

***Marital Dissatisfaction (MD).*** Based on Snyder (1997), the marital dissatisfaction is defined as the overall dissatisfaction with the relationship including global relationship dissatisfaction, an unfavorable comparison to others' relationships, and a negative outlook pertaining to the future of the relationship defines marital dissatisfaction.

***Sexual Dissatisfaction (SD).*** Based on Snyder (1997), this is the general dissatisfaction with the sexual relationship, inadequate affection during sexual exchanges, and malcontent with the partner's enthusiasm or interest in sexual activities defines sexual dissatisfaction.

**Other terms.** Other terms identified were the TBI group and the control group.

***TBI group.*** The TBI group was identified by those participants who met inclusion criteria and had a spouse who has incurred a traumatic brain injury.

***Control group.*** Those participants who met inclusion criteria and had a spouse who had *never* incurred a traumatic brain injury made up the control group.

## **Instruments**

The following instruments were administered successively, in the order listed.

**Exclusion survey.** The purpose of this survey was to assess factors that may cause the potential participant to be excluded from the survey due to pre-established exclusion criteria, as well as assess for the independent variable of gender. The researcher supplied all questions in this survey. The 10-question survey included queries regarding the following: age, education level, gender, relationship status, residential

status, sexual disorders, traumatic brain injury, and medical/psychological disorders. See Appendix B for specific questions and response options (if given).

**Demographic survey.** The purpose of this survey was to assess socio-demographic factors that may be correlated with the dependent variables and to categorize the participant into either of the groups (i.e., TBI group vs. control group). The researcher supplied all questions in this survey. The nine-question survey included queries regarding race, socioeconomic status, geographic location, religion, psychological disorders, and referral source. It also included a final question inquiring about the participant's spouse's TBI history so as to direct them to the next appropriate section of the survey. More specifically, if the participant indicated that her spouse has experienced a TBI, they would be placed in the TBI group and directed to answer questions regarding that TBI (i.e., Traumatic Brain Injury Survey) before proceeding to the Marital Satisfaction Inventory, Revised. However, if the participant indicated that their spouse has never experienced a TBI, they would be placed in the control group and directed straight to the Marital Satisfaction Inventory, Revised. See Appendix C for specific questions and response options (if given) on the demographic survey.

**Traumatic brain injury (TBI) survey.** The purpose of this survey was to categorize the independent variable of Traumatic Brain Injury as well as assess situational factors of the TBI and the precipitating deficits. As previously stated, this survey was only given to those participants determined to be in the TBI group. The researcher supplied all questions in this survey. The six-question survey included queries about their spouse's TBI in the following domains: severity, time since TBI, presence of



various disabilities, and time of TBI in relation to the start of the marriage. See Appendix D for specific questions and response options (if given).

**Marriage survey.** The purpose of this survey was to assess information about the participant's marriage and spouse that may correlate with the dependent variables. The five-question survey included queries about the following: spouse's age at time of marriage, length of marriage, and any psychological disorders their spouse is currently being treated for. See Appendix E for specific questions and response options (if given).

**Marital Satisfaction Inventory, Revised (MSI-R).** The Marital Satisfaction Inventory, Revised (MSI-R; Snyder, 1997) is a valid and reliable self-report measure developed to identify the type and magnitude of marital satisfaction or distress experienced in a marital relationship. The primary purpose for the administration of this instrument was to quantify the dependent variables of MD and SD. The measure is comprised of 150 "True" or "False" questions that are structured into 13 scales. The 13 scales include two validity scales (i.e., Inconsistency and Conventionalism), one global affective scale (i.e., Global Distress Scale [GDS]), and 10 scales that measure specific areas of marital distress, including the following: Affective Communication, Problem-Solving Communication, Aggression, Time Together, Disagreement about Finances, Sexual Dissatisfaction, Role Orientation, Family History of Distress, Dissatisfaction with Children and Conflict over Child Rearing.

The MSI-R is based on a sample population of 1,020 intact couples that were geographically diverse and representative of the U.S. census regions (Snyder, 1997). Additionally, the sample was also consistent with the U.S. census for ethnicity, education level, socioeconomic status (SES), and occupation. The measure demonstrates internal

consistency and test-retest reliability. Internal consistency ranges from .70 to .93 with a mean alpha of .82. Test-retest reliability coefficients were measured for a six-week period and ranged from .74–.88 with a mean of .79.

The MSI-R has been used in past research with couples experiencing many types of psychological and health concerns including the following: traumatic brain injuries (Carroll, Byrne, & Casey, 2009), cancer (Brosseau, MacDonald, & Stephen, 2011; Speer et al., 2005), chronic distress (Christensen et al., 2004), depression and/or anxiety (Hickey et al., 2005), Attention Deficit Hyperactivity Disorder (Robin & Payson, 2002), and alcoholism (Perodeau & Kohn, 1989).

For the purpose of this study, the MSI-R was reproduced electronically with permission from the Western Psychological Services (Appendix A) using the original instructions and the first 129 questions in the original order (i.e., the last 21 questions regarding children were omitted). Most relevant to this study, two scales were calculated—the Global Distress Scale (GDS) and Sexual Dissatisfaction Scale (SEX)—using T-scores based on the gender of the participant.

GDS was used to measure Marital Dissatisfaction. The GDS scale measures overall dissatisfaction with the relationship including global relationship distress, an unfavorable comparison to others' relationships, and a negative outlook pertaining to the future of the relationship (Snyder, 1997).

SEX was used to measure Sexual Dissatisfaction. The SEX scale assesses sexual dissatisfaction in three domains: general dissatisfaction with the sexual relationship, inadequate affection during sexual exchanges, and discontent due to the partner's apparent lack of enthusiasm or interest in sexual activities (Snyder, 1997).

**Sexual activity survey.** The purpose of this survey was to assess factors regarding the married couples' sexual activity in the past year that may be correlated with the dependent variables. The researcher supplied all questions in this survey. The five-question survey included queries regarding frequency of intercourse and other sexual activity, medications with negative sexual side effects, and sexual disorders/dysfunctions. See Appendix F for specific questions and response options (if given).

## **Procedures**

Participants were recruited via the internet, word of mouth, post, and flyers to participate in the online survey. Online advertisement took place through online brain injury support groups, professional psychological association listserves, blogs, and social media sites. Furthermore, recruitment letters were sent nationally to professionals working at cognitive rehabilitation centers and in other settings that work with traumatic brain injury. In addition to these letters, flyers were attached for these professionals to use as they wish. Materials directed potential participants to the uniform resource locator (URL) where the survey was to be completed.

When filling out the survey, potential participants first answered questions in the Exclusion Survey that screened for eligibility for either the experimental or control group. Skip-logic technology provided by the secure survey host Survey Monkey® allowed for this ability. If inclusion criteria were met, the subjects were then redirected to an electronic consent form (Appendix G). Once they read and agreed to the consent procedures, participants proceeded to complete the surveys: Demographic Survey (Appendix B); Traumatic Brain Injury Survey (if in the experimental group) (Appendix D); Marriage Survey (Appendix E); the electronically adapted version of the MSI-R; and

Sexual Activity Survey (Appendix F). Following the successful completion of these surveys, participants were redirected to a debriefing page explaining the purpose of the research (Appendix H) and given the opportunity to provide their home or email address so as to receive the results of the study upon completion.

### **Assumptions**

In order to assess the levels of dissatisfaction via dependent variables of MD and SD, measures from the MSI-R where measuring dissatisfaction were utilized. Thus, when interpreting levels of satisfaction in both domains, the assumption was made that the more dissatisfied an individual is in either domain, the less satisfied they are in the respective domain; that is, that they are inversely proportionate.

### **Ethical Considerations**

The study was submitted to the Institutional Review Board (IRB) of The Chicago School of Professional Psychology. Research design, procedures, and documents were approved by the IRB.

Informed consent was gained through an online form that was completed before engaging in other study materials; furthermore, the participants were encouraged to print a copy for their records. Adaptive technology was implemented so as to be certain that the participant understood the informed consent.

The informed consent document (Appendix G) included the potential risks of engaging in the survey. The risks in participating in the study were found to be minimal and limited to breach of confidentiality. Due to this possibility, participants were not required to provide any identifying information (e.g., phone number, address, etc.). However, if they were interested in receiving the results of the present study, they were

asked to provide their email address. The individuals participating in the study were given contact information for the principle investigator, dissertation chair, and The Chicago School Institutional Review Board.

Benefits of participation included the opportunity to receive the results of the present study upon completion. In addition, subjects may have benefited from considering their personal thoughts and feelings during the completion of the instruments. No other benefits were anticipated as a result of participating in the study.

The collected data was protected on an encrypted storage device and placed in a locked office. Furthermore, data containing identifying information was stored on a separate, encrypted storage device that was stored at a separate location behind a locked door. Per ethical guidelines regarding research, study data will be saved on an external hard drive and stored for the required period of five years and then physically destroyed.

There were no known conflicts of interest or personal biases held by the principal investigator that are related to this study.

## **Chapter 4: Results**

In order to address these concerns and fill the gaps in the current literature, this study posed the following research questions, which were explored in the present chapter:

- Is there a relationship between the gender of an individual with an injured spouse and their sexual dissatisfaction?
- Is there a relationship between the severity of an individual's TBI and their spouse's sexual dissatisfaction?
- Is there a significant relationship between marital dissatisfaction and sexual dissatisfaction?
- Is there a significant difference in marital dissatisfaction between individuals with injured spouses and individuals with non-injured spouses?
- Is there a significant difference in sexual dissatisfaction between individuals with injured spouses and individuals with non-injured spouses?

### **Descriptive Statistics**

Participants ranged in age from 21 to 79 ( $M = 44.12$ ,  $SD = 13.64$ ). The majority of participants were female (90.9%) and had completed a bachelor's degree or higher (61.6%). Although the current study strived to include participants from diverse racial backgrounds, the population was largely White not of Hispanic or Latino origin (67.7%) or White of Hispanic or Latino origin (28.3%). Marriage length ranged from one to 57 years ( $M = 17.69$ ;  $SD = 13.70$ ).

The group of participants whose spouse had incurred a TBI (TBI group) comprised of 38 individuals, the majority being female ( $n = 32$ ). The severity of TBIs represented included all three categories: mild (28.9%), moderate (26.3%), and severe

(44.7%). Health problems resulting from the injury included loss of ambulation (18.4%), physical dysfunction (31.6%), and sexual dysfunction (34.2%). Furthermore, half (50%) of the injured spouses are receiving therapy for a psychological difficulty. The majority of the marriages occurred before their spouses' TBI (76.3%). The TBIs experienced by spouses occurred between three and 360 months from the date of the survey ( $M = 119.43$ ,  $SD = 111.06$ ).

Select demographic variables for all eligible participants ( $n = 99$ ) are represented in Table 1, including demographics by gender and by group.

To determine whether the two groups (i.e., TBI group and Control Group) differed significantly in age or length of marriage, a  $t$  test was executed. Although equal variances could not be assumed, there was not a significant difference between the ages of participants [ $t(95.29) = -1.49$ ,  $p = .14$ ] or length of marriage [ $t(95.48) = -1.52$ ,  $p = .13$ ] between the groups.

To determine whether the two sexes (i.e., male and female) differed significantly in age or length of marriage, a  $t$  test was executed. There was no significant difference in age [ $t(97) = -.49$ ,  $p = .63$ ] between the two groups. Furthermore, there was no significant difference in length of marriage [ $t(97) = -1.23$ ,  $p = .16$ ] between the groups. Equal variance can be assumed in both cases.

Table 1

*Demographic Variables*

Variable	Mean (SD)	Range
Age	44.12 (13.64)	21–79
Male	42.00 (10.21)	26–56
Female	44.33 (13.97)	21–79
Control Group	45.61 (15.09)	23–79
TBI Group	41.74 (10.70)	21–62
Age of Spouse	46.25 (6.74)	21–85
Marriage Length (years)	17.69 (13.70)	1–57
Male	12.33 (10.83)	1–34
Female	18.22 (13.89)	1–57
Control Group	19.21 (15.17)	1–57
TBI Group	15.24 (10.67)	1–35
Variable	Frequency	Percent
Groups		
Control Group	61	61.6
TBI Group	38	38.4
Sex		
Male	9	9.1
Female	90	90.9
Race		
White (Hispanic Origin)	28	28.3
White (Non-Hispanic Origin)	67	67.7
Black/African American	2	2.0
Other (Biracial)	2	2.0
Income*		
≤40,000	15	16.3
40,001–90,000	40	43.5
≥ 90,001	37	40.2
Education**		
High School Graduate	20	20.2
Associate's Degree	17	17.2
Bachelor's Degree	29	29.3
Graduate Degree	32	32.3

\* Not all participants responded.

\*\*Selected categories representing the majority are reported.



## Inferential Statistics

**1. Is there a significant relationship between marital dissatisfaction (MD) and sexual dissatisfaction (SD)?** The researcher sought to explore the relationship between SD and MD. It was hypothesized that MD will have a strong correlation with SD given that the measure used to calculate the two scales (MSI-R) uses Sexual Dissatisfaction (SEX; the scale used to measure SD) as a subscale of the Global Distress Scale (GDS; the scale used to measure MD), and there is an inherent relationship. The relationship was investigated using a Pearson product-moment correlation coefficient. Initial analyses were conducted to ensure no violation of the assumptions of normality, linearity, or homoscedasticity. According to guidelines set by Cohen (1988), there was a large, positive correlation between the two variables [ $r = .62, n = 99, p < .0005$ ], suggesting that SD is associated with MD within the total population. (See Table 2). However, when separated by gender, it is noted that there was only a significant correlation between the two variables for females [ $r = .63, n = 90, p < .0005$ ] and not males [ $r = .37, n = 9, p = .33$ ].

Table 2

### *Correlation Between SEX and GDS*

<i>Source</i>		<i>SEX</i>
Correlation	Sexual Dissatisfaction	.62**
	Sig. (2-tailed)	.000
	N	99

\*\*Correlation is significant at the 0.01 level (2-tailed).

**2. Is there a significant difference in marital dissatisfaction (MD) between individuals with injured spouses and individuals with non-injured spouses?** The researcher sought to explore whether there is a relationship between having a spouse with a TBI and one's marital dissatisfaction. It was hypothesized that individuals who have injured spouses will report higher rates of marital dissatisfaction than those who have non-injured spouses. Given the strong correlation between dependent variables *SEX* and *GDS*, a one-way two-group multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. To answer the current question, the analysis was used to compare the marital dissatisfaction scores as represented by the MSI-R *GDS* scale for the independent variable of group (i.e., TBI vs. control). Preliminary assumption testing was conducted to check for normality, linearity, homogeneity of variance-covariance matrices, and multicollinearity. It was noted that Levene's Test of Equality of Error Variances indicate that equality of variances cannot be assumed. There was a statistically significant difference noted between the TBI group and the control group on the combined dependent variables:  $F(2,96) = 23.66$ ,  $p < .0005$ ; Wilk's Lambda = .67; partial eta squared = .33. (See Table 3). When looking at the dependent variables separately, *GDS* reaches significant statistical significance using a Bonferoni adjusted alpha level of .025:  $F(1,97) = 46.44$ ,  $p < .0005$ , partial eta squared = .32. Review of the mean scores indicates that the TBI group ( $M = 62.61$ ,  $SD = 11.80$ ) report higher levels of marital dissatisfaction than the control group ( $M = 49.15$ ,  $SD = 7.86$ ). Thus, those with injured spouses reported significantly more MD.

Table 3

*Tests of Between-Subjects Effects: TBI Status on Marital/Sexual Dissatisfaction*

<i>Source</i>	<i>Dependent Variable</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial Eta Squared</i>
Injured Spouse	Marital Dissatisfaction	4240.54	1	4240.54	46.44	.0005	.32
	Sexual Dissatisfaction	1179.76	1	1179.76	8.80	.004	.08
Error	Marital Dissatisfaction	8856.71	97	91.31			
	Sexual Dissatisfaction	12999.41	97	134.02			
Total	Marital Dissatisfaction	305139.00	99				
	Sexual Dissatisfaction	288362.00	99				
Corrected Total	Marital Dissatisfaction	13097.29	98				
	Sexual Dissatisfaction	14179.17	98				

**3. Is there a significant difference in sexual dissatisfaction (SD) between individuals with injured spouses and individuals with non-injured spouses?** The researcher sought to explore whether there is a relationship between having a spouse with a TBI and SD. It was hypothesized that individuals who have injured spouses will report higher rates of sexual dissatisfaction than those who have non-injured spouses. Given the strong correlation between dependent variables SEX and GDS, a one-way two-group multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. To answer the current question, the analysis is used to compare the sexual dissatisfaction scores as represented by the MSI-R SEX scale for the independent

variable of group status (i.e., TBI vs. control). Preliminary assumption testing was conducted to check for normality, linearity, homogeneity of variance-covariance matrices, and multicollinearity, though no serious violations were noted. As mentioned before, there was a statistically significant difference noted between the TBI group and the control group on the combined dependent variables:  $F(2,96) = 23.66, p < .0005$ ; Wilk's Lambda = .67; partial eta squared = .33. (See Table 3.) When looking specifically at sexual dissatisfaction, significance is reached using a Bonferoni adjusted alpha level of .025:  $F(1,97) = 8.80, p = .004$ , partial eta squared = .08. (See Table 3.) Review of the mean scores indicates that the TBI group ( $M = 57.00, SD = 11.69$ ) report higher levels of sexual dissatisfaction than the control group ( $M = 49.90, SD = 11.51$ ). Thus, those with injured spouses reported significantly more SD.

**4. Is there a relationship between the gender of an individual with an injured spouse and their sexual dissatisfaction (SD)?** The researcher sought to explore whether there is a relationship between gender and SD within individuals with injured spouses. It was hypothesized that husbands of injured women would report less sexual dissatisfaction than wives of injured men. Given the strong correlation between dependent variables SEX and GDS, a one-way multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. To answer the current question, the analysis was used to compare the sexual dissatisfaction scores as represented by the MSI-R SEX scale, for the independent variable of gender. Preliminary assumption testing was conducted to check for normality, linearity, homogeneity of variance-covariance matrices, and multicollinearity, though no serious violations were noted. There was no statistically significant difference noted between the

men and women with injured spouses on the combined dependent variables:  $F(2,35) = 1.51$ ,  $p < .079$ ; Wilk's Lambda = .92; partial eta squared = .08. (See Table 4.)

Furthermore, when looking specifically at sexual dissatisfaction, significance is not reached using a Bonferoni adjusted alpha level of .025:  $F(1,36) = 2.70$ ,  $p = .14$ , partial eta squared = .06. Review of the mean score indicates that males with injured spouses report slightly higher sexual dissatisfaction ( $M = 50.50$ ,  $SD = 8.39$ ) than females with injured spouses ( $M = 58.22$ ,  $SD = 11.91$ ); however, males with injured spouses do not report significantly different levels of sexual dissatisfaction than females with injured spouses. Therefore, there is not a significant difference in SD between males and females with injured spouses.

Table 4

*Tests of Between-Subjects Effects: Gender on Sexual Dissatisfaction*

<i>Source</i>	<i>Dependent Variable</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial Eta Squared</i>
Gender	Sexual Dissatisfaction	301.031	1	301.03	2.281	.140	.060
Error	Sexual Dissatisfaction	4750.969	36	131.97			
Total	Sexual Dissatisfaction	128514.000	38				
Corrected Total	Sexual Dissatisfaction	5052.000	37				

**5. Is there a relationship between the severity of an individual's TBI and their spouse's sexual dissatisfaction (SD)?** The researcher sought to explore the

difference between severity of a spouse's injury by SD. It was hypothesized that the reported severity of injury would not be correlated to sexual dissatisfaction, given that severity does not correlate with the level of disability sustained (e.g., moderate disability or severe disability). Given the strong correlation between dependent variables SEX and GDS, a between-group multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. Subjects were divided into four groups (Group 0: no TBI; Group 1: mild TBI; Group 2: moderate TBI; and Group 3: severe TBI). There was a statistically significant difference noted between the levels of injury severity on the combined dependent variables:  $F(6,188) = 7.55, p < .0005$ ; Wilk's Lambda = .65; partial eta squared = .19. (See Table 5.) Furthermore, when looking specifically at sexual dissatisfaction, significance is reached:  $F(3,95) = 3.55, p = .017$ , partial eta squared = .10. Post-hoc comparisons using the Tukey HSD test revealed a significant difference between the mean score of Group 0 ( $M = 49.90, SD = 11.51$ ) and Group 3 ( $M = 59.82, SD = 9.49$ ) (Mean Difference = -9.92). Group 1 ( $M = 54.27, SD = 12.67$ ) and Group 2 ( $M = 55.20, SD = 13.97$ ) do not significantly differ from Group 0, Group 3, or each other (see Table 5). Thus, sexual dissatisfaction differed significantly only between Group 0 (no TBI) and Group 4 (severe TBI), but not between those with a spouse experiencing some severity of brain injury (i.e., mild, moderate, and severe). Altogether, the results suggest that individuals with a spouse who has experienced a severe TBI have significantly more SD than those individuals with an uninjured spouse.

Table 5

*Test of Between-Subject Effects: TBI Severity on SEX*

<i>Dependent Variable</i>	<i>(I) TBI Severity</i>	<i>(J) TBI Severity</i>	<i>Mean Difference (I-J)</i>	<i>Sig.</i>
Sexual Dissatisfaction	No TBI	Mild TBI	-4.37	.658
		Moderate TBI	-5.30	.540
		Severe TBI	-9.92*	.012
	Mild TBI	Moderate TBI	-.93	.998
		Severe TBI	-5.55	.604
	Moderate TBI	Severe TBI	-4.617	.749

\*The mean difference is significant at the 0.05 level.

Dependent Variable: SEX

Tukey HSD

## Exploratory Analyses

In order to determine if SD and MD were correlated with other demographic variables measured during the survey, as well as those explored in past research, exploratory analyses were conducted on the TBI group.

### **Demographic correlates of sexual dissatisfaction (SD).**

**Household income.** The relationship between household income and SD was investigated using Pearson product-moment correlation coefficient. Bearing mention, TBI severity was not controlled for given aforementioned results (i.e., there is not a significant difference between severity and SD among individuals whose spouse has incurred a TBI) and will not be controlled for in further correlations. According to the guidelines set by Cohen (1988), there was no significant relationship between SD and household income at the  $p < .05$  level [ $r = .195$ ,  $n = 34$ ,  $p = .268$ ]. (See Table 6.)

Table 6

*Correlation Between SEX and Household Income (TBI Group)*

<i>Source</i>		<i>Sexual Dissatisfaction</i>	<i>Household Income</i>
Correlation	Sexual	1	.195
	Dissatisfaction		
	Sig. (2-tailed)		.268
	N	38	34
	Household Income	.195	1
	Spouse	.268	
	Sig. (2-tailed)	34	34
	N		

**Race.** The researcher sought to explore whether there is a relationship between the race of the participant (i.e., uninjured spouse of injured individual) and SD. Given the strong correlation between dependent variables *SEX* and *GDS*, a one-way multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. To answer the current question, the analysis was used to compare the sexual dissatisfaction scores as represented by the MSI-R *SEX* scale for the independent variable of race. Subjects were asked to identify their race as one of seven groups (Group 1: White of Hispanic/Latino Origin; Group 2: White not of Hispanic/Latino Origin; Group 3: Black/African American; Group 4: American Indian/Alaska Native; Group 5: Asian; Group 6: Native Hawaiian or Other Pacific Islander; Group 7: Other). Given that only four groups were present, two of which contained only one participant (i.e., Group 3 and Group 7), only Group 1 and Group 2 were compared. Preliminary assumption testing was done to examine normality, univariate and multivariate outliers, and homogeneity of



variance-covariance matrices. No serious violations were noted. There was no statistically significant difference noted between the race of the participants (i.e., White Hispanic/Latino vs. White Non-Hispanic/Latino) on the combined dependent variables:  $F(2, 33) = 1.94, p = .016$ , partial eta squared = .11. Furthermore, when looking specifically at sexual dissatisfaction, significance is again not reached using a Bonferoni adjusted alpha level of .025:  $F(1, 34) = .06, p = .81$ , partial eta squared = .002. (See Table 7.) Altogether, the results suggest that there is no significant difference in SD between individuals identifying as White Hispanic/Latino Origin and those individuals identifying as White not of Hispanic/Latino Origin.

Table 7

*Tests of Between-Subjects Effects: Race on SEX (TBI Group)*

<i>Source</i>	<i>Dependent Variable</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial Eta Squared</i>
Race	Sexual Dissatisfaction	8.496	1	8.496	.059	.810	.002
Error	Sexual Dissatisfaction	4900.254	34	144.125			
Total	Sexual Dissatisfaction	123589.000	36				
Corrected Total	Sexual Dissatisfaction	4908.750	35				

**Education level.** The researcher sought to explore the differences between education level of the participant (i.e., uninjured spouse of injured individual) by SD. Given the strong correlation between dependent variables *SEX* and *GDS*, a between-group

multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. Subjects were asked to identify their education level as one of seven groups (Group 1: 6<sup>th</sup> grade or less; Group 2: Some middle school; and Group 3: Some high school; Group 4: High school graduate; Group 5: Associates Degree; Group 6: Bachelor's Degree; or Group 7: Graduate Degree). Due to the absence of participants in Group 1 and Group 2, and the low number of participants in Group 3 (n=1), these groups were omitted. There was no statistically significant difference noted between Group 4, Group 5, Group 6, and Group 7 on the combined dependent variables:  $F(6,64) = .20, p = .98$ ; Wilk's Lambda = .96; partial eta squared = .02. Furthermore, when looking specifically at sexual dissatisfaction, significance is again not reached using a Bonferoni adjusted alpha level of .025:  $F(3,33) = .072, p = .097$ , partial eta squared = .01. (See Table 8.) Due to lack of significance, post-hoc comparisons were not necessary. Altogether, the results suggest that within individuals with a spouse who has experienced a severe TBI, SD does not significantly differ between education levels.

Table 8

*Tests of Between-Subjects Effects: Education Level on SEX (TBI Group)*

<i>Source</i>	<i>Dependent Variable</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial Eta Squared</i>
Education Level	Sexual Dissatisfaction	32.882	3	10.961	.072	.974	.007
Error	Sexual Dissatisfaction	5002.686	33	151.597			
Total	Sexual Dissatisfaction	124793.000	37				
Corrected Total	Sexual Dissatisfaction	5035.568	36				

**Age.** The relationship between frequency of age and SD was investigated using Pearson product-moment correlation coefficient. According to guidelines set by Cohen (1988), there was no significant relationship at the  $p < .05$  level between sexual dissatisfaction and the age of the uninjured spouse [ $r = .230, n = 38, p < .165$ ]; however, there was a significant medium-sized relationship between sexual dissatisfaction and the age of the injured spouse [ $r = .394, n = 38, p < .014$ ]. This suggests that SD is higher with increasing age of injured spouse. (See Table 9.) An analysis of shared variance indicates age of injured spouse helps to explain nearly 12% of the variance in SD within the TBI group.

Table 9

*Correlation Between SEX and Age of Injured Spouse (TBI Group)*

<i>Source</i>		<i>Age of Injured Spouse</i>
Correlation	Sexual	.394**
	Dissatisfaction	.014
	Sig. (2-tailed)	38
	N	

\*\*Correlation is significant at the 0.05 level (2-tailed).

**Effect/correlation of other variables on sexual satisfaction (SS).**

**Frequency of sexual intercourse.** The relationship between frequency of sexual intercourse and SD was investigated using Pearson product-moment correlation coefficient. Bearing mention, TBI severity was not controlled for given aforementioned results (i.e., there is not a significant difference between severity and SS among individuals whose spouse has incurred a TBI) and will not be controlled for in further

correlations. According to guidelines set by Cohen (1988), there was a large, negative correlation between sexual dissatisfaction and frequency of intercourse [ $r = -.66$ ,  $n = 37$ ,  $p < .0005$ ], suggesting that SD decreases with increased frequency of sexual intercourse within the TBI population (see Table 10). An analysis of shared variance indicates frequency of sexual intercourse helps to explain nearly 44% of the variance in SD within the TBI group.

Table 10

*Correlation Between SEX and Frequency of Intercourse (TBI Group)*

<i>Source</i>		<i>Sexual Dissatisfaction</i>
Correlation	Freq. Intercourse	-.657**
	Sig. (2-tailed)	.000
	N	37

\*\*Correlation is significant at the 0.01 level (2-tailed).

***Frequency of sexual activity (other than intercourse).*** The relationship between frequency of other sexual activity (i.e., excluding sexual intercourse) and SD was investigated using Pearson product-moment correlation coefficient. According to guidelines set by Cohen (1988), there was a medium, negative correlation between sexual dissatisfaction and frequency of other sexual activity [ $r = -.48$ ,  $n = 37$ ,  $p < .003$ ], suggesting that SD decreases with increased frequency of sexual activity within the TBI population. (See Table 11.) An analysis of shared variance indicates frequency of other sexual activity helps to explain nearly 23% of the variance in SD within the TBI group.

Table 11

*Correlation Between SEX and Frequency of Other Sexual Activity (TBI Group)*

<i>Source</i>		<i>Sexual Dissatisfaction</i>
Correlation	Freq. Other Sex. Activity	-.476**
	Sig. (2-tailed)	.003
	N	37

\*\*Correlation is significant at the 0.01 level (2-tailed).

***Time since injured spouse's TBI.*** The relationship between the number of months since the occurrence of the TBI and SD was investigated using Pearson product-moment correlation coefficient. According to guidelines set by Cohen (1988), there was a very small negative correlation between sexual dissatisfaction and number of months since TBI [ $r = -.086$ ,  $n = 38$ ,  $p = .606$ ] (Table 12); however, the results do not reach statistical significance at the  $p < .05$  level, thus suggesting that the length of time since the TBI does not significantly correlate with SD.

Table 12

*Correlation Between SEX and Frequency of Other Sexual Activity (TBI Group)*

<i>Source</i>		<i>Sexual Dissatisfaction</i>
Correlation	Months Since TBI	-.086
	Sig. (2-tailed)	.606
	N	38

\*\*Correlation is significant at the 0.01 level (2-tailed).

***Time of marriage.*** The researcher sought to explore whether there is a relationship between time of marriage (i.e., before TBI vs. after the TBI) and SD within individuals with injured spouses. Given the strong correlation between dependent variables *SEX* and *GDS*, a one-way multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. To answer the current question, the analysis was used to compare the sexual dissatisfaction scores, as represented by the MSI-R *SEX* scale, for the independent variable of time of marriage (i.e., before TBI [1] vs. after TBI [2]). Preliminary assumption testing was conducted to check for outliers and homogeneity of variance-covariance matrices; no serious violations were noted. There was no statistically significant difference noted between time of marriage (i.e., before or after TBI) on the combined dependent variables:  $F(2,35) = 2.86, p = .071$ ; Wilk's Lambda = .86; partial eta squared = .14. Furthermore, when looking specifically at sexual dissatisfaction, significance is again not reached using a Bonferoni adjusted alpha level of .025:  $F(1,36) = 3.56, p = .067$ , partial eta squared = .09. (See Table 13.) Review of the mean score indicates that individuals who married their spouse prior to their spouse's TBI report slightly higher sexual dissatisfaction ( $M = 58.93, SD = 2.10$ ) than those who married their spouse after their spouse's head injury ( $M = 50.78, SD = 3.77$ ); however, the two groups did not report significantly different levels of sexual dissatisfaction. Therefore, there is not a significant difference in SD between individuals who married their spouse pre-TBI vs. post-TBI.

Table 13

*Tests of Between-Subjects Effects: Time of Marriage on SEX (TBI Group)*

<i>Source</i>	<i>Dependent Variable</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial Eta Squared</i>
Time of Marriage	Sexual Dissatisfaction	456.582	1	456.582	3.577	.067	.090
Error	Sexual Dissatisfaction	4595.418	36	127.650			
Total	Sexual Dissatisfaction	128514.00	38				
Corrected Total	Sexual Dissatisfaction	5052.00	37				

***Length of marriage.*** The relationship between length of marriage within the TBI group and SD was investigated using Pearson product-moment correlation coefficient. According to guidelines set by Cohen (1988), there was a small, positive correlation between sexual dissatisfaction and frequency of other sexual activity [ $r = .29$ ,  $n = 38$ ,  $p < .081$ ]; however, the results do not reach statistical significance at the  $p < .05$  level, thus suggesting that SD is not significantly correlated with length of marriage. (See Table 14.)

Table 14

*Correlation Between SEX and Length of Marriage (TBI Group)*

<i>Source</i>	<i>Sexual Dissatisfaction</i>	
Correlation	Length of Marriage	.287
	Sig. (2-tailed)	
	N	.081
		38

\*\*Correlation is significant at the 0.01 level (2-tailed).

***Presence of sexual dysfunction.*** The researcher sought to explore whether there is a relationship between whether or not the injured spouse has a sexual dysfunction and SD. Given the strong correlation between dependent variables *SEX* and *GDS*, a one-way multivariate analysis of variance (MANOVA) was conducted to reduce the chances of a Type I error. To answer the current question, the analysis was used to compare the sexual dissatisfaction scores, as represented by the MSI-R *SEX* scale, for the independent variable of presence of a sexual dysfunction (i.e., injured spouse with a sexual dysfunction [1] vs. injured spouse without a sexual dysfunction [2]). Of the 37 individuals with spouses who had incurred a TBI, approximately 35% (n=13) reported their spouse to have a sexual dysfunction, while approximately 65% (n= 24) indicated no presence of a sexual dysfunction. Preliminary assumption testing was conducted to check for outliers and homogeneity of variance-covariance matrices and no serious violations were noted. There was no statistically significant difference noted between time of marriage (i.e., before or after TBI) on the combined dependent variables:  $F(2,34) = 2.95, p=.066$ ; Wilk's Lambda = .852; partial eta squared = .148. Furthermore, when looking specifically at sexual dissatisfaction, significance is again not reached using a Bonferoni adjusted alpha level of .025:  $F(1,35) = 5.26, p=.028$ , partial eta squared = .131. (See Table 15.) Review of the mean score indicates that individuals whose injured spouse has a sexual dysfunction report slightly higher sexual dissatisfaction ( $M = 62.15, SD = 3.02$ ) than those whose injured spouse does not have a sexual dysfunction ( $M = 53.54, SD = 2.23$ ); however, the two groups did not report significantly different levels of sexual dissatisfaction. Therefore, there is not a significant difference in SD between individuals who have an injured spouse with or without a sexual dysfunction.



Table 15

*Tests of Between-Subjects Effects: Sexual Dysfunction on SEX (TBI Group)*

<i>Source</i>	<i>Dependent Variable</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial Eta Squared</i>
Sexual Dysfunction	Sexual Dissatisfaction	635.430	1	625.430	5.257	.028	.131
Error	Sexual Dissatisfaction	4163.651	35	118.961			
Total	Sexual Dissatisfaction	123185.00	37				
Corrected Total	Sexual Dissatisfaction	4789.081	36				

### Summary of Results

Table 16 displays the relationships between sexual dissatisfaction and the variables examined in both the inferential statistics and the exploratory analysis sections. Unfortunately, due to the small number of males in the TBI group (n=6), correlations and effects could not reliably be analyzed separately.

Given the results, SD is thought to correlate negatively with frequency of sexual intercourse and frequency of sexual activity. Thus, the quantity of these activities seems to be an important factor in determining SD, not strictly quality. Furthermore, age of the injured spouse has a medium positive affect on SD, revealing that SD tends to increase with older age of the injured individual. Not surprisingly, having a spouse with a TBI in general seems to contribute to higher levels of SD. None of the other variables analyzed seemed to significantly correlate with or have an effect on level of SD.

Table 16

*Summary of Results between SEX and Examined Variables (TBI Group)*

	<i>Sexual Dissatisfaction</i>	<i>r</i>	<i>% Variance (eta squared)</i>
Variable with Effect/Correlation	Freq. of Intercourse	-.657*	43%
	Freq. of Sexual Activity	-.476*	23%
	Age (Injured Spouse)	.394**	16%
	Spouse with a TBI	--	(.08)***
Variables with no Effect/Correlation (at min. $p < .05$ level)	Time Since Injury		
	Time of Marriage		
	Sexual Dysfunction (Injured Spouse)		
	Age (Uninjured Spouse)		
	Household Income		
	Race of Participant <sup>1</sup>		
	Education Level <sup>2</sup>		
	(Uninjured Spouse)		
	Length of Marriage		
	Gender		
	Severity of Injury		

\*Correlation is significant at the 0.01 level (2-tailed).

\*\*Correlation is significant at the 0.05 level (2-tailed).

\*\*\*Between-subjects effect is significant at  $p < .05$ .

<sup>1</sup>White of Hispanic/Latino Origin vs. White not of Hispanic/Latino Origin only.

<sup>2</sup>Selected groups only.

*Note.* % Variance is calculated by squaring  $r$ .

## **Chapter 5: Summary, Conclusions, and Recommendations**

Traumatic brain injury (TBI) is known to impact many cognitive processes, including behavior, personality, language, and many other factors impacting daily living and functioning. Approximately 1.7 million TBIs occur annually in the United States alone and leave about 2% of the national population with a disability; thus, making TBI a disorder of public health significance (NIH, 1999). Aside from the devastating personal difficulties brought on by TBI, the changes also affect those closest to the injured individual. Of those, spouses are thought to represent the most affected family member (Brooks, 1984; Lezak, 1988; Rosenbaum & Najenson, 1976; Thomsen, 1974, 1984). Not surprisingly, these struggles result in a variety of difficulties, including separation, divorce, feelings of burden, financial difficulty, and a variety of sexual difficulties.

A sample of 38 men and women currently married and living with a spouse who has incurred a TBI and 61 control subjects met eligibility and participated in the current study via the Internet. Participants were between the ages of 21 and 79 and represented various locations within and outside the United States of America. Participants completed multiple small surveys, including: the Exclusion Survey, Demographic Survey, Traumatic Brain Injury Survey (TBI group only), Marriage Survey, and Sexual Activity Survey, totaling 29 to 35 questions. Additionally, participants were asked to complete the MSI-R (Snyder, 1997). In order to address the research questions, data was analyzed using inferential statistics (e.g., Pearson's correlation and MANOVAs). Further, frequencies and descriptive statistics were reported for the study. The remainder of this chapter will discuss the findings and their implications, as well as limitations of

the present study. Recommendations and future directions of research will also be discussed.

### **Review of Findings and Implications**

The current study examined whether or not there is a significant relationship between marital dissatisfaction and sexual dissatisfaction. The scales used to measure the two variables are inherently correlated given the construction of the MSI-R; in fact, initial construction of the scales revealed a large intercorrelation (.53; Snyder, 1997). Nonetheless, the current study suggests that the responses given by females on the two scales are highly correlated; however, the responses given by males on the two scales are not significantly correlated. Of importance, the male population size was limited ( $n = 9$ ). Thus, sexual dissatisfaction and marital dissatisfaction may not be associated for married men. Bearing mention when discussing the results in terms of marital and sexual satisfaction, it is assumed that there is a direct inverse correlation between scales measuring dissatisfaction and the responder's satisfaction.

Consistent with the researcher's hypothesis regarding the difference in marital dissatisfaction between individuals with injured (i.e., TBI) spouses and individuals with non-injured spouses, individuals with spouses who have had a TBI experience significantly less marital satisfaction than individuals with uninjured spouses.

Consistent with the researcher's hypothesis and past research (Rosenbaum & Najenson, 1976), individuals with spouses who have had a TBI experience significantly less sexual satisfaction than individuals with uninjured spouses. Further research that includes a larger population of uninjured males with wives who have incurred a TBI is needed to adequately assess gender differences within this result.

Inconsistent with the researcher's hypothesis, there was not a significant difference in the level of reported sexual dissatisfaction between men with injured wives and women with injured husbands. Although men reported a slightly higher mean T-score, there is not a clinically significant difference between the sexes in sexual satisfaction. Bearing emphasis, the small population of males in the TBI group was likely to have influenced statistical significance.

Consistent with the researcher's hypothesis, there was not a significant difference in the level of reported sexual satisfaction between those with an injured spouse of mild, moderate, or severe injury. Current results further suggest that sexual satisfaction only differed between those individuals who have a spouse without a TBI and those individuals who have a spouse with a severe TBI.

It was determined that individuals with spouses who have incurred a TBI experience significantly less sexual satisfaction within their marriage than those with uninjured spouses. Further exploratory analyses suggest that there are multiple significant determinants of sexual satisfaction in the TBI group, including:

- Sexual satisfaction increases with increased *frequency of intercourse*
- Sexual satisfaction increases with increased *frequency of sexual activity* (other than intercourse)
- Sexual satisfaction decreases as the *age of the injured spouse* increases.

### **Existing Literature and Present Study**

**Marital satisfaction.** Consistent with past literature on acquired brain injuries (Burridge et al., 2007), the current results indicate a significant difference in relationship satisfaction between couples in which one has a TBI and couples in which neither have

had a TBI, as reported by the uninjured spouse. Furthermore, looking at the current population, approximately five out of six individuals with injured spouses are reporting significant ( $T = 50-60$ ; 36.8%) to extensive ( $T > 60$ ; 47.4%) levels of relationship dissatisfaction (MSI-R Global Distress Scale) in their marriage post injury. This result is consistent with past literature (Gossling & Oddy, 1999).

**Sexual satisfaction.** When examining the past literature in which the perspective of the uninjured spouse was taken into account, many consistencies emerge with the results of the current study; however, discrepancies are also noted.

Firstly, consistent with past study of Rosenbaum and Najenson (1976) that states that wives of men with TBI report more sexual difficulties in their relationship than wives of healthy men, uninjured spouses in the TBI group report significantly more sexual dissatisfaction than individuals in the control group. The idea that wives of men who have experienced a TBI experience reduced sexual satisfaction in general (i.e., not compared to a control group) has been largely supported in past research (Gosling & Oddy, 1999; Garden et al., 1990). Although the current research did not assess change in sexual satisfaction, it may be assumed that sexual dissatisfaction rates rose in part due to their spouse's TBI given the rates of their control counterparts.

Of particular interest, results of the current study indicate that the severity of TBI experienced by an individual does not correlate with their spouse's sexual satisfaction. This result is consistent with the similar probabilities of incurring moderate to severe general disability regardless of TBI severity (Thornhill et al., 2000). Although past literature has suggested a correlation between TBI severity and personality change (Brooks & McKinlay, 1983) and qualitative reports of socioemotional and personality

changes being a key factor in decreased sexual satisfaction in the uninjured spouse (Aloni & Katz, 2003; Gill et al., 2011; Gosling & Oddy, 1999; Maus-Clum & Ryan, 1981; Rosenbaum & Najenson, 1976), one cannot assume that TBI severity thusly correlates with sexual satisfaction. There is likely a confounding variable and/or specific socioemotional/personality qualities involved in the separation of the two variables that warrant further investigation.

Consistent with Kreuter et al. (1998 [1]), the present study indicated that the age of the injured spouse does impact the resulting sexual experience. Specifically, age has an indirect relationship with sexual satisfaction. This same correlation was not seen in the control group, thus suggesting that the correlation is due to factors specific to the TBI group.

The current study explored other factors as they relate to sexual satisfaction of the uninjured spouse of the TBI group that was not found in previous literature. Specifically, that frequency of sexual intercourse and other sexual activity is positively correlated with sexual satisfaction within the TBI group. It should be noted that similar correlation coefficients were found in the control group, suggesting that these correlations are not unique to the TBI group. Although these results are not surprising, they emphasize the importance of quantity of sexual activity in a relationship to sexual satisfaction.

When considering the many reported outcome variables that women tend to fare worse post-TBI (Farace & Alves, 2000), it is surprising that a gender difference in marital and/or sexual satisfaction is not prominent, given the likely impact. The current results may suggest, similarly to Hibbard et al. (2000), that the female TBI spouses of the uninjured male participants were able to “hide” their sexual difficulties or that the

uninjured male respondent is reluctant to disclose difficulties in his sexual relationship. To explore these options, it is suggested that future studies involving females with TBI are additionally assessed as to whether they actively “hide” sexual difficulties from their partner.

### **Limitations**

Upon review of the findings, the researcher notes the following limitations:

**Measurement.** The current study chose to look at the marital and sexual satisfaction of married individuals using the MSI-R (Snyder, 1997). Given the correlation of the two scales measuring the variable (SEX and GDS), there are correlations inherent to the construction to the test. Thus, the correlation between the two variables affects inferences made based on participants’ responses. Looking back, using separate assessment tools to measure the two domains would have been more useful.

Exploring additional variables that had been proven significant in past research would have been prudent. For example, assessing for personality changes and negative personality qualities and whether the spouse felt that their injured partner was a “stranger.”

The measure used to examine the variables of marital and sexual satisfaction (MSI-R) includes many questions that are not relevant to individuals with severely injured spouses. For example, a participant noted that he was unsure of how to answer “My partner and I are often unable to disagree with one another without losing our tempers,” because “[his wife] is unable to form an opinion, [and thus] can’t very well disagree with me.” This comment highlights the limitations of the measure in populations with various cognitive disabilities. Furthermore, the MSI-R uses a



True/False answering system. Allowing only for a dichotomous response, rather than a gradient, allows for little qualitative review in marriages that no doubt contain complexities beyond yes or no answers. After review, the researcher finds that a qualitative component of the participants' experience, allowing or requesting them to expand on questions, would have been useful.

In order to ensure low face validity and proper use of the measure, the core 129 questions of the MSI-R were administered (i.e., 21 optional questions at the end of the survey regarding children were omitted). Regardless of this elimination, the length of the survey, along with the personal and emotional nature of the question, caused many participants to discontinue. These participants had to be excluded from the data, as the resulting scales representing the dependent variables were contingent on many of the latter questions.

Overall, although there is little one can do to make the topic of sexual and marital satisfaction any less personal, the researcher would have sacrificed face validity to provide a shorter survey to participants. For example, only accompanying the demographic and informational surveys with the sexual dissatisfaction scale of the MSI-R (15 questions; Snyder, 1997) and a smaller measure of marital satisfaction.

**Procedural.** The survey was only available to those individuals with Internet access. Therefore, it is not representative of the general population, which also includes individuals without the Internet. The researcher obtained permission to administer the tool (MSI-R; Snyder, 1997) in an internet-adapted format. Because of the limited interaction with the researcher during the administration (i.e., email address was provided), no questions could be answered regarding the directions or other confusion.

Furthermore, the researcher did not make the MSI-R questions mandatory via the survey engine used (i.e., Survey Monkey®). Thus, participants could proceed through the survey without responding to all of the questions. Looking back, the researcher would make all questions pertaining to obtaining scale scores mandatory so as to disqualify less participants and calculate more accurate scale scores.

**Methodological.** The researcher used the SEX (sexual dissatisfaction) scale to measure sexual satisfaction; thus, assuming that low T-scores of sexual dissatisfaction were equivalent to higher sexual satisfaction (i.e., using the inverse of the original scale). Likewise, the GDS (Global Distress scale) is used to measure marital satisfaction. Due to these assumptions, results should be interpreted with caution. Perhaps describing correlations to the variables of sexual dissatisfaction and global distress in a marriage would be more prudent.

Given the limited males that participated in the survey (n=9), the researcher was unable to look at gender differences based on severity of a TBI. Looking back, if time restrictions were not present, the researcher would have done additional recruiting targeted at obtaining additional male responders. Furthermore, the researcher would have used statistical methods to match controls to TBI group members to reduce inter-group variance.

### **Recommendations and Future Directions**

The implications of the current study further echo the recommendations of recent research in the domain of sexual and marital functioning of couples post-TBI (Gill et al., 2011) in the need for more couple-centered services during and beyond rehabilitation. As discussed, there are many social deficits that result from TBI that can lead to increased

dependence on others. With the potential impact of losing a spouse, maintaining the marital relationship can be crucial for an individual with a TBI. High divorce and separation rates within the population highlight both the severity of the impact a TBI can have on a marriage and the inadequate focus placed on the marriage within psychological and social services during rehabilitation and beyond.

The general public may not be aware of the impact of the prevalence and impact of social sequelae of TBI, especially following a more mild injury. Primary caregivers and other mental and medical health care professionals that have contact with TBI individuals and their spouses should take responsibility to educate the couple on the social, marital, and sexual impact of TBI. Moreover, a referral to professional psychological help may be warranted.

Furthermore, the current data allows for a better understanding of the marital and sexual experience of an individual married to a spouse with a TBI. Informing health practitioners, marriage and family therapists, physicians, and researchers of the findings of this study can allow for increased understanding of the difficulties occurring in marriage post-TBI. It is the responsibility of the health care professionals working with this population to stay abreast of current research that may help to provide a more individualized experience for the patients within this population.

Additionally, the implications of this data should be integrated into therapeutic and rehabilitative work with individuals with TBI and their spouses. Marital and sexual sequelae of TBI should be discussed openly with patients so as to address the increased risk of the subsequent marital deterioration (i.e., separation and divorce). Those medical professionals treating/rehabilitating an individual with TBI should be active in supporting

both members of the couple, especially given the importance of family and spousal support in TBI recovery.

It is apparent that a measure should be developed based on prevalent problems experienced between spouses who have experienced TBI. An item analysis of the current research may serve to highlight specific difficulties that are experienced by this population based on TBI severity as well as other demographic factors (e.g., age, income, race, religion, etc.). Furthermore, qualitative studies should be done to examine the individual struggles experienced by individuals with spouses who have incurred a TBI. The comments received from participants highlighted many experiences unique to marriage with an individual with TBI that may not be represented on a traditional measure.

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## APPENDIX A

### Permission to Electronically Reproduce MSI-R

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March 19, 2012

Kristina J. Jackson  
Psy.D. Candidate  
The Chicago School of Professional Psychology  
617 West 7<sup>th</sup> Street  
Los Angeles, CA 90024

Re: *Marital Satisfaction Inventory, Revised (MSI-R)*

Dear Ms. Jackson—

WPS has processed your license for a specific web-based application of MSI-R material. By surface mail, you will soon receive a paid-in-full WPS invoice/receipt, which serves as your license to use the MSI-R items and scoring key in a secure, password-protected on-line environment, permitting adaptation, administration and scoring of the instrument up to one hundred (100) times total. This authorization is for sole use in your registered graduate study, examining the sexual satisfaction of married individuals who have a spouse who has incurred a traumatic brain injury as compared to a control population— with no authorization for continued or commercial use — subject to the provisions of terms and conditions provided to you on March 2, 2012.

With reference to condition (4) of WPS's March 2 terms letter, please affix the following copyright notice in its entirety, on the screen of item presentation, to each reprint/viewing of the MSI-R:

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On behalf of WPS, I hope the MSI-R well serves your study, and look forward in due course to learning of your research results.

Sincerely yours,

Fred Dinkins  
WPS Rights & Permissions Specialist  
e-mail: [fdinkins@wpspublish.com](mailto:fdinkins@wpspublish.com)

FD:fd

## **APPENDIX B**

### **Exclusion Survey**

**Your age:**

**Years of Education:** 6<sup>th</sup> grade or less/some middle school/some high school/high school graduate/associate's degree/bachelor's degree/graduate degree)

**Sex:** male/female

**Relationship Status:** single/married/separated/divorced/widowed

**Are you currently living with your spouse?** yes/no

**Sex of your spouse:** male/female

**Have YOU ever been diagnosed with a sexual disorder?** yes/no

**Have YOU ever experienced a traumatic brain injury?** yes/no

If yes, **do you know the severity of your spouse's traumatic brain injury as diagnosed by a medical professional? (e.g., Mild/Moderate/Severe or Glasgow Coma Scale ranking)** yes/no

**Has your SPOUSE ever experienced a traumatic brain injury (TBI)? (note: this includes concussion)** yes/no

**Do YOU have any major medical or psychological disorders that affect the following: (check all that apply)** interpersonal functioning (e.g., social skills); physical functioning (e.g., walking); vision; hearing; sexual functioning; other (please specify)



## **APPENDIX C**

### **Demographic Survey**

**Your race:** White of Hispanic, Latino, or Spanish origin/White not of Hispanic, Latino or Spanish origin/Black or African American/American Indian or Alaska Native/Asian/Native Hawaiian or Other Pacific Islander/other (please specify)

**Household income (if unsure, please estimate):**

**What state are you currently residing in?**

**Your chosen religion:** Christian/Islam/Hindu/Buddhist/Judaism/No religion/Other (please specify)

**Your spouse's chosen religion:** Christian/Islam/Hindu/Buddhist/Judaism/No religion/Other (please specify)

**Have YOU ever been diagnosed with any psychological disorder (e.g., depression):**  
yes/no  
**If YES, please list:**

**Are YOU currently being treated for any psychological disorder (e.g., depression):**  
yes/no  
**If YES, please list:**

**How did you hear about this survey?**

**Has your spouse ever experienced a traumatic brain injury?** yes/no

## **APPENDIX D**

### **Traumatic Brain Injury Survey**

**What severity was your spouse's traumatic brain injury (TBI)?** Mild (Glasgow Coma Scale 13-15)/Moderate (Glasgow Coma Scale 8-12)/Severe (Glasgow Coma Scale 7 or less)

**How long (in months) has it been since your spouse's TBI?**

**Is your spouse ambulatory (e.g., can he or she walk)?** yes/no

**Did your spouse lose any physical abilities due to the TBI? (e.g., use of legs or other body parts):** yes/no  
**If yes, please describe:**

**Does your spouse currently suffer from any sexual dysfunction resulting from the TBI?** yes/no

**Were you married BEFORE your spouse's TBI?** yes/no  
**If YES, how long into your marriage did the TBI occur, in months (12 months = 1 year)**

## **APPENDIX E**

### **Marriage Survey**

**Spouse's current age:**

**Age you entered into current marriage:**

**Age your spouse entered into current marriage:**

**Current length of marriage in years (please round to the closest year):**

**Is your spouse currently being treated for any psychological disorder (e.g., depression): yes/no**

## **APPENDIX F**

### **Sexual Activity Survey**

**In the PAST YEAR, how often have you and your spouse had sexual intercourse?**  
never/less than once per month/once to three times per month/once or twice per week/several times per week/daily

**In the PAST YEAR, how often have you and your spouse engaged in sexual activity other than intercourse:** never/less than once per month/once to three times per month/once or twice per week/several times per week/daily

**Are you on any medication that has negative sexual side effects (e.g., decreased desire, decreased arousal, etc):** yes/no  
**If YES, please list these medications:**

**Is your spouse on any medication that has negative sexual side effects (e.g., decreased desire, decreased arousal, etc):** yes/no  
**If YES, please list these medications:**

**Does your spouse currently suffer from any sexual disorders or dysfunctions?** yes/no  
**If YES, please list:**

## **APPENDIX G**

### **Electronic Consent**

#### Electronic Informed Consent

Title: Traumatic Brain Injury and Relationships

Principle Investigator: Kristina Jackson

Research Assistant: Krystol McIntyre

We are asking you to participate in a research study. Please take your time to read the information below and feel free to email the principle investigator (kjj4952@ego.thechicagoschool.edu) with any questions before electronically signing this document.

#### Purpose:

The purpose of this study is to learn about spouses of individuals with traumatic brain injury (TBI) and personal relationships.

#### Procedures:

You will complete an online survey assessing demographic information as well as other aspects of your marriage. The survey takes approximately 30 to 45 minutes. Upon completion of the experiment, you will be given the option to provide contact information if you would like to receive the results of the study after its completion.

#### Benefits of Participation:

You may benefit from considering aspects of your marriage; however, you may find no benefit from participating in this research study.

#### Risks to Participation:

Participation in the study is limited to minimal risk. You may become more aware of marital difficulties you are having or the impact of the traumatic brain injury on your life and this awareness may cause distress. If you choose to provide contact information, we will take all precautions to protect this information. (See confidentiality section below.)

#### Alternatives to Participation:

Participation in this study is voluntary. You may withdraw from study participation at anytime without penalty. You may skip any questions that you feel uncomfortable asking; however, skipping multiple questions may result in an invalid profile.

#### Confidentiality:

No names are being collected; however, if you choose to provide the researcher with your contact information (optional), this information will be split from your responses and kept separately and will not be accessed. The data collected will not be released to the public except in aggregate form; therefore, there is no risk to confidentiality.

Questions/Concerns:

For study related questions, please contact Kristina Jackson (kjj4952@ego.thechicagoschool.edu) or Mekel Harris, PhD. (mekelharris@thechicagoschool.edu)

If you have questions concerning your rights in this research study you may contact The Chicago School Institutional Review Board (IRB), which is concerned with the protection of subjects in research project. You may reach the IRB office Monday–Friday by calling 312.467.2343 or writing: Institutional Review Board, The Chicago School of Professional Psychology, 325 N. Wells, Chicago, Illinois, 60654.

By checking one of the following boxes you will be indicating your consent or dissent electronically. If you agree to participation, you are agreeing that you understand the information you just read and that you provide your consent for your data to be used in this study:

- ☐ I agree to participate
- ☐ I do not want to participate

## APPENDIX H

### Debriefing Page

Thank you for participating in the present study concerning your marital relationship. This study evaluates the roles of gender and traumatic brain injury on marital and sexual satisfaction among married individuals. We request that you do not discuss your participation in this study with anyone that may be eligible to participate until after they have done so. Prior knowledge of questions asked during the study can invalidate the results. We greatly appreciate your cooperation.

If you have any questions regarding this study, please feel free to contact the primary researcher or her chair via email:

Primary researcher: Kristina Jackson, M.A. (kjj4952@ego.thechicagoschool.edu)  
Chair: Mekel Harris, PhD (mekelharris@thechicagoschool.edu)

Furthermore, if you would like the results of this study after it has concluded, please provide your email or post address in the box provided below.

In the event that you feel psychologically distressed by participation in this study, you are encouraged to contact Dr. Harris at the email address above. If you are feeling distraught and are unable to contact a person associated with this study, please contact the Chicago School Westwood Counseling Center at 1145 Gayley Ave., Los Angeles, CA 90024, (310) 208-3120. Please contact one of the above persons involved in the study if you need another reference in your area.

If you wish to learn more about the topic being investigated, the following resources are recommended:

Aloni, R., & Katz, S. (2003). *Sexual difficulties after traumatic brain injury and ways to deal with it*. Springfield, Illinois: Charles C Thomas.

Burrige, A., Williams, H. W., Yates, P., Harris, A., & Ward, C. (2007). Spousal relationship satisfaction following acquired brain injury: The role of insight and socio-emotional skill. *Neuropsychological Rehabilitation*, 17(1), 95–105.

Florian, V., & Katz, S. (1991). The other victims of traumatic brain injury: Consequences for family members. *Neuropsychology*, 5(4), 267–279.

Thank you again for your participation.