ROLE OF FAMILY SATISFACTION IN PREDICTING LIFE SATISFACTION TRAJECTORIES OVER THE FIRST FIVE YEARS FOLLOWING ACQUIRED DISABILITY

A Dissertation

by

CAITLIN LOUISE HERNÁNDEZ

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: Counseling Psychology

Role of Family Satisfaction in Predicting Life Satisfaction Trajectories

Over the First Five Years Following Acquired Disability

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Approved by:

Chair of Committee,	Timothy Elliott
Committee Members,	Daniel Brossart
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ABSTRACT

Role of Family Satisfaction in Predicting Life Satisfaction Trajectories Over the First Five Years Following Acquired Disability. (August 2012)

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This study aimed to model the trajectories of life satisfaction as influenced by functional impairment and family satisfaction over a five-year period following spinal cord injury, severe burns, and lower-extremity fractures. Marital status and injury type were included to estimate predicted life satisfaction over the five-year period post-injury. Measures: Six-hundred sixty-two participants completed the Functional Independence Measure, Family Satisfaction Scale, and Life Satisfaction Inventory at 12, 24, 48, and 60 months post-injury. Results: Family satisfaction was a consistent predictor of life satisfaction across models. Consistent with past research (Resch et al., 2009), functional impairment was significantly predictive of life satisfaction. Conclusions: Individuals predicted to be most at risk were those individuals with severe burns, who were divorced or separated, with low family satisfaction, and/or high functional impairment.

DEDICATION

Para mi querido Pablo….*eren.*

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NOMENCLATURE

AIS	Abbreviated Injury Scale
FIM	Functional Independence Measure
FSS	Family Satisfaction Scale
HLM	Hierarchical Linear Modeling
IAF	Intra-Articular Fracture
LSI	Life Satisfaction Inventory
SB	Severe Burns
SCI	Spinal Cord Injury

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CHAPTER I

INTRODUCTION: THE IMPORTANCE OF RESEARCH

Incidence of Traumatic Injuries

Traumatic injury impacts thousands of people each year, altering the course of their lives and the lives of their families physically, emotionally, socially, and economically. The National Spinal Cord Injury Statistical Center (2008) estimates that approximately 12,000 people sustain a Spinal Cord Injury (SCI) each year in the United States, with over 200,000 people currently living with an SCI. The number of traumatic injuries grows with the addition of burns and intra-articular fractures. The American Burn Association reported over 500,000 people seek treatment for burns each year, and 40,000 people suffered burns serious enough to require hospitalization. Furthermore, while chronic debilitating conditions are positively related to morbidity and mortality (Shewchuk & Elliott, 2000), life expectancies, while still lower than non-injured persons, are increasing for those people with traumatic injuries due to increases in quality of care (Hui, Elliott, Shewchuk, & Rivera, 2007).

With large numbers of people with acquired disability and lifespans approaching that of a non-injured population, the need for chronic care is greatly increasing. Direct medical costs for a 25-year-old man after suffering an SCI are estimated to range from $650,000 to $2.9 million depending on the injury location and severity (Priebe, Chiodo,

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This thesis follows the style of *Journal of Consulting and Clinical Psychology*.

Scelza, Kirshblum, Wuermser, & Ho, 2007). Nationally, the direct annual costs of burn injury are estimated at over $10 billion (Spires, Kelly, & Pangilinan, 2007). Approximately 68% of all health care expenditures in the American health care system are accounted for by the management of chronic health conditions (Frank, 1997). As the largest group of caregivers, family caregivers increasingly incur the financial burden of acquired disability (Parish, Pomeranz-Essley, & Braddock, 2003). In fact, the risks associated with caregiving and an increase in the number of family caregivers now compose such a significant public health concern that the U.S. Department of Health and Human Services acknowledges the need for behavioral and social interventions (Healthy People 2010; Lollar & Crews, 2003).

Life Satisfaction

Life satisfaction is one of three components of overall levels of happiness or subjective well-being (Dunn, Uswatte, & Elliott, 2009). Quality of life, a concept that overlaps ―conceptually and empirically" with life satisfaction (Dunn & Brody, 2008, p. 415) has been associated with healthy psychological functioning following injury and it may be a critical component of rehabilitation (LoBello et al., 2003). Life satisfaction, like other aspects of well-being and happiness, may be more influenced by ongoing ―set" levels within an individual and less susceptible to events and circumstances than commonly assumed. This perspective is expressed and studied as a part of hedonic adaptation.

Research concerning hedonic adaptation has long suggested that following a life-altering event, both positive and negative, a person will return to an overall similar level of happiness and well-being as prior to the event. Researchers posited that people adapt to their circumstances through habituation and contrast and maintain a relatively stable set-point of psychological functioning, or happiness, throughout their lives. New experiences pale in comparison to the past salient experience or traumatic injury (contrast), or past experiences often become less relevant or salient in everyday life following adjustment to new experiences (habituation). Despite experiencing emotional ~~h~~highs" and ~~l~~lows", people should return to a set level of happiness (Brickman, Coates, & Janoff-Bulman, 1978). These patterns have been demonstrated in lottery winners and individuals with spinal cord injury in that returned to prior levels of happiness (Brickman, et al., 1978).

However, recent research has shown contrasting views to the idea of hedonic adaptation. Resch and colleagues (2009) showed that following traumatic brain injury (TBI), an overall sample of participants decreased in life satisfaction over five years with the exception of those individuals with the lowest levels of functional impairment. Individuals with the most impairment showed the steepest declines in life satisfaction. Similarly, Lucas (2007) found moderate to large decreases in life satisfaction following incurred disability that did not return to pre-disability levels. Diener, Lucas, and Scollon (2006) conjecture these conflicting results may be due to variations in individual set-points, the presence of multiple set-points within a single individual, and to possible individual differences in adaptation.

Role of Family Satisfaction

Many factors influence adjustment following acquired disability. Personal, familial and social characteristics can promote well-being (Elliott, Kurylo, & Rivera, 2002; Elliott & Warren, 2007). A dynamic model of adjustment (Elliott & Warren, 2007) includes predictive factors such as enduring characteristics and individuals difference along with environmental and social characteristics. Due to the fluid nature of these constructs, the model accounts for change over time. One aspect of environmental predictors is family satisfaction. Family adjustment and support is a component known to affect adjustment following disability, and it is most susceptible to changes over time.

Families influence adjustment in many ways. Families may have more influence on an individual's health than any other service provider (Elliott & Rivera, 2003), as families often taking the responsibilities for much of the recovery process. People with acquired disability indicated that partners and family members were more useful than other caregivers, including professional staff, in helping them in the first year following the onset of disability (Rogers & Kennedy, 2000).

In addition to logistical and physical support, families also provide a degree of social support that can abate decreases in life satisfaction. Family support, activities, and family closeness were associated with increased life satisfaction in a sample of individuals with SCI and other disabilities (Hicken, Putzke, Novack, Sherer, & Richards, 2002; Warren, Wrigley, Yoels, & Fine, 1996). Family satisfaction has been shown to

contribute to higher quality of life among persons with recently acquired disability (Klinge et al., 2009; Warren et al., 1996).

The dynamic models of adjustment require methodological and statistical approaches that can accommodate changes over time. Unfortunately, the inconsistent research concerning outcomes following traumatic injury is compounded by limitations imposed by research methods most often employed. Most research concerning psychological adjustment following incurred disability is often atheoretical in nature, lacking the structure and generalizability provided by a solid theory. Additionally, most research is cross-sectional in design, relying on outcomes measured at one time point. This limits predictive ability and generalizability. Attempts at remedying this limitation through the use of longitudinal data collection has been limited in the past by missing data points, attrition, and a general insensitivity to individual variations in adjustment over time (Resch et al., 2009). Overall, there is a general lack of research focusing on long-term trajectories of psychological adjustment following traumatic injury.

Purpose of This Study

The purpose of this study to examine the co-varying associations between functional impairment, family satisfaction, and life satisfaction in the first five years following traumatic injury modeling trajectories of change using HLM based on a dynamic model of rehabilitation. HLM allows for the simultaneous analyses of nested data over multiple measurement points without inflating standard error measurements (Raudenbush & Bryk, 2002). This method is also appropriate for longitudinal data, as

missing data points can be accounted for within the model and analyzed under the assumption that data are missing at random (Raudenbush & Bryk, 2002).

Consistent with findings of a TBI sample in Resch et al. (2009), the following predictions are made: 1) functional independence will be a significant predictor of life satisfaction at initial measurement at 12 months post-discharge and over the five-year measurement period, 2) consistent with past literature, family satisfaction will be a consistent predictor of life satisfaction over the five-year period, and 3) individuals who are married will have higher life satisfaction than non-married counterparts, but no difference will be expected between injury groups for life satisfaction. It is more important now than ever to address the needs this population faces, and in conjunction with increases in longevity, increase quality of life.

CHAPTER II

LITERATURE REVIEW

Historically, researchers have ascribed to a medical model of rehabilitation, focusing on the importance of the diagnosis in outcomes without greatly acknowledging the role of personal or environmental factors. With the increased role of psychologists in rehabilitation settings, this mindset is shifting to a more dynamic model of rehabilitation. While appropriate and effective in short-term rehabilitation settings, the medical model misses the increased importance of behavioral and psychological variables for people with chronic conditions, including those with acquired disability (Elliott & Warren, 2007). Rehabilitation may be described as ―the process by which biologic, psychologic, and social functions are restored or developed after damage, thus enabling a person to regain maximum personal autonomy and to achieve an independent lifestyle," (Wrigley et al., 1995, p. 446). The importance of psychological and behavioral models should be accounted for in rehabilitation models and literature.

Adjustment Following Acquired Disability

Traumatic injuries and acquired disabilities require, in some cases, months of recovery in both inpatient and community settings and a lifetime of changes in both physical and psychological functioning. Functionality, conceptualized by the WHO in the *International classification of functioning, disability and health* (2001) at organic (body structure), person, or societal levels, is a common outcome measure of rehabilitation. Due to the great impact of rehabilitation on determining functional

outcome, researchers are recommending a biopsychosocial approach to rehabilitation (Dorsett & Geraghty, 2008). It is recommended that rehabilitation begin in the intensive care stage, and progress after discharge in some cases, to address ~~–m~~edical, physical, social, emotional, recreational, vocational, and functional recovery" (Kirshblum et al., 2007, p. S62). Rehabilitation is typically described in two stages, acute and long-term or post-discharge (McNulty, 2002; Patterson & Ford, 2000; Weichman & Patterson, 2004). The initial stages of the acute phase composes the onset of the injury to initial admittance and recovery shortly after, with the primary focus of the patient, family, and medical team on survival (McNulty, 2002). During the initial parts of the acute phase, physical issues are attended to and restorative care is the focus (Weichman & Patterson, 2004). The physical impact of a disability is often the most apparent and first addressed ahead of psychological difficulties that may develop over time.

Once the patient is stable, long-term recovery plans and psychological issues become a focus. In this part of the acute phase, psychological issues begin to emerge, in some cases creating a psychological emergency five to six weeks into treatment (Goodsten, 1985). Often times this falls to medical staff, with one study showing 73% of patients' source of psychological support was from a doctor or nurse, with the other 27% falling to a psychologist/psychiatrist or a family member (Kleve & Robinson, 1999). Multiple issues can arise, including grief, fear of dying, depression, anxiety, post-traumatic stress symptoms, and having to face changes in physicality that may include disfigurement or loss of mobility (McNulty, 2002; Weichman & Patterson, 2004). Increased perception of injury severity, despite actual injury severity, is

associated with higher levels of distress (Kleve & Robinson, 1999). One review study found as many as 23-61% of patients were dealing with a diagnosable level of depression, 13-47% anxiety, and up to 30% with post-traumatic stress symptoms during the acute phase of rehabilitation. In burn patients, psychological difficulties may be exacerbated in those with self-inflicted burns, a population that may range from .67% to 9% of all burn injuries (Patterson & Ford, 2004) and the fact that burn survivors have the highest rate of premorbid psychopathology (Weichman & Patterson, 2004).

Length of stay in an inpatient rehabilitation program has been linked to functional outcomes, with shorter stays associated with better functional outcomes following SCI (Klinge, Chamberlain, Redden, & King, 2009; Post, Dallmeijer, Angenot, van Asbeck, & van der Woude, 2005). Despite other factors influencing length of stay in the study, it was determined that initial functionality was the best predictor of length of stay, creating a relationship of functionality influencing length of inpatient rehabilitation, and length of inpatient rehabilitation influencing later functionality (Post et al., 2005).

The second phase of the rehabilitation model is post-discharge. Discharge from the hospital following disability onset can be filled with mixed emotions for the patient and his or her family. Often times, this is when the majority of care responsibility falls to the patient and family, increasing levels of anxiety and responsibility dealing with long-term changes. Acquired disability can have detrimental effects on physical functioning and mobility. Following spinal cord injury, besides mobility issues, bowel and bladder incontinence, sexual issues, fertility problems, spasticity, and pain can all be

factors that impact rehabilitation outcomes (Branco, Cardenas, & Svircev, 2007). The location of the injury in both SCI and burns can affect functional outcome, with burns of the face, genitalia, and hands and higher-level spinal cord lesions associated with greater functional impairment (Goodstein, 1985; Kirshblum et al., 2007; Post et al., 2005). The extent of the injury can also impact functionality, with individuals suffering larger percentages of severe burns on their bodies showing increased difficulty (Goodstein, 1985; Post et al., 2005). Walking time and ability is important in individuals with either SCI or intra-articular fractures (IAF), in that increased time spent walking or increased walking functioning were both associated with better outcomes (Aito et al., 2007; Powell et al. 2009).

But while physical functioning and status can be great predictors of future functionality, the importance of social contributions and age, along with significant co-occurring medical conditions must be considered in assessing outcomes (Branco et al., 2007). In addition to multiple physical changes, changes in psychological functioning have been noted in previous studies. The influence of psychological variables following spinal cord injury may be primary in nature, related to the actual injury, but may also be secondary in nature, related to the physical and social changes occurring in conjunction with the onset of the disability. The four weeks prior to discharge have been deemed a ―social emergency" in that family and social reintegration becomes the focus (Goodstein, 1985).

Following discharge, individuals with acquired disability are not only adjusting to physical changes, but may also face changes in the family structure, role expectancies,

reactions of family, friends, and strangers to new physical changes, and traumatic stress reactions (McNulty, 2002). This may be the most neglected phase of emotional rehabilitation due to family reactions and expectations to reintegrate quickly back into the previous environment (Goodstein, 1985). Continued symptoms of both depression and anxiety may be present following acute care, but these symptoms tend to dissipate when measured at one year following discharge (Patterson & Ford, 2000). Anxiety and depressive symptoms may be heightened by decreased psychosocial adjustment or avoidance behaviors, but are not generally affected by the extent or severity of burns (Bras, Loncar, Brtgkovic, Gregurek, Mickovic, 2007; Franulic, Gonzalez, Trucco, & Vallejos, 1996). In individuals with IAF, increased reported activity levels are associated with increased negative affect, but not influenced by levels of positive affect, which affects observed walking time (Powell et al., 2009).

Some personal characteristics can predict functional outcomes following injury. Typically stable personality characteristics prior to disability onset may influence outcomes across injury types. Marital status, employment, and socio-economic status (SES) all have been shown to predict psychosocial outcomes following acquired disability, with those individuals who are unemployed, unmarried, or at a lower SES to be at greater risk for lower functional outcomes (Klinge, et al. 2009). A literature review of spinal cord injury research revealed many people who suffer incomplete SCI show both neurologic and motoric improvement in the years following disability onset, with women showing increased improvement in motor scores (Lim & Tow, 2007), despite higher FIM Motor scores for men at discharge (Sipski, Jackson, Goméz-Marín, Estores,

& Stein, 2004). Other gender effects have also been observed, in that women have also shown increased body image disillusionment secondary to burns, and report increased treatment and rehabilitation problems (Klinge et al., 2009). With increased percentage of body burned combined with an increased importance of appearance, body image dissatisfaction increases in women (Thombs et al., 2008). This study also found that, while body image does increase in women one-year post-discharge, body image dissatisfaction is a significant predictor of psychological functioning at one year following discharge and mediates the relationship between pre-burn and one-year post-discharge psychological functioning (Thombs et al., 2008). Overall, being female is associated with more risk factors in functional outcomes over time (Klinge et al., 2009).

Other important predictors of functional outcome are aligned with patient behaviors. An important predictor of adjustment is patient cooperation during hospitalization and exerted self-control (Gilboa, 2001). Coping skills have been an effective factor in decreasing pain, increasing overall well-being and a sense of control, as well as decreasing length of stay in the hospital, all of which can be associated with better functional outcomes (Tobiasen & Hiebert, 1985).

Dynamic Model of Adjustment in Rehabilitation

The Dynamic Model of adjustment in rehabilitation proposed by Elliott and Warren (2007) acknowledges that multiple factors influence both psychological and physical well-being following the onset of disability. Moderated by phenomenological and appraisal processes, social and individual characteristics are consistently predictive of well-being. This model accounts for individual variation between person and

environment and tailors itself to the unique individual. Involved in the Dynamic Model are five factors: Enduring Characteristics/Individual Differences, Environmental/Social Characteristics, Phenomenological/Appraisal Process, Physical Health, and Psychological Well-Being.

Enduring characteristics and individual differences are those factors specific to the person. These can include personality and behavior characteristics as well as demographic information. In addition to these, characteristics specifically related to disability type are influential here, including functionality and injury severity. Onset of disability is a strong negative predictor of life satisfaction, with those individuals incurring a disability reporting lower levels of well-being (Chase, Cornille, & English, 2000; Dunn & Brody, 2008). Multiple demographic variables have been studied in predicting psychological well-being or life satisfaction following acquired disability. However, many of these demographic variables, including race and gender, have little to do with successfully predicting psychological outcomes following disability onset (Hicken, Putzke, Novack, Sherer, & Richards, 2002). Age has been somewhat of an inconsistent variable, with some studies showing an inverse relationship between age and life satisfaction (Hicken et al., 2002) while others report little to no correlation between age and psychological well-being following acquired disability (Dunn & Brody, 2008). Developmental theories have not been explored in researching the effect of age on functionality following acquired disability.

Marriage, conversely, has consistently been a solid predictor of life satisfaction in rehabilitation; multiple studies have shown married people have higher levels of life

satisfaction in general and following acquired disability (Dunn & Brody, 2008; Hicken et al., 2002). Divorce and widowhood, in contrast to marriage, tend to be stronger predictors of negative psychological outcomes for well-being (Dunn & Brody, 2008). Studies show an increase in divorce rates initially following acquired disability onset, but those rates may decline over time, approaching that of the general population (Craig & Hancock, 1998; Kreuter, 2000). While marital status has been associated with functional outcomes, the actual mechanisms underpinning these associations have not been identified.

The model recognizes both environmental and social characteristics such as family dynamics, social support, and institutional or community barriers that influence rehabilitation outcomes. Research on the importance of social support following disability onset has shown that individuals who experience greater social support report better adjustment to injury, less emotional distress, higher quality of life and life satisfaction, fewer health problems, less hospital utilization, and decreased mortality (Chase, Cornille, & English, 2000; Sherman, DeVinney, & Sperling, 2004).

An intrapersonal appraisal process addressing meaning, goals, and threats (Elliott & Warren, 2007) can mediate the relationship between multiple influential factors and outcomes following acquired disability. Rehabilitation outcomes have been defined by this model into two categories, psychological well-being and physical health. Psychological well-being includes assessments of life satisfaction, happiness, and quality of life while physical health captures wellness and the presence of secondary complications to the disability. Well-being is composed of three constructs, an

individual happiness set point, individual circumstance, and individual actions (Dunn & Brody, 2008). Life satisfaction, as a subjective function of well-being, is "…the overall belief that one's life is a good one" (Dunn & Brody, 2008, p. 415).

It is important to acknowledge the psychological outcomes affecting the rehabilitation process along with physical outcomes. Life satisfaction is a key variable in determining a person's outcomes following disability onset. Addressing the multiple factors that may impact life satisfaction, including functional independence and levels of family satisfaction, may lead to more comprehensive understanding of the psychological effects of acquired disability and the processes available to remediate these effects.

Life Satisfaction

Life satisfaction as a function of quality of life following acquired disability is an important psychological outcome variable of rehabilitation models. While acquired disabilities are not always or often curable, there is a level at which rehabilitation can relieve discomfort, enhance physical and psychological functioning, individual, familial, and social support, and improve overall mental health in those individuals who have sustained a traumatic injury (Dijkers, 1996). This focus on quality of life is emphasized as a better focus for burn rehabilitation. Due to better treatment options, more individuals are surviving severe burns. Past focus on decreasing mortality rates has been successful, but researchers recommend this focus expand to include quality of life to address the growing population of survivors of burn injuries with an attempt to "return the patient as close to the pre-injury state as possible" (Jaskill et al., 2009, p. 707). The focus of rehabilitation has embraced the necessity of quality of life as an outcome

variable, with some positing that attaining the highest level of quality of life following disability onset should be a primary goal in rehabilitation (Glass, 1999, in Hammell, 2004).

General research on life satisfaction has been mixed in outcome research, and varies by injury type. Much of the SCI research shows a decrease in quality of life and life satisfaction in individuals following SCI compared to retrospective ratings of pre-morbid life satisfaction or non-injured control populations (Dijkers, 2005; Dijkers, 1997; Middleton, Tran, & Craig, 2007; Norrbrink Budh & Österåker, 2007; van Koppenhagen et al., 2008). This decrease was noted across physical, mental, and social health scales (Dijkers, 2005). In contrast, some studies show little or no difference between individuals with acquired disability and non-injured controls on measures of life satisfaction. A study by Abrantes-Pais, Friedman, Lovallo, and Ross (2007) found no difference between individuals with SCI and non-injured controls on a measure of satisfaction with life, despite reported decreased physical functioning in the SCI group. Similar findings were found for individuals with severe burns, in that while many individuals who have experienced severe burns have increased psychological disturbances and decreased generic health status, quality of life is adequate, similar to that of the non-injured control population, and may increase over time (Altier, Malenfant, Foget, & Choiniere, 2002; Falder et al., 2009; Litleré, Wentzel-Larsen, Salemark, Klopodal Wahl, & Rokne Hanestad, 2006). Based on the physical, social, and psychological changes accompanying an acquired disability, an objective decrease in life

satisfaction may be expected; however, that decrease is not seen in subjective ratings of life satisfaction, which may stay the same as controls (Dijkers, 1996).

With contradictions in current research, focusing on components of life satisfaction may help to clarify the role of life satisfaction in disability rehabilitation models. Physical, environmental, and psychological factors have the potential to impact life satisfaction ratings. Physical changes can be some of the most frequent and apparent faced by an individual with acquired disability. Pain consistently predicts quality of life, with individuals enduring more pain reporting lower levels of quality of life (Ekstrom, Dahlin Ivanoff, & Elmstahl, 2008; Middleton et al., 2007; Norrbrink Budh & Osteraker, 2007; van Koppenhagen et al., 2008). The presence of continuous pain as opposed to intermittent increases the relationship between pain and quality of life, with individuals with continuous pain reporting more consistently decreased quality of life (van Koppenhagen et al., 2008). In SCI, level of the lesion, secondary complications to the injury and decreased motor recovery also predict decreased quality of life (Noonan, Kopec, Zhang, & Dvorack, 2008; van Koppenhagen et al., 2008). By addressing the associated conditions in rehabilitation following SCI, physical and mental function can be maximized for the individual (Noonan et al., 2008).

Environmental and social factors also influence life satisfaction following acquired disability (Whiteneck et al., 2004). Sex and age of the individual following SCI do not seem related to quality of life (Middleton et al., 2007). Marriage is a solid predictor of adjustment following acquired disability, with individuals who are married reporting higher levels of life satisfaction following acquired disability (Dunn & Brody,

2008; Hicken et al., 2002). Marriage is related to an increased protective effect to hip fracture, which is consequently related to increases in life satisfaction (Peel, McClure, & Hendrikz, 2007). Men who experience a change in marital status have reported decreases in emotional control as well as decreases in restricted emotionality (Schopp, Good, Mazurek, Barker, & Stucky, 2007). A study of individuals with severe burns reported the most at-risk populations are those individuals that live alone, are unemployed, sustain a non-burn physical illness, have psychological disorders, suffer chronic pain, or sustained full thickness injuries (Litleré et al., 2006).

Participation is another influential factor for life satisfaction. Participation is a ~~"p~~erson's lived experiences of involvement in their life satisfaction," and is a new concept of the World Health Organization (Larsson Lund, Nordlund, Bernspang, & Lexell, 2007, p. 1417). Decreases in participation have been shown to be related to decreases in life satisfaction in individuals with severe burns as well as individuals with SCI (Ekstrom et al., 2008; Larsson Lund et al., 2007). Influenced by pain, participation decreases are related to increased pain (Ekstrom et al., 2008). Both current health rating and community participation are positively related to life satisfaction (Tonack et al., 2008).

In predicting life satisfaction, psychological complications were one of the few significant variables in a model addressing rehabilitation following SCI (Tonack et al., 2008). The importance psychological factors has been demonstrated as more highly associated with quality of life than is physical impairment following onset of disability (LoBello et al., 2003). Pre-existing psychological disorders and increased psychological

distress are shown to be related to delayed recovery following burn trauma (Wisely, Wilson, Duncan, & Tarrier, 2010). While quality of life may remain similar to that of controls, significantly greater psychological disturbance has been shown in individuals with severe burns (Altier et al., 2002). Personality, specifically increased neuroticism and decreased extraversion, has been shown to be related to increased risk of depression (Andrews, Brown, Drummond, & Wood, 2010). Disengagement-type coping, overall negative emotional response (i.e. depression, anxiety) and the severity and impact of disability are all related to decreased levels of adaptation to SCI (Martz et al., 2005). Body image dissatisfaction was inversely related to psychological functional post-burn, in that individuals with greater body image dissatisfaction reported decreased psychological function following the onset of the severe burn (Thombs et al., 2008). This relationship mediates the relationship between pre- and post-burn function.

Depression and anxiety are both important factors in determining life satisfaction, in that decreases in life satisfaction have been found in the presence of mood disorders, Major Depressive Disorder, and increased affective and somatic symptoms, even when controlling for pain (Bombardier et al., 2004; Norrbrink, Budh, & Osteraker, 2007; Richardson & Richards, 2008). This is important, because a study using the overall database for the National Spinal Cord Injury Statistical Center (NSCISC) found that 11.4% of all participants met the criteria for Major Depressive Disorder (Bombardier et al., 2004).

Self-efficacy may be a personal protective factor. Researchers have shown a relationship between increased self-efficacy and increased life satisfaction (Middleton et

al., 2007; Zhang Hampton, 2000). The interaction between self-efficacy and pain was a strong predictor of quality of life, in that decreased self-efficacy with increased pain was related to lower quality of life, and was predicted more effectively by the combination than either of the variables individually (Middleton et al., 2007).

Social Support

Overall increased social integration is positively related to reports of both life satisfaction and family satisfaction across injury types (LoBello et al., 2003). Following burn injury, social support was related to adjustment independent of burn severity (Davidson, Bowden, & Feller, 1981). Social support was also shown to moderate life satisfaction despite increasing levels of pain in individuals with SCI, where increased levels of social support were correlated with increased levels of life satisfaction, despite pain levels (Widerström-Noga, Roy Felix, Cruz-Almeida, & Turk, 2007). The reverse of this effect was also shown where individuals who had higher levels of pain with lower social support reported lower overall levels of life satisfaction. More specifically, satisfaction with relationships has repeatedly been shown to positively correlate with quality of life or life satisfaction variables (Hammell, 2004).

Role of Family Satisfaction

Family support is often viewed as an extension of social support (Elliott & Rivera, 2003), incurring many of the same benefits offered by general social support. Due to the increased position of family care providers in rehabilitation, family roles are becoming progressively more important in studies of rehabilitation outcomes. In addition to social support, families provide logistical support and can improve patient

compliance with rehabilitation and treatment regimens (McNulty, 2002). Multiple studies have shown the importance of family relationship and satisfaction in rehabilitation following acquired disability, specifically in positive correlations between family factors and psychological well-being. Positive stable social relationships and family acceptance may be related to increases in adjustment and functional outcomes following severe burns (Klinge et al., 2009). The quality of the relationship may generate a positive experience for the survivor, increasing self-esteem and confidence in social situations with strangers, therefore encouraging increased social interaction (Klinge et al., 2009). Additionally, closeness to family and level of family activities were most significantly related to increases in life satisfaction in people with SCI (Warren et al., 1996).

Researchers have found no differences in levels of family life ratings by the individual with SCI compared to the general population, indicating family satisfaction may not change following acquired disability (Norrbrink, Budh, & Österåker, 2007). This is important in suggesting family satisfaction may not co-vary with onset of disability as do quality of life or life satisfaction variables. However, levels of family satisfaction may be predictive of participation in inpatient rehabilitation for individuals with SCI, which may increase functional outcomes (Horn, Yoels, & Bartolucci, 2000).

It is important to note, however, that family support may not always lead to better psychological or physical outcomes following acquired disability. Increased criticism and decreased support from a family caregiver or enabling behaviors from well-intentioned caregivers can lead to poor rehabilitation outcomes (Bolger, Foster,

Vinokur, & Ng, 1996; Manne & Zautra, 1989). Additionally, negative perceptions of the caregiving received are prevalent in individuals with disability, with up to two-thirds of older adults with a disability experiencing a negative reaction to some aspect of their care (Newsom, 1999). These negative reactions involve a complex social interaction, possibly involving misperceptions of the caregiving experience or non-helpful caregiving behaviors (Newsom, 1999). Along with psychologically deleterious caregiving effects such as increased depression and stress experienced by the caregiver (Weitzenkamp, Gerhart, Charlifue, Whiteneck, & Savic, 1997), the family experience is a delicate balance of support that, until recently, has not received the attention it warrants.

Limitations of Current Research

When considering literature on SCI, the use of long-term outcomes is recommended (Dijkers, 1997). However, much of the literature is focused on initial outcomes or cross-sectional in nature. This limits the predictability of psychological factors that may develop later in the rehabilitation process. Small sample sizes, sample compositions, and methodological issues pose further problems for interpretability and may confound the literature with opposing views (Dijkers, 1997). Burn literature is further limited, with under-represented populations of women and a focus on developed countries, despite the large numbers of individuals experiencing severe burns from under-developed countries (Klinge et al., 2009). Comorbidity and heterogeneity of the population pose further limitations for the current research (Klinge et al., 2009). Research on IAF is limited to geriatric populations who frequently experience fractures,

but neglects younger populations and does not frequently address the role of psychological functioning in rehabilitation. It would be important to address the psychological health of individuals following acquired disability with a longitudinal study with a larger sample size that is diverse in ethnicity, age, and gender to address the gaps in research that currently exist.

Along with methodological issues limiting current research, unsound theoretical structure may strongly affect research outcomes. Much of the current research is atheoretical with limited applicability to clinical settings (Dijkers, 2005). Relationships between family satisfaction, social support, and adjustment form a complex interaction where family satisfaction does not always equal social support, which may not always indicate positive adjustment. The social, environmental, and personal factors all play a role in the intricate outcome of adjustment. Similarly, the construct of marital status, while related to positive adjustment in numerous studies, has evaded researchers as to the nature and specific role it plays in adjustment following acquired disability.

Present Study

The present study was designed to examine influence of family satisfaction and marital status upon the self-reported life satisfaction of individuals who were in the first five years of living with traumatically-acquired severe disabilities. The study relies on linear modeling techniques that can account for individual variations in adjustment trajectories over time, while examining the dynamic and fluid influences of family satisfaction, functional impairment and marital status on the trajectory of life satisfaction.

CHAPTER III

METHODS

Participants

Participants were part of a larger volunteer study conducted by the Injury Control Research Center (ICRC) at the University of Alabama at Birmingham. Researchers identified possible participants through review of acute-care medical records. Each person was diagnosed with one of four injuries at time of hospitalization, including traumatic brain injury, spinal cord injury (SCI), severe burns, or intra-articular fractures of the lower extremities (IAF). To qualify for participation, each individual must have been admitted to an acute care setting for at least three days, resided and injured in Alabama, been discharged alive from the hospital between October 1, 1989 and September 30, 1992, been older than 17 years old at time of injury, and agreed be contacted at pre-specified intervals following discharge. Study participants were contacted at 12 months post-discharge by letter containing an explanation of the study and including a pre-addressed consent to contact postcard. Individuals were contacted by phone to obtain consent if the written consent was not initially returned. Following receipt of consent, a trained interviewer contacted participants to collect data. Caretakers, spouses, or close relatives were interviewed if an individual was unable to complete the survey himself.

Previous research has examined the relationship of life satisfaction with functional independence in a sample of participants with traumatic brain injury over five years (Resch et al., 2009). In the same sample of people with traumatic brain injury,

family satisfaction served as a buffer against the decrease in life satisfaction for individuals who had low functional impairment (Johnson et al., 2010). This study will examine these relationships in participants with SCI, burns, and intra-articular fractures. Of the 1311 consenting participants in the overall study, 662 participants had an SCI, IAF, or severe burns. There were 662 total participants. Four hundred sixty-five men and 197 women participated in the study. The participants' average age at time of injury was 41.10 years (*SD* = 17.11), ranging from 18 to 96 years old. The sample was primarily Caucasian (*n* = 455; 68.7%) and 30.1% of the sample were African American (*n* = 199). Other participants identified as Asian, Chinese, Hawaiian Islander, or Other.

Procedures

Following admission to the project, each participant was interviewed by a trained interviewer by telephone as closely as possible to 12 months following discharge from the acute-care setting. Data were subsequently collected at 24, 48, and 60 months post-discharge. Data were collected on multiple social and demographic characteristics, rehabilitation services, other medical services, secondary complications due to the injury, overall health status, physical and psychological adjustment to disability, and rehabilitation outcomes. For purposes of this study, information collected using the Life Satisfaction Inventory (LSI), the Functional Independence Measure (FIM), the Family Satisfaction Scale (FSS) and demographic variables were investigated at each of the four data points (12, 24, 48, 60 months post-discharge).

Measures

Life Satisfaction. The Life Satisfaction Index – A (LSI; Neugarten, Havighurt, & Tobin, 1961) is a 20-item instrument designed to measure psychological well-being, measuring passion for life, mood, and congruence between desired and achieved goals. Items are scored as 0 or 1 with the possible total score ranging from 0 to 20. Higher scores indicate greater perceived life satisfaction. Previous studies have found LSI item discriminative values that range from 16 to 75.4%, with means of 42% and 58.7% (Adams, 1969; Rao & Rao, 1981, Resch et al., 2009). The LSI total score has been positively correlated with other measures of life satisfaction, adjustment, and morale, and has shown consistently high internal validity (Wallace & Wheeler, 2002). The internal consistency coefficient for the present sample ranged from .86 - .90.

Functional Impairment. This study used the telephone version of Functional Independence Measure (FIM; Keith, Granger, Hamilton, & Sherwin, 1987). The FIM is a self-report questionnaire used to assess the need for assistance across various functional domains. The FIM has 18 questions on a Likert-type rating scale that is composed of two subscales that address motor functioning (13 items) and cognitive functioning (5 items). The FIM scale scores ranges from 1 to 7. A score below 6 indicates a need for total assistance, an inability to complete the activity despite assistance, or the need for supervision of a second person. A score of 6 means that an activity requires an assistive device, takes an excessive amount of time to complete, or requires safety considerations. A score of 7 denotes complete independence (meaning the activity is performed safely, reasonably quickly, without aids and without

modifications). All 18 items combine to form a FIM total score with higher scores associated with greater functional independence. Due to a large ceiling effect on this scale, Rasch analysis will be conducted to increase variability in scores to enhance the current study. The internal consistency coefficient for the present sample was .95-.97.

Functional independence is a commonly used variable in research concerning extent of patient disability and rehabilitation outcomes following acquired disability (Choo, Umraw, Gomez, Cartotto, & Fish, 2006). Functional independence is an important objective of acute rehabilitation for spinal cord injury (McKinley, Santos, Meade, & Brooke, 2007). Wood-Dauphinée, Exner, and the SCI Consensus Group (2002) determined functional outcome as one of the main predictors of overall quality of life due to its role in level of dependency and social integration. With the important nature of functional outcomes, the consensus group suggested the use of the Functional Independence Measure (FIM) as an appropriate tool for gauging functional outcomes following acquired disability (Wood-Dauphinée et al., 2002). Researchers have shown levels of functional independence measured by the FIM to be predictive of the need for inpatient rehabilitation, with discharge FIM scores of 110 or less indicative of a need for inpatient rehabilitation services (Choo et al., 2006).

Injury Severity. Injury severity as a measure of physical disability at time of injury was included using the Abbreviated Injury Scale (AIS; Committee on Injury Scaling, 1985). This measure contains values ranging from 0 (not injured) to 6 (maximum injury). Scores of 9 are missing or not otherwise specified (Committee on Injury Scaling, 1985). AIS scores for six body regions were calculated using ICDMAP, a

computerized table that converts ICD-9-CM coded discharge diagnoses to AIS scores (MacKenzie, Steinwachs & Shankar, 1989). Injury severity was coded by trained raters who reviewed the discharge record for each participant. AIS varied in relation to FIM across injury types. There was none to very weak negative relationships between FIM and AIS for both IAF and burns ($r = -.019$, $r = -.015$ respectively). There was a weak positive correlation between FIM and AIS in individuals with SCI ($r = .180$).

Family Satisfaction. The original Family Satisfaction Scale was developed by Olsen and a team of researchers in 1982 (FSS; Olson & Wilson, 1982). The FSS consists of 14 items designed to measure family cohesion and adaptability (Olson, Russell, & Sprenkle, 1983). These 14 items are based on a Likert-type scale (1 = dissatisfied, 2 = somewhat dissatisfied, 3 = generally satisfied, 4 = very satisfied, 5 = extremely satisfied) with total scores ranging from 14 to 70. The FSS has proven useful in injury outcome research (Perlesz, Kinsella & Crowe, 2000; Warren et al., 1996; Webb, Wrigley, Yoels & Fine, 1995). Olsen and Wilson (1982) found an overall alpha coefficient of .92 for the total scale, with high internal consistency for both subscales, cohesion ($\alpha = .85$) and adaptability ($\alpha = .84$). The total score is recommended for research purposes (Olson & Wilson, 1982). The internal consistency coefficient for the present sample ranged from .94 to .97.

For this study, the FSS was modified (Underhill, Lobello & Fine, 2004) because two of the original items (#4 and #5) assessed satisfaction a dependent child may have with parental actions. These two items were rewritten to eliminate this focus (see Underhill et al., 2004 for a complete description of the modification to these items).

Despite these changes to items 4 and 5, the standardized item-to-total score correlation coefficients in the sample of TBI participants were .78 at 12 months and .76 at 60 months for item 4, and .69 at 12 months and .82 at 60 months for item 5 (Underhill et al., 2004).

Statistical Analysis

Preliminary analyses were conducted to examine initial differences within the sample, including basic demographic information and descriptive statistics for each of the three self-report measures.

Hierarchical linear modeling (HLM) was used to examine the influence of family satisfaction and functional independence on life satisfaction trajectories five years following traumatic injury. HLM has a unique capability to examine growth trajectories for individuals nested within groups (Raudenbush & Bryk, 2002), and these data were appropriate for this type of multi-level model analysis with multiple observations collected over a five-year period that were nested within each individual participant. The MIXED routine in SPSS version, used for fitting multi-level linear growth-modeling, was used to analyze these data (see Kwok et al., 2008, for a more detailed explanation).

Initial analyses examined the overall relationship of functional impairment on life satisfaction in individuals who have sustained an SCI, burns, or IAF. This one-level model is represented as:

$$LSI_{ti} = \pi_{0i} + \pi_{1i}Time_{ti} + \pi_{2i}FIM_{ti} + \pi_{3i}FIM_{ti}*Time_{ti} + e_{ti}$$

As depicted in the above equation, life satisfaction was the outcome measure (LSI) while *i* represents an individual with t representing a specific time point.

Meanwhile, π_{1i} represents slope parameters that represent linear rates of change over time, with π_{2i} and π_{3i} representing the linear relationship between the respective variable and LSI controlling for other variables. Interaction effects, noted as $\pi_{4i,}$ and $\pi_{5i,}$ $\pi_{6i,}$ and π_{7i} represent linear rates of change over time as a function of respective variables. The individual intercept is represented by π_{0i} and e_{ti} represents within-individual error.

More complex models followed to assess the combined effect of family satisfaction and functional impairment on life satisfaction over time, as such:

$$LSI_{ti} = \pi_{0i} + \pi_{1i}Time_{ti} + \pi_{2i}FIM_{ti} + \pi_{3i}FSS_{ti} + \pi_{4i}FIM_{ti}*Time_{ti} + \pi_{5i}FSS_{ti}*Time_{ti} + \pi_{6i}FIM_{ti}*FSS_{ti} + \pi_{7i}FIM_{ti}*FSS_{ti}*Time_{ti} + e_{ti}$$

Further building upon initial models incorporated a multi-level model incorporating injury type as a higher-order predictor of life satisfaction, to explore differences between individuals with different injury types. This equation is structured as:

Level 1:

$$LSI_{ti} = \pi_{0i} + \pi_{1i}Time_{ti} + \pi_{2i}FIM_{ti} + \pi_{3i}FSS_{ti} + \pi_{4i}FIM_{ti}*Time_{ti} + \pi_{5i}FSS_{ti}*Time_{ti} + \pi_{6i}FIM_{ti}*FSS_{ti} + \pi7_{i}FIM_{ti}*FSS_{ti}*Time_{ti} + e_{ti}$$

Level 2:

$$\pi_{0i} = \beta_{00} + \beta_{01}\text{Injury Type} + U_{0i}$$

$$\pi_{1i} = \beta_{10}$$

$$\pi_{2i} = \beta_{20}$$

$$\pi_{3i} = \beta_{30}$$

$$\pi_{4i} = \beta_{40}$$

$$\pi_{5i} = \beta_{50}$$

$$\pi_{6i} = \beta_{60}$$

$$\pi_{7i} = \beta_{70}$$

Combined Model:

$$LSI_{ti} = \beta_{00} + \beta_{01}\text{Injury Type} + U_{0i} + \beta_{10}*\text{Time}_{ti} + \beta_{20}FIM_{ti} + \beta_{30}*FSS_{ti} + \beta_{40}FIM_{ti}*\text{Time}_{ti}$$

$$+ \beta_{50}FSS_{ti}*\text{Time}_{ti} + + \beta_{60}FIM_{ti}*FSS_{ti} + \beta_{70}FIM_{ti}*FSS_{ti}*\text{Time}_{ti} + e_{ti}$$

By including injury type as a predictor at the between-individual level, life satisfaction can be modeled for separate injury groups. LSI_{ti} is an outcome measure of life satisfaction for participant *i* at time *t*, β_{00} is a Level 2 estimate of the mean population value for initial status. β_{10} is the average rate of change in LSI, while β_{20} and β_{30} are the average relation between LSI and FIM, and LSI and FSS, respectively. β_{40} and β_{50}, and β_{70} examine the potential FIM and FSS by time interaction effects, while β_{60} examines the interaction of FIM and FSS with LSI.

Between-Individual error is represented by U_{0i} while within-individual error is represented by e_{ti}.

A combined equation modeled the complex relationship of functional impairment and family satisfaction with the additional variables of injury type and marital status, to account for differences in psychological response in individuals with differing disabilities. This equation followed as:

Level 1:

$$LSI_{ti} = \pi_{0i} + \pi_{1i}\text{Time}_{ti} + \pi_{2i}FIM_{ti} + \pi_{3i}FSS_{ti} + \pi_{4i}FIM_{ti}*\text{Time}_{ti} + \pi_{5i}FSS_{ti}*\text{Time}_{ti} +$$

$$\pi_{6i}FIM_{ti}*FSS_{ti} + \pi 7_{i}FIM_{ti}*FSS_{ti}*\text{Time}_{ti} + e_{ti}$$

Level 2:

$$\pi_{0i=} \beta_{00} + \beta_{01}\text{Injury Type} + \beta_{02}\text{Marital Status} + U_{0i}\, \pi_{1i} + \beta_{10}$$

$$\pi_{2i=} \beta_{20}$$

$$\pi_{3i=} \beta_{30}$$

$$\pi_{4i=} \beta_{40}$$

$$\pi_{5i=} \beta_{50}$$

$$\pi_{6i=} \beta_{60}$$

$$\pi_{7i=} \beta_{70}$$

Combined Model:

$$LSI_{ti} = \beta_{00} + \beta_{01}\text{Injury Type} + \beta_{02}\text{Marital Status} + U_{0i} + \beta_{10}*\text{Time}_{ti} + \beta_{20}FIM_{ti} + \beta_{30}$$

$$*FSS_{ti} + \beta_{40}FIM_{ti}*\text{Time}_{ti} + \beta_{50}FSS_{ti}*\text{Time}_{ti} + \beta_{60}FIM_{ti}*FSS_{ti} + \beta_{70}FIM_{ti}*FSS_{ti}*\text{Time}_{ti} +$$

$$e_{ti}$$

With data now nested for each participant by injury type and marital status, the possibility that variation between participants could be modeled at Level 2 as a function of injury type or marital status was tested. Here LSI_{ti} is an outcome measure of life satisfaction for participant *i* at time *t*, β_{00} is a Level 2 estimate of the mean population value for initial status. β_{10} is the average rate of change in LSI, while β_{20} and β_{30} are the average relation between LSI and FIM, and LSI and FSS, respectively. β_{40} and β_{50}, and β_{70} examine the potential FIM and FSS by time interaction effects, while β_{60} examines the interaction of FIM and FSS with LSI. Individual error is represented by U_{xi} and group error by e_{ti}.

CHAPTER IV

RESULTS

Preliminary Analyses

At the initial measurement, twelve months post-discharge, 662 individuals participated in this study (465 men, 70.2%; 197 women, 29.8%). Mean age of all participants was 41.10 at time of injury (*SD* = 17.12). Individuals with SCI (37.33, *SD* = 15.02) and burns (39.97; *SD* = 16.97) had lower recorded mean ages overall than individuals with IAF (44.33, *SD* = 17.83). Further statistical analysis revealed significant differences in age at time of injury between groups ($F = 8.86$, df = 2, $p = < .01$). Post-hoc Bonferroni analysis found significant differences in age between individuals with SCI and IAF (mean difference = -7.00, *SE* = 1.76, $p = < .01$) and between individuals with severe burns and IAF (mean difference = -4.36, *SE* = 1.49, $p = .01$). These analyses indicate that at time of injury, individuals with SCI and severe burns were significantly younger than individuals with IAF. There was no significant age difference between individuals with SCI and severe burns.

A large percentage of the sample was composed of individuals with a self-reported ethnicity of White (455; 68.7%). There was a significant minority of Black participants (n = 199) that accounted for 30.1% of the total sample (see Table 1). The difference between the number of Black and White participants in the study was significant across all injury types (SCI: $x^2 = 16$, df = 1, $p = < .01$; IAF: $x^2 = 39.06$, df = 1, $p = < .01$; Burns: $x^2 = 45.92$, df = 1, $p = < .01$).

Of the total sample, 75.5% of all participants were rated at an injury severity level (AIS) of 2 or 3 (see Table 2.) These ratings indicate that the majority of the population was injured at a moderate to serious level. Past research reveals a modest yet significant correlation between AIS and FIM scores in individuals with traumatic brain injury (Resch et al., 2009). In the present sample, FIM was significantly negatively correlated with AIS in individuals with severe burns, indicating that with increased ratings of AIS, ratings of FIM decreased in these individuals (r = -.191, N = 739, p = < .01). However, there was no significant relationship between AIS and FIM in individuals with IAF (r = -.049, N = 793, p = .169) or SCI (r = -.091, N = 350, p = .090). AIS was not included as a variable in modeling trajectories to avoid redundancy in the models and overlapping information.

As depicted in Table 3, injury types were divided among the three study groups: 260 participants had severe burns (39.3%), 258 had IAFs (39.0%) and 144 had SCI (21.8%). Most participants were married at the first measurement point (334; 50.5%; see Table 4). One hundred sixty-seven participants reported being single (25.2%). Participants reported being divorced (77; 11.6%) or widowed (41; 6.2%) at lower rates. Those participants that reported being separated were least frequently observed in this study (N = 21; 3.2%). Tables 5 and 6 contain information about changes in marital status across all four measurement points by gender and injury type, respectively.

Self-Report Measures

Across all measures and measurement points, 36% of data were missing. Across measures, 25% of data were missing across all time points for both LSI and FIM.

However, 59% of data were missing for FSS across all measurement points. At initial measurement, no differences were found between injury groups on life satisfaction (LSI) and family satisfaction (FSS), indicating similar levels of satisfaction with life and family between all injury groups. Repeated-measures MANOVA revealed no significant difference between injury groups and life satisfaction at each time point ($\Lambda = .974$, $p = .162$). No significant differences were found between married and non-married participants in family satisfaction ratings across measurement points using repeated-measures MANOVA ($\Lambda = .066$, $p = .653$). However, there were significant differences between injury groups for functional impairment (FIM). Further post-hoc Bonferroni analysis revealed significant differences between individuals with SCI and IAF on the FIM total score (mean difference = -21.53, $SE = 1.76$, $p = < .01$). Significant differences were found between individuals with SCI and severe burns on the FIM total score (mean difference = -23.96, $SE = 1.75$, $p = < .01$). These data indicate that at initial measurement, individuals with SCI had significantly greater functional impairment than individuals with IAF or severe burns. There were no significant differences in functional impairment between individuals with IAF and severe burns.

The mean scores for the self-report variables by measurement occasion and injury type and used in subsequent analyses are presented in Tables 7 and 8. Across measurement points, the mean life satisfaction (LSI) for the total sample was 12.50 ($SD = 4.88$). The average family satisfaction score across time for the total sample was 55.26 ($SD = 11.59$) and the average Rasched functional independence measure score was 2.93

(*SD* = 2.02). All scales are positively correlated, in that higher scores indicate greater life and family satisfaction, and greater functional independence (see Table 8).

Growth Models

Preliminary multi-level liner growth models analyzed changes in life satisfaction as predicted by FIM scores. Functional impairment (FIM) was significantly predictive of life satisfaction overall (est = .67, *SE* = .09, *p* = < .01). However, the interaction between FIM scores and time was not significantly predictive of life satisfaction trajectories for the total sample. These results indicate that individuals with less functional impairment had higher life satisfaction, generally, and there were no significant changes over time in the relationship between life satisfaction and functional impairment across all injury types (see Table 9). In general, across all samples and regardless of time, FIM was directly related to scores of life satisfaction.

Multi-level linear growth models predicting the rates of change in life satisfaction were conducted using functional impairment and family satisfaction as the time-variant covariates (see Table 10). Both functional impairment, as measured by total FIM scores (est = .68, *SE* = .10, *p* = < .01) and family satisfaction (FSS; est = .14, *SE* = .02, *p* = < .01) were significantly predictive of life satisfaction. Both FIM and FSS scores were constantly related to life satisfaction, generally. Individuals who reported less functional impairment and greater family satisfaction had higher life satisfaction across all injury types. There were no significant associations between functional impairment or family satisfaction with life satisfaction over time across the various

injury types (see Table 10). Thus, there were no significant variations in the associations of functional impairment and family satisfaction to life satisfaction over time.

Combined Analyses

Functional Impairment, Family Satisfaction, and Injury Type

Further analyses incorporating injury type as a time-invariant covariate revealed similar results. Both FIM (est = .83, *SE* = .11, *p* = < .01) and FSS (est = .14, *SE* = .017, *p* = < .01) scores significantly and positively predictive of life satisfaction, generally, with no statistical effects for time. Additionally, there was no effect of injury type for those individuals with spinal cord injury or inter-articular fractures. However, individuals with burns predicted lower life satisfaction than the other two injury groups across all measurement occasions (est = -1.25, *SE* = .34, *p* = < .01; see Table 11).

Functional Impairment, Family Satisfaction, and Marital Status

Marital status was incorporated into the models of functional impairment and family satisfaction to predict life satisfaction. Models were run including those individuals who were ―married" as the basis for comparison. Marital status – coded as ―single" or ―separated" – was significantly and negatively associated with life satisfaction (Single; est = -1.46, *SE* = .32, *p* = < .01; Separated; est = -3.53, *SE* = .76, *p* = < .01). Being single or separated at any measurement occasion was significantly associated with lower life satisfaction scores (see Figure 2). Family satisfaction remained significantly predictive of life satisfaction (FSS; est = .12, *SE* = .03, *p* = < .01) regardless of marital status. Greater family satisfaction was associated with increased life satisfaction. However, once marital status was included in the model, functional

impairment was no longer significantly predictive of life satisfaction, generally, and there was no significant effect of functional impairment on life satisfaction over time (see Table 12).

Functional Impairment, Family Satisfaction, Injury Type, and Marital Status

A final model incorporating all measures of family satisfaction, functional impairment, injury type, and marital status was conducted. Family satisfaction remained a significant predictor of life satisfaction, generally (est = .12, *SE* = .03, *p* = < .01). Functional impairment was not a significant predictor in this model. These results indicate that self-reported family satisfaction is a significant predictor of life satisfaction, and increased family satisfaction is associated with increased life satisfaction. Across injury types, burn injuries were significantly associated with predicting lower life satisfaction (est = -1.29, *SE* = .33, *p* = < .01). Other injury types were not associated with life satisfaction. "Single," "Divorced," and "Separated" were significantly and negatively predictive of life satisfaction (Single; est = -1.51, *SE* = .32, *p* = < .01; Divorced; est = -1.15, *SE* = .40, *p* = < .01; Separated; est = -3.54, *SE* = .76, *p* = < .01). Being single, divorced, or separated was associated with lower life satisfaction, and burn injuries were associated with lower life satisfaction (see Table 13).

Overall, family satisfaction, marital status, and injury type were the strongest predictors of life satisfaction in these models. As family satisfaction increased, so did life satisfaction. Individuals who were married or widowed and individuals with SCI or IAF were predictive of increased levels of life satisfaction. Functional impairment initially was a strong predictor of life satisfaction with higher functional impairment

indicative of lower life satisfaction, but this relationship appeared to diminish upon the addition of other variables (marital status, injury type). Consistent with past research, time was not a significant variable in any model. Levels of life satisfaction appeared to remain constant over the five year period, in general, and in differences in life satisfaction predicted by variables.

CHAPTER V

CONCLUSIONS

The purpose of this study was to examine the impact of psychosocial variables on life satisfaction over time following traumatically acquired disability to understand mechanisms that affect their long-term psychological health. While life satisfaction has been a well-established concept in regard to adjustment following SCI, recent reviews of burn adjustment in persons who incur burn injuries overlook life satisfaction and overall well-being of burn survivors (Askay & Patterson, 2010; Sen, Greenhalgh, & Palmieri, 2010). This study appears to be the first to examine trajectories of life satisfaction over the first five years following medical treatment for burn injuries.

Past research has shown a connection between functional impairment and life satisfaction following traumatic-onset brain injury (TBI; Resch et al., 2009). Higher family satisfaction is also associated with increased life satisfaction following TBI (Johnson et al., 2010). Other data indicates that marital status, too, is positively associated with greater life satisfaction following disability (Dunn & Brody, 2008; Hicken et al., 2002. The present study attempted to further our understanding of these factors and their influence on life satisfaction over time following disability.

Theoretical Support

These results may be best understood in the context of the dynamic model of adjustment outlined by Elliott and Warren (2007). This model incorporates multiple factors to best understand the complexities involved in rehabilitation following physical impairment. Important to note in these data is the inclusion of four unique factors that

influence the process: life satisfaction as a measure of psychological well-being, functional impairment (physical health), family satisfaction (environmental or social characteristics), and marital status and type of disability (enduring characteristics and individual differences, respectively). In the first year following injury, low functional impairment, higher family satisfaction and being married appear to be characteristic of those who report higher life satisfaction over the first five years following a SCI, burn injury or severe lower-extremity fractures. Consistent with the dynamic model, each factor appears to have independent, beneficial effects on life satisfaction over time. Increases and decreases in these variables occurred independent of, and not in response to, one another. In this study, each variable was an important predictor of life satisfaction.

Functional Impairment

Functional impairment, measuring the physical health category of the dynamic model, has long been shown to influence recovery (Johnson et al., 2010; Pallua et al., 2003, Resch et al., 2009). Consistent with past research (Resch et al., 2009), functional impairment was found to be associated with life satisfaction. Across most of the statistical models performed, life satisfaction decreased as functional impairment increased. The level of impairment was stable across time for each disability group: No significant changes were observed in FIM scores over time. Previous modeling of impairment following TBI revealed a steady decrease in life satisfaction over time for all but those individuals with levels of functional impairment one standard deviation below the study mean (Resch et al., 2009). In the current study, functional impairment

(FIM) scores were predictive of consistent life satisfaction over the five year measurement period.

Functional ability may reflect a capacity to engage in intentional activities that are pleasurable and characteristic of life satisfaction among people in general (Lyubomirsky, Sheldon, & Schkade, 2005). One might assume that immediately following acquired disability, an individual may have decreased physical functioning, therefore limiting the overall ability to engage in activities that previously contributed to feelings of happiness and well-being. If a person is more physically capable of performing desirable tasks, it might be more likely that he or she tries to resume familiar or similar tasks. Individuals with greater functional impairment may have less ability to perform certain tasks and decreased opportunities to engage in situations that promote desired and valued activities (Pallua et al., 2003). Although this interpretation is consistent with the theoretical notion of intentional activities (and with clinical ideals of rehabilitation), it is interesting that the relation of functional impairment to life satisfaction was diminished upon adding other predictors in later models. The strength of the impairment-life satisfaction relationship decreased once marital status and family satisfaction variables were added into the equation. Further research would be needed to investigate the reasons for these changes. As such, it appears that while functional impairment may be a fair predictor of life satisfaction in general, more specific variables of family satisfaction, marital status, and injury type may be better predictors overall.

Family Satisfaction

Family satisfaction was significantly predictive of life satisfaction across all models in which it was incorporated. As scores on a measure of family satisfaction (FSS) increased, so did life satisfaction scores. There was no change in this relationship over time, indicating a stable association of family satisfaction to life satisfaction over the first five years of acquired disability. Family satisfaction, indicative of a flexible, resilient, and cohesive family (Olson, 2011), is predictive of increased life satisfaction following acquired injury, independent of the beneficial effects of both marital status and functional impairment.

Characterized as cohesive and resilient, families with positive relationships may be more likely to facilitate positive emotions and adaptive behaviors that promote well-being in individuals following injury (Ryff, 1989). These features, consistent with increased family satisfaction and positive emotion, might help individuals following onset of injury, in that they may inoculate against stress and increase the likelihood of the person generalizing positive experiences to intentionally engage in more positive acts (Dunn, et al., 2009). Unfortunately, few studies investigate the impact of family relationships on outcomes following injury onset. Most research conceptualizes family in terms of social support (Müeller, Peter, Cieza, & Geyh, 2012), and more research is needed to better understand how cohesion, resilience, and adjustment of families impact overall adjustment following traumatic and disabling injuries.

Marital Status

Being currently married or having been married and widowed were consistently associated with increased life satisfaction in comparison to individuals who were single, separated, or divorced. Individuals who were unmarried at time of measurement had, on average, much lower scores of life satisfaction than other groups.

Marriage was a consistent factor in this model; a demographic characteristic that may remain stable but could have important implications should it change. Marriage, often defined as a proxy of support, is a consistent predictor of well-being following injury (Patterson et al., 2000; Patterson & Ford, 2000; Putzke, Elliott, & Richards, 2001). It may be more likely that being married accounts for more of the ~~"e~~everyday support" from day-to-day interactions with spouses (van Leeuwen, Post, van Asbeck, Bongers-Janssen, van der Woude, de Groot, & Lindeman, 2012; Vaux, 2000). While they are unique variables, marital status and family satisfaction might pull from similar features. However, because marriage is considered a ~~"c~~ircumstantial" variable, it is not to be assumed that a marriage equals a flexible, well-adjusted, cohesive unit, and it typically accounts for only 8-15% of total variance in well-being and life satisfaction (Lyuborminsky et al., 2005, p. 117). Results from multi-site study found factors that mitigate the benefits or liabilities of being married or divorced among persons with SCI (Kalpakjian et al., 2011). It will be important for future research to consider the possibilities of this interaction.

Injury Type

Variations appeared between injury groups, and these were consistent across multiple models. Severe burns were consistently associated with lower predicted life satisfaction than that observed among individuals with either SCI or IAF. If this relationship remains consistent over time as shown, perhaps individuals with severe burns might benefit from more intensive psychosocial interventions following injury to abate the overall decrease in life satisfaction with which severe burns are related.

Time

Time did not appear to be a significant variable across models. Measures of life satisfaction as influenced by functional impairment and family satisfaction were not significantly different over time, indicating perhaps a stability of life satisfaction over the five year period. This lack of results might also indicate that most of the dynamic rehabilitation occurred prior to the one-year post-discharge at which point these data were initially collected. Implications of initial rehabilitation within the first year should be considered for future studies.

Clinical Implications

Collectively these results of the present study indicate that ―…working with families to promote cohesion, stability, and …positive achievement must be part of rehabilitation" following acquired disability (Park, Choi, Jang, & Oh, 2007, p. 30). Complicating this recommendation is the fact that rehabilitation clinical services are severely limited in terms of time, resources, and access. Current programs do not focus on family adjustment, nor is there empirical evidence to support the provision of such

services. Although innovative, home-based programs have been developed, these have been psychoeducational in nature, focused on the needs of the caregiver, and confined to family members of persons with SCI and other neurological disabilities (Berry, Elliott, Grant, Edwards, & Fine, in press; Elliott & Berry, 2009; Elliott, Brossart, Berry, & Fine, 2008).

Clinical risks are important to consider when working with this population. Considering that predictions of life satisfaction were consistent after the first year pending stable marital status, it is likely that one may predict those individuals who are less likely to adjust well following acquired disability within the first year following injury. Those individuals less likely to adjust well might be those individuals who are single, isolated socially, have increased functional impairment, and exposed to rigid family interactions. Knowing these risk factors, one might be more likely to intervene early, ideally within the first year following injury, to help fortify the strengths and psychological resilience of that individual through therapy and social re-integration programs.

An important focus of this finding might be that initial rehabilitation is an invaluable time for recovery and rehabilitation. With increase psychosocial intervention, perhaps levels of life satisfaction can be increased to a higher level than predicted and maintained over time with structured psychological and physical maintenance. It is important to note that a decrease in life satisfaction over time was not present in these models. It may not be practical or beneficial for providers to assume that life satisfaction will decrease over time. In fact, drops in life satisfaction following initial

measurement after acquired disability might be clinically significant in alerting practitioners to a physical or psychosocial problem the person is facing that requires intervention.

Limitations of the Present Study

All data included in this study are self-report data collected directly from the patient. Self-report data is a subjective measure of one person's experience and may not accurately reflect the true status of that person. Best practice measures call for an overlap of measures to best reflect the true nature of the measured aspect. However, it is important to recognize the perception of the person is paramount in understanding satisfaction with life. Further research might effectively incorporate data from sources other than the patient to support research of life satisfaction.

Several other variables with a potential to influence life satisfaction were not incorporated in this study. Particularly, psychological factors (Altier, Malenfant, Forget, & Choinière, 2002; Fauerbach et al., 2007) including substance abuse, depression, anxiety, or acute or post-traumatic stress responses were not measured. Measures of chronic pain, barriers and accessibility issues, and return to work (Dyster-Aas, Kildal, & Willebrand, 2007) were not included, all factors that have been significantly related to outcomes following acquired disability. Accounting for current physical, social, and psychiatric conditions will be important for future research into life satisfaction.

With recent research suggesting that levels of adjustment may level off three to six months following the onset of injury, and dramatic changes often occurring within the first year post-injury, it is possible that significant, dynamic changes in rehabilitation

had already occurred in this patient population, prior to the first measurement point at the first year following discharge from the hospital (de Roon-Cassini, Rusch, Mancini, & Bonanno, 2010; Klein, Lezotte et al., 2011).The failure to assess life satisfaction within the first year post-injury may, in part, account for the lack of time effects in the present study. Future research could examine trajectories of life satisfaction immediately following onset of injury.

Future Research

Future research is needed to better discern the complex relationships between the variables presented. Interventions studies targeting increased life satisfaction with intensive psychosocial rehabilitation would be interesting, particularly in groups of individuals with severe burns or little social support. Interventions can better distinguish the complexities between social support and family satisfaction along with marital status.

It will be important to investigate the factors of marital status that precipitate such a strong relationship with life satisfaction, even washing out the relationship with functionality that has proven so important past research. Further investigation into the role of family satisfaction and interventions targeted at increasing family satisfaction will be important to address, as family satisfaction has consistently been related to outcomes in overall life satisfaction in current and past research (Johnson et al., 2010).

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APPENDIX

Table 1.

Reported Ethnicity for the Total Sample at Twelve Months Post-Discharge

	Frequency	Percent
Asian	3	.5
Black	199	30.1
White	455	68.7
Chinese	1	.2
Hawaiian Islander	1	.2
Other	1	.2
Unknown	2	.3
Total	662	100.0

Table 2.

Injury Severity by Injury Type for the Total Sample

	SCI	IAF	Burns	Total
1	1	0	43	44
2	21	144	112	277
3	48	110	65	223
4	40	4	7	51
5	11	0	17	28
6	0	0	1	1
Missing	23	0	15	38
Total	144	258	260	662

Note: 1= minor injury, 2= moderate, 3= severe, not life threatening, 4= severe, life threatening, 5= critical, survival uncertain, and 6= maximum injury (Civil & Schwab, 1988).

Table 3.

Injury Type

	Frequency	Percent
SCI	144	21.8
IAF	258	39.0
Burn	260	39.3
Total	662	100.0

Table 4.

Reported Marital Status for the Total Sample at Twelve Months Post-Discharge

	Frequency	Percent
Single	167	25.2
Married	334	50.5
Divorced	77	11.6
Separated	21	3.2
Widowed	41	6.2
Other	22	3.3
Total	662	100.0

Table 5.

Frequencies of Marital Status by Sex Across Measurement Points

			Month Follow-Up				
Sex			1	2	4	5	Total
Male	Marital Status	Single	127	96	65	54	342
		Married	255	235	196	165	851
		Divorced	49	45	35	29	158
		Separated	11	11	9	5	36
		Widowed	5	5	5	4	19
		Other	18	0	0	0	18
		Total	465	392	310	257	1424
Female	Marital Status	Single	40	31	28	20	119
		Married	79	77	63	54	273
		Divorced	28	21	19	16	84
		Separated	10	7	1	2	20
		Widowed	36	33	24	22	115
		Other	4	0	0	0	4
		Total	197	169	135	114	615

Table 6.

Frequencies of Marital Status by Injury Type Across Measurement Periods

Injury Type			Month Follow-Up 1	2	4	5	Total
SCI	Marital Status	Single	48	36	25	21	130
		Married	65	57	46	42	210
		Divorced	18	19	13	10	60
		Separated	6	7	1	2	16
		Widowed	1	0	1	1	3
		Other	6	0	0	0	6
		Total	144	119	86	76	425
IAF	Marital Status	Single	62	47	40	28	177
		Married	126	119	98	83	426
		Divorced	31	27	25	18	101
		Separated	8	5	4	2	19
		Widowed	21	22	20	17	80
		Other	10	0	0	0	10
		Total	258	220	187	148	813
Burn	Marital Status	Single	57	44	28	25	154
		Married	143	136	115	94	488
		Divorced	28	20	16	17	81
		Separated	7	6	5	3	21
		Widowed	19	16	8	8	51
		Other	6	0	0	0	6
		Total	260	222	172	147	801

Table 7.

Mean Measurement Scores by Injury Type at the First Assessment

ITYPE		LSI	FSS	FIM
SCI	Mean	11.80	56.80	1.1737
	N	407	320	416
	SD	4.686	11.858	1.61497
IAF	Mean	12.69	55.16	2.6955
	N	798	384	793
	SD	4.877	10.879	1.68052
Burn	Mean	12.68	54.11	4.1005
	N	787	392	784
	SD	4.957	11.921	1.76513
Total	Mean	12.50	55.26	2.9305
	N	1992	1096	1993
	SD	4.881	11.588	2.02389

Table 8.

Mean Measurement Scores at Each Measurement Point

Month Follow-Up		LSI	FSS	FIM
1	Mean	12.72	55.26	3.0152
	N	624	610	637
	SD	4.589	11.922	2.02659
2	Mean	12.17	59.69	2.9031
	N	556	75	551
	SD	5.112	12.513	2.01042
4	Mean	12.51	62.56	2.9473
	N	442	45	439
	SD	4.848	10.976	2.01513
5	Mean	12.64	53.47	2.8043
	N	370	366	366
	SD	5.034	10.275	2.05065
Total	Mean	12.50	55.26	2.9305
	N	1992	1096	1993
	SD	4.881	11.588	2.02389

Table 9.

FIM and Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	*T*	Sig.
Intercept	10.51	.34	30.91	<.01
Time	-.16	.09	-1.72	.085
FIM	.67	.09	7.22	<.01
FIM * Time	.04	.03	1.65	.099

a. Dependent Variable: LSI.

Table 10.

FIM, FSS, and Estimates of Fixed Effects[a]

Parameter	Estimate	S.E.	*T*	Sig.
Intercept	3.01	.99	3.03	.002
Time	.06	.39	.16	.872
FSS	.14	.02	8.04	<.01
FIM	.68	.10	6.99	<.01
FIM * Time	.04	.10	.44	.663
FSS * Time	-.00	.01	-.32	.752
FSS * FIM * Time	.00	.00	.08	.940

a. Dependent Variable: LSI.

Table 11.

Injury Type, FIM, FSS, and Estimates of Fixed Effects[a]

Parameter	Estimate	S.E.	*T*	Sig.
Intercept	2.98	1.01	2.96	.003
Time	.11	.39	.29	.774
FSS	.14	.017	8.09	<.01
SCI[b]	.16	.38	.42	.675
Burns[b]	-1.25	.34	-3.70	<.01
FIM	.83	.11	7.89	<.01
FIM * Time	.04	.10	.38	.707
FSS * Time	-.00	.01	-.41	.684
FSS * FIM * Time	.00	.00	.11	.909

a. Dependent Variable: LSI.
b. Reference Injury Type: IAF.

Table 12.

Marital Status, FIM, FSS, and Estimates of Fixed Effects[a]

Parameters	Estimate	S.E.	*T*	Sig.
Intercept	4.69	1.53	3.06	.002
Time	-.10	.50	-.21	.838
FIM	.50	.46	1.09	.274
Single[b]	-1.46	.32	-4.55	<.01
Divorced[b]	-1.10	.41	-2.72	.007
Widowed[b]	-.61	.56	-1.09	.275
Separated[b]	-3.53	.76	-4.62	<.01
FSS	.12	.03	4.46	<.01
FIM * Time	.07	.15	.46	.646
FSS * Time	.00	.01	.02	.984
FIM * FSS	.00	.01	.31	.758
FIM * FSS * Time	-.00	.00	-.12	.904

a. Dependent Variable: LSI.
b. Reference Marital Status: Married.

Table 13.

Injury Type, Marital Status, FIM, FSS, and Estimates of Fixed Effects[a]

Parameters	Estimate	S.E.	*T*	Sig.
Intercept	4.87	1.54	3.16	.002
Time	-.12	.49	-.24	.812
FIM	.58	.45	1.29	.198
SCI[b]	.28	.37	.77	.445
Burns[b]	-1.29	.33	-3.95	<.01
Single[c]	-1.51	.32	-4.77	<.01
Divorced[c]	-1.15	.40	-2.88	.004
Widowed[c]	-.33	.56	-.60	.552
Separated[c]	-3.54	.76	-4.69	<.01
FSS	.12	.03	4.29	<.01
FIM * Time	.09	.15	.58	.565
FSS * Time	.00	.01	.08	.939
FIM * FSS	.00	.01	.51	.608
FIM * FSS * Time	-.00	.00	-.25	.804

a. Dependent Variable: LSI.
b. Reference Injury Type: IAF.
c. Reference Marital Status: Married.

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