

## Reliability and validity of the Family Satisfaction Scale with survivors of traumatic brain injury

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**Abstract**—For this study, we investigated the reliability and validity of the FSS (Family Satisfaction Scale) in survivors of traumatic brain injury (TBI). The FSS was administered during the 12- and 60-month follow-up interviews. Data analyses included Cronbach's Alpha to determine internal consistency and analysis of variance to determine the relationship of FSS total score to Life Satisfaction Index-A (LSI-A) total scores, marital status, living arrangement, and number of family contacts outside the home. Cronbach's Alphas were 0.94 (12 months,  $N = 541$ ) and 0.95 (60 months,  $N = 340$ ). FSS total score and marital status were significantly related at both 12 months ( $F_{3, 534} = 6.04, p < 0.001$ ) and 60 months postdischarge ( $F_{3, 335} = 4.52, p < 0.005$ ). FSS total scores are correlated with the number of family contacts ( $r_{342} = 0.12, p < 0.03$ ) and with LSI-A total scores ( $r_{337} = 0.43, p < 0.001$ ). The FSS has excellent internal consistency with survivors of TBI. We also demonstrated the evidence of convergent validity.

**Key words:** Family Satisfaction Scale, reliability, traumatic brain injury, validity.

### INTRODUCTION

A traumatic brain injury (TBI) can profoundly affect social functioning, including family relationships. Previously independent adults may be severely limited in their ability to manage the demands of daily life. They may return from the hospital or rehabilitation unit to a family structure that has made significant changes to accommodate the needs of the survivors. Family members who

were not employed prior to the injury may go to work to replace the income of the family breadwinner. Children may take on adult responsibilities neglected by adults forced to reorder family priorities. Outside caregivers may come into the home to assume some of these caregiving roles. When the injury leaves visible physical or behavioral stigmas, the family may be the only social group to provide the TBI survivor with acceptance and support.

Families, like individuals, often adjust quite well to markedly changed circumstances [1]. However, a need exists for an instrument to measure family satisfaction in survivors of TBI, because of the potential stress and altered

**Abbreviations:** AIS = Abbreviated Injury Scale, ANOVA = analysis of variance, FSS = Family Satisfaction Scale, LSI-A = Life Satisfaction Index-A, SCI = spinal cord injury, SD = standard deviation, TBI = traumatic brain injury, UAB-ICRC = University of Alabama at Birmingham's Injury Control Research Center.

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demands on family members. Previous research with survivors of TBI has shown that family satisfaction is positively related to functional independence, which, in turn, leads to greater life satisfaction [2]. In another study, family satisfaction was the strongest predictor of life satisfaction among survivors of TBI regardless of whether the respondent reported blaming him or herself for the injury [3].

Family satisfaction is a vital construct, and it has been widely used in studies of normal and problematic family functioning. A number of inventories are available based on a wide variety of assumptions about family functioning [4–11]. Although family satisfaction has emerged as an influential postinjury factor, most of the family satisfaction inventories were not developed with special populations, such as TBI survivors, in mind.

The Family Satisfaction Scale (FSS) [6] is one family satisfaction instrument that has proved pertinent in injury outcome research [1–3,12]. This is one of several scales developed by Olson and colleagues to measure family functioning in counseling and research settings [6]. The FSS is a 14-item scale that was designed to measure satisfaction with family cohesion and adaptability. When the FSS was published in 1982, there were few, if any, family satisfaction scales found in the literature, although several have been developed since [4–12].

The FSS [6] items survey satisfaction related to parental arguments and decision making and frames the construct of family satisfaction in a way that might not be completely appropriate for adults who are adapting to TBI. Adult survivors of TBI are adjusting to a family structure that may be radically altered in the roles and responsibilities of the members. Nevertheless, the FSS provides a psychometrically sound starting point for adapting the scale to assess family functioning in postinjury patients.

This research determines the psychometric properties of an adaptation of the FSS with survivors of TBI. Our hypotheses were—

1. The FSS would have a high degree of internal consistency as assessed by Cronbach's Alpha.
2. Married survivors of TBI would express greater family satisfaction than unmarried survivors.
3. Survivors of TBI who had extensive family contacts would express greater family satisfaction than those who had limited family contacts.
4. Survivors of TBI who lived with family members would express greater family satisfaction than those who lived alone.

5. Survivors of TBI with high levels of life satisfaction would express greater family satisfaction than survivors with lower levels of life satisfaction.

## METHODS

In 1989, the University of Alabama at Birmingham's Injury Control Research Center (UAB-ICRC) received approval from the UAB Institutional Review Board to begin an ongoing, prospective, and longitudinal study of persons with one or more of the following injuries: spinal cord injury (SCI), TBI, intraarticular fractures of the lower limbs, or severe burns. Criteria for inclusion in this study were—

1. Having sustained one or more of the aforementioned injuries between 1989 and 1992.
2. Having a documented acute care stay of 3 or more days due to that injury.
3. Residing and having been injured in Alabama.
4. Being at least 18 years of age when injured.
5. Participating in regularly scheduled telephone follow-up interviews conducted by UAB-ICRC personnel.

Injured persons meeting the criteria for inclusion, who were treated in one of eight participating hospitals in central and northern Alabama were asked to take part in the study. Within 1 year of injury, potential participants were contacted by letter, which described the study in detail. A representative from UAB-ICRC then called the person, explained the study in greater detail, and obtained the individual's informed consent. Initial participant data were collected with the use of medical records provided by the respective hospitals. Telephone follow-up interviews began as close as possible to the 12-month anniversary of the participants' initial discharge from the acute care setting. Subsequent telephone follow-up interviews continue annually, the only exceptions being at 36 and 84 months, and continue today.

## Participants

Participants with TBI in the current study were part of the aforementioned larger longitudinal study of physical and psychological outcomes among people with a wide variety of injuries. A total of 550 survivors of TBI were identified as potential participants at 12 months postdischarge. A limited number of participants had completed FSS data at the 24- and 48-month follow-up periods, so the data analysis included only those participants at the 12 and 60-month follow-up periods.

**Table 1** summarizes the demographic data for the sample at 12 and 60 months postdischarge. No significant differences were found between the 12- and 60-month postdischarge groups on any demographic variable, suggesting that, at least on these variables, the groups were similar. In addition, a similar analysis was performed between the group that participated in the 60-month fol-

low-up and the group that was lost to follow-up. No significant differences were found between these groups on any of the variables listed in **Table 1**. The sample was predominantly Caucasian, male, unmarried, and not employed. The sample was evenly divided with respect to educational attainment among those who had not completed high school, those who were high school graduates,

**Table 1.**

Demographic characteristics of the TBI participants at 12 months and 60 months postdischarge.

Characteristics	12 Mo Postdischarge		60 Mo Postdischarge		$\chi^2$ (df)	p-Value
	N	Percentage	N	Percentage		
<b>Gender</b>						
Men	382	71.4	239	70.5	1.4 (1)	0.24
Women	153	28.6	100	29.5		
Total	535	—	339	—		
<b>Race</b>						
White	385	72.6	253	75.1	0.63 (1)	0.43
Nonwhite	145	27.4	84	24.9		
Total	530	—	337	—		
<b>Employment Status</b>						
Employed	201	39.3	146	44.1	1.9 (1)	0.17
Not Employed	310	60.7	185	55.9		
Total	511	—	331	—		
<b>Marital Status</b>						
Never Married	204	37.9	100	29.5	7.6 (3)	0.06
Married	201	37.4	154	45.4		
Separated/Divorced	99	18.4	63	18.6		
Widowed	34	6.3	22	6.5		
Total	538	—	339	—		
<b>Educational Attainment</b>						
Less than H.S.	187	37.3	118	36.9	1.3 (2)	0.51
H.S. Graduate	166	33.0	96	30		
More than H.S.	149	29.7	106	33.1		
Total	502	—	320	—		
<b>Injury Severity</b>						
Mild	1	0.2	1	0.3	0.4 (4)	0.98
Moderate	169	33.7	104	32.2		
Serious	195	38.8	131	40.6		
Severe	116	23.1	73	22.6		
Critical	21	4.2	14	4.3		
Total	502	—	323	—		
N = number      df = degree of freedom      TBI = traumatic brain injury      H.S. = High School						

and those with at least some postsecondary education. Almost 40 percent of the sample had sustained an injury rated 3, or "serious," on the Abbreviated Injury Scale (AIS) [13] score. The AIS, the most widely used anatomic injury severity scale in the world [14], has values that range from 1 (mild injury) to 6 (unsurvivable injury). The average age of the participants was 37.4 years ( $SD = 17.2$ , range = 18–90).

### Instruments

The FSS [6] is a 14-item instrument composed of items designed to measure family cohesion and adaptability. The original reliability and validity analyses completed by Olson and Wilson at the time of the instrument's development were based on studies of university students, and from a national survey of married couples and adolescents [6]. From these analyses, the reported Cronbach's Alphas are 0.92 for the entire scale, 0.85 for the cohesion scale, and 0.84 for the adaptability scale. In the original reliability and validity analyses, the test-retest reliability was 0.75 when readministered after a 5-week interval.

As previously mentioned, the FSS was modified for use in follow-up interviews for this longitudinal study, from which our sample of survivors of TBI was drawn. Specifically, items that reflected satisfaction of a dependent child with parental actions were rewritten to eliminate this focus. Thus, item 4 ("How satisfied are you with how often parents make decisions in your family?") became "How satisfied are you with how decisions are made in your family?" and item 5 ("How satisfied are you with how much mother and father argue with each other?") became "How satisfied are you with how much arguing goes on in your family?" The standardized item-to-total score correlation coefficients for revised item 4 were 0.78 at 12 months and 0.76 at 60 months. The coefficients for revised item 5 were 0.69 at 12 months and 0.82 at 60 months. In the original report on FSS scale development, the item-total correlation for item 4 was 0.66 and for item 5 was 0.52 [6].

We retained the original 5-point Likert scale-scoring format in our modified FSS (1 = dissatisfied, 2 = somewhat dissatisfied, 3 = generally satisfied, 4 = very satisfied, 5 = extremely satisfied). Total scores range from 14 to 70. Although the original FSS was validated in individual and group face-to-face interviews [6], the modified FSS we used was always administered during structured telephone interviews.

In addition to the FSS, we used telephone questionnaire items dealing with other family-related variables. These variables dealt with self-reported living arrangements (alone or with family), marital status (single, married, separated/divorced, widowed), and extent of family contacts outside the immediate family. Responses to these questions were used as validity indicators of the FSS total scores.

The Life Satisfaction Index-A (LSI-A) [15] is a 20-item instrument of demonstrated reliability and validity designed to measure enthusiasm for life, mood, and congruence between desired and achieved goals. Two studies of the LSI-A have examined the capability of items to discriminate between high and low scorers. These studies produced item discriminative values that range from 16.0 to 75.4 percent, with means of 42 and 58.7 percent [16–17]. An aggregate of 157 studies of LSI-A validity yielded an average internal consistency coefficient of 0.79, with score reliability unrelated to a variety of sample characteristics [18]. The LSI-A is also positively correlated with a variety of instruments that measure life satisfaction, adjustment, and morale [19,20].

### RESULTS

The internal consistency reliability of the FSS at both the 12- and the 60-month postdischarge follow-up periods was determined with Cronbach's Alpha. The reliability coefficients for the FSS were 0.94 (12 months) and 0.95 (60 months). These coefficients are similar to those reported for the FSS total score in large-sample survey research with families [6]. The item-to-total score correlations ranged from 0.52 to 0.73 at 12 months (median  $r = 0.64$ ) and 0.54 to 0.84 at 60 months (median  $r = 0.74$ ).

We next examined the relationship between FSS total score and several other family-related variables that were measured as part of the follow-up survey. The relationship between FSS and marital status at 12 months and 60 months postdischarge (single, married, separated/divorced, and widowed) was assessed with analysis of variance (ANOVA). From the results, we ascertained that there were significant mean differences in FSS total scores among the four groups at 12 months ( $F_{3, 534} = 6.04$ ,  $p < 0.001$ ) and 60 months ( $F_{3, 335} = 4.52$ ,  $p < 0.005$ ). **Table 2** reports the mean FSS scores and results of multiple comparison tests for each marital status group at the two follow-up periods. Identical results were obtained at

**Table 2.**

Marital status and mean FSS Scores at 12 and 60 months postdischarge with multiple comparisons.

Marital Status	12 Mo Postdischarge				60 Mo Postdischarge			
	N	Mean	Widowed	Married	N	Mean	Widowed	Married
Widowed	34	59.0	—	NS	22	55.5	—	NS
Married	201	55.4	NS	—	154	54.1	NS	—
Single	204	52.6	<0.02	<0.005	100	49.6	<0.04	<0.005
Separated/Divorced	99	51.0	<0.0005	<0.005	63	49.3	<0.04	<0.01
Total	538	—	—	—	339	—	—	—

N = number      FSS = Family Satisfaction Scale      NS = not significant

both periods. Those who were widowed or married had the highest FSS total scores, which were not significantly different from each other. Those who were single and those who were separated/divorced had the lowest FSS total scores, and those scores did not differ significantly from each other. As shown in **Table 2**, the FSS total scores for the married and widowed survivors of TBI were significantly greater than the scores of the single or the separated/divorced.

The 60-month sample was divided into those who lived alone (N = 56) and with family members (spouse, children, and other family; N = 276). Using ANOVA, we sought to determine if family satisfaction was greater in survivors of TBI who lived with family members than those who lived alone. No differences were found in mean FSS total scores between the two groups. Mean FSS scores for those who lived alone were 51.9 and 52.1 for those who lived with family.

The 60-month follow-up survey asked respondents to specify the number of relatives outside the immediate family that was contacted (visit, phone, write) each month. The estimated number of contacts ranged from 0 to 75 (mean = 7.7, SD = 6.7). There was a significant positive correlation between FSS total score and estimated number of family contacts outside the home ( $r_{342} = 0.12$ ,  $p < 0.03$ ).

Finally, the 60-month follow-up questionnaire contained the LSI-A. We found a significant positive correlation between the LSI-A total scores and FSS total scores at the 60-month follow-up ( $r_{337} = 0.43$ ,  $p < 0.001$ ).

## DISCUSSION

The results of these studies indicate that the FSS has excellent internal consistency reliability with this sample

of survivors of TBI. The magnitude of the internal consistency coefficients is similar to those in the original studies of this scale [6], which focused on the evaluation of family and adaptability and cohesion in normal families. The range of item-to-total score correlations indicates that, as expected with internal consistency coefficients of this magnitude, the items in the FSS are at least moderately related to total score.

Some limited support for the validity of FSS scores is presented as significant relationships with survey variables related to family configuration. The FSS total scores were significantly higher for married and widowed survivors than for single or separated/divorced survivors. Married survivors may experience greater family support and satisfaction as a result of having a spouse and possibly children who are nearby and willing to fill these roles. Widowed survivors may experience increased or renewed support from sympathetic family members when the spouse dies.

Additional findings included the small, but significant, correlation between family satisfaction and typical number of family contacts. Although the number of family contacts is an indirect measure of family satisfaction, the relationship is positive, since greater numbers of contacts with family members are associated with higher FSS scores. The number of family contacts is a crude measure of family satisfaction, and additional studies would be needed to understand the relationship between family contacts and measures of satisfaction.

The FSS total score was moderately correlation with the LSI-A total score. This correlation is consistent with previous research findings [2,3], although these studies examined the relationship between life satisfaction and family satisfaction 1 and 2 years postdischarge. Our result shows that the significant association between these variables continues 5 years after injury.

The lack of difference in FSS scores between survivors of TBI who live alone or with family was surprising. It was expected that those survivors who lived with family members would have higher family satisfaction levels than those who lived alone, but no difference was found between the two groups. However, this analysis was conducted 5 years postdischarge and the results may simply reflect the fact that most survivors had adjusted to changed living situations and family circumstances by the time this assessment was conducted. Perhaps family satisfaction would have a greater impact shortly after injury because previously independent individuals may find themselves in arrangements with family members that also involve a loss of personal autonomy. It is also possible that individuals may lack responsive and involved families, which may cause problems initially, but not 5 years after injury. Obviously, there are additional questions raised by this finding that could form the basis for additional research.

## LIMITATIONS

As with all research studies, ours has important limitations that should be considered. First, the demonstration of reliability and validity with one group does not signify that the instrument is reliable or valid for all groups or for all purposes. The current research does, however, add to the body of literature by supporting the reliability and validity of the FSS with TBI survivors.

Second, the groups available for evaluation at 12 and 60 months postinjury were subsets of TBI survivors who were part of a larger longitudinal study. Although the demographic indicators suggest that there was adequate coverage of TBI survivors by age, race, educational level, and other characteristics, we cannot be certain that the samples were not affected by selection bias in the distribution of some characteristics. To the extent that this occurred, the results may not represent all TBI survivors, and generalization of results should be done with the demographics of the samples in mind.

Finally, the variables selected for use in validating the FSS, such as living alone or with family, and outside family contacts, are taken from a survey that included these and very few, if any, other indicators of family satisfaction. Better evidence of convergent validity information might result if more direct measures of family satisfaction were used.

## CONCLUSION

The FSS has reliability and validity within this cohort of survivors of TBI. Further work should be done to expand our understanding of FSS validity with TBI cohorts, as well as with groups with different injury profiles.

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