

## **Mediation Analysis of Leisure, Perceived Stress, and Quality of Life in Informal Caregivers**

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### **Abstract**

Due to the prediction of a significant increase in older adults as well as an expected decrease in availability of professional homecare, the number of informal caregivers in the United States is expected to grow exponentially by the year 2050. Unfortunately, caregivers will likely continue to experience negative health consequences due to caregiver burden. In this study, mediation analysis was used to investigate the relationship among three leisure variables, perceived stress, and quality of life of informal family caregivers. Results showed that the effect of two of the leisure variables mediated quality of life through perceived stress. Recommendations address discussion of alternative recreation programming perspectives for informal caregivers as well as further research directions to expand these findings.

*KEYWORDS: Caregivers, mediation analysis, leisure, perceived stress, quality of life*

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Approximately 48.9 million individuals (21% of the adult U.S. population) are involved in some form of unpaid care for an adult relative or loved one who is ill, disabled, or aged (National Alliance of Caregiving and The American Association of Retired Persons, 2009 [NAC/AARP]). With the projection of adults aged 65 and older (40.2 million) estimated to double by 2050 (Administration on Aging, 2009 [AoA]), the number of these informal caregivers is likely to grow exponentially. A concern of this projection is that many informal caregivers currently experience negative health consequences as a result of their caregiving responsibilities. In fact, many caregivers have identified their own health as fair to poor (e.g., AoA, 2009; Collins et al., 1999; Lee, Colditz, Berkman, & Kawachi, 2003). In addition, research shows that caregivers often experience high levels of perceived stress, increased social isolation, compromised quality of life, and have reported loss of leisure as a significant negative consequence of caregiving (e.g., Bedini & Gladwell, 2006; Dunn & Strain, 2001; McCullagh, Brigstocke, Donaldson, & Kalra, 2005; NAC/AARP, 2009; National Family Caregivers Association, 1998; Ory, Hoffman, Yee, Tennstedt, & Schulz, 1999; Vitaliano, Young, & Zhang, 2004).

The type of chronic stress encountered in caregiving can take as many as 10 years off the life of a caregiver (Epel et al., 2004) and can compromise one's immune system for up to three years after the caregiving responsibilities end, thus increasing chances of developing a chronic illness themselves at more than twice the rate of non-caregivers (Kielcot-Glaser & Glaser, 2002). Unfortunately, caregivers often demonstrate reduced ability to cope with caregiving burden (Mannell, Salmoni, & Martin, 2002; Ory et al., 1999) and subsequently have decreased health status (e.g., King, Baumann, O'Sullivan, Wilcox, & Castro, 2002; Shanks-McElroy & Strobino, 2001) and reduced or abandoned meaningful leisure participation (e.g., Bedini & Phoenix, 2004; Kesselring et al., 2001; Loucks-Atkinson, Kleiber, & Williamson, 2006; Rogers, 2001; Shanks-McElroy & Strobino, 2001).

Although copious research exists linking participation in leisure activities to improved health, decreased depression, increased self-esteem, reduced stress, decreased risk of dementia, and greater quality of life in many populations (e.g., Beaumont & Kenealy, 2004; Gabriel & Bowling, 2004; Loucks-Atkinson et al., 2006; Mannell et al., 2002; Verghese et al., 2003; Waters & Moore, 2002), there is an absence of research that specifically addresses the use of leisure as a mechanism for improving the well-being of caregivers. This gap in knowledge is an important problem because until a better understanding of the relationship between leisure and the well-being of caregivers is obtained, it is unlikely that programs, policies, and strategies will be developed that effectively utilize leisure as a mechanism to improve the mental and physical health of informal caregivers.

The purpose of this study was to examine the relationship of three components of leisure with the health and well-being of family caregivers. The specific aims of this study were to (a) examine the relationships among leisure participation, satisfaction with time for leisure, and satisfaction with quality of the leisure experience, perceived stress, and quality of life, and (b) test whether perceived stress mediated the effect of these leisure constructs on the quality of life of family caregivers.

## **Background**

### **Caregiver Profile**

According to a study by the NAC/AARP (2009), a typical informal/family caregiver is female (66%), 48 years old, White (72%), married or living with a partner (63%), has some college education (68%), and lives with or near the people for whom they care (72%). In addition, these data identified that caregivers of adults spent approximately 19 hours a week providing care. Economic changes in Medicare and related legislation have reduced the availability of professional home healthcare workers. Thus, caregiving comprises more than 90% of long-term care of older adults with disabling conditions in the United States (Gibson, 2005). According to Houser and Gibson (2008), the value of this unpaid care in 2007 was estimated at \$375 billion annually.

### **Quality of Life**

Quality of life, from a social science standpoint, has typically been defined as distinguishable from concepts such as life satisfaction, morale, and happiness. Other perspectives, however, associate quality of life with emotional well-being and life satisfaction. Perhaps the most inclusive definition comes from the World Health Organization (WHO, 1998), which defined quality of life as “individuals’ perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (p. 3). WHO further stated that quality of life is, “affected in a complex way by the person’s physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment” (p. 3). Issues of quality of life are particularly salient for informal caregivers. Many studies exist that show that caregiver burden is negatively related to caregivers’ quality of life (e.g., Gove, Dahl, Moum, & Fossa, 2005; McCullagh et al., 2005). More recently, work by Ho and colleagues (2009) found that primary caregivers had poorer quality of life than non-caregivers.

While leisure is just one facet of quality of life, studies show that passive and active forms of leisure have been perceived as an important contributor to quality of life (e.g., Beaumont & Kenealy, 2004; Gabriel & Bowling, 2004). In addition, items and subscales addressing leisure and recreation are often found in scales measuring quality of life (i.e., Quality of Life Scale; Burckhardt & Anderson, 2003; HRQOL-14; Centers for Disease Control, 1995; Quality of Life Questionnaire; Bigelow, Olson, Smoyer, & Stewart, 1991; Quality of Life Index; Ferrans & Powers, 1985; WHOQOL-100 Index, 1998). Considering this, leisure might have potential to address the loss of quality of life experienced by caregivers due to caregiver burden. Similarly, loss of leisure may contribute to this decrease or decline in quality of life.

### **Perceived Stress**

Perceived stress is commonly considered a subjective appraisal of events or situations in one’s life that exceed one’s abilities and resources with which to cope with these situations (Chawalisz, 1992). The effects of chronic perceived

stress are quite extensive. For example, Goldman, Gleib, Seplaki, Liu, & Weinstein (2005) found that physiological dysregulation is associated with both the level of perceived stress at a given time as well as longitudinal estimates of perceived stress. Other studies show that perceived stress can compromise one's immune system (e.g., Herbert & Cohen, 1993), cause inflammation (e.g., Jain, Mills, von Känel, Hong, & Dimsdale, 2007), and increase cortisol levels (e.g., Pruessner, Hellhammer, & Kirschbaum, 1999).

For caregivers specifically, studies support the relationship between perceived stress from caregiving burden and increased health problems (physical, psychological, or social) that sometimes lead to hospitalization (e.g., Collins et al., 1999; Schulz, Beach, Lind, Martire, & Zdaniuk, 2001). In a meta-analysis, Vitaliano, Zhang, and Scanlan (2003) noted that caregivers reported poorer health and took more medications for physical problems than non-caregivers, had a 23% higher level of stress hormones, and a 15% lower level of antibody responses than those who were not caregivers. Similarly, evidence supported that caregivers with a high caregiving burden reported increased stress and demonstrated loss of immune cell function (Mills et al., 2004), increased risk of chronic heart disease (Lee et al., 2003), higher levels of blood pressure (Kim & Knight, 2008), increased secondary stressors (Gaugler et al., 2008), and even increased risk of mortality (e.g., Beach, Schulz, Yee, & Jackson, 2000; Schulz & Beach, 1999; Vitaliano et al., 2003).

### **Caregivers' Leisure**

Overall, it is well known that leisure time activities contribute to overall health and well-being in general populations. More specifically, leisure activities have been associated with positive cognitive function (e.g., Weuve et al., 2004), better mental health (e.g., Everard, Lach, Fisher, & Baum, 2000), improved quality of life (e.g., Gabriel & Bowling, 2004), positive adjustment to life events (e.g., Mannell et al., 2002), and reduced risk of dementia (e.g., Crowe, Andel, Pedersen, Johansson, & Gatz, 2003; Verghese et al., 2003). For caregivers in particular, however, their caregiving responsibilities often prove too great a burden and subsequently they reduce or abandon their leisure pursuits (e.g., Arguelles & von Simson, 1999; Bedini & Guinan, 1996; Bedini & Phoenix, 2004; Cantor, 1983; Chenoweth & Spencer, 1986; Gladwell & Bedini, 2004; Miller & Montgomery, 1990; Rogers, 1997; Seltzer & Li, 2000; Stevens, et al., 2004). This change in leisure involvement can be difficult for this population. In a national survey, family caregivers reported that this loss of leisure was one of the top three negative consequences to being a caregiver (NFCA, 1998).

In addition, research shows that restricted activity because of family caregiver responsibilities can negatively affect their health and well-being. For example, Williamson, Shaffer, & Schulz (1998) found that activity restriction due to disruption from caregiving responsibilities was related to negative affective outcomes in caregivers. Cannuscio and colleagues (2003) found that female caregivers who were socially isolated from friends and family due to caregiving experienced a significant increase in depression. Shanks-McElroy and Strobino (2001) found that male caregivers who reported fewer leisure opportunities also demonstrated poorer emotional and physical health. In addition, it is important

to note that this reduction or abandonment of leisure does not come easily to caregivers. Bedini and Phoenix (2004) found that just over 70% of the respondents indicated that they valued leisure, yet only 12% of them stated they were able to protect their leisure due to their caregiving responsibilities.

### **Conceptual Frameworks**

Understanding the issues of lack of leisure for caregivers can be partially explained by the Activity Restriction Model (Williamson & Schulz, 1992) which provides support for the reduction of leisure pursuits as a result of caregiving burden. Building on the initial work which identified that activity restriction provided mediating effects between pain and symptoms of depression in older adults living in the community, Williamson and colleagues (1998) found that activity restriction for caregivers mediated the relationship between stress generated from elements of caregiving and symptoms of depression. Thus, it is likely that leisure is associated with perceived stress and perhaps may mediate the effect of perceived stress on caregivers' quality of life.

Coleman and Iso-Ahola's Stress-Buffer Model (1993) provides the foundation for examining leisure as an instrument not only to buffer stress, but also possibly to suppress the effects of some stressors (e.g., Iwasaki & Mannell, 2000). In addition, Hutchinson and Kleiber's (2005) work about leisure as a resource for coping with negative life events posits that leisure can serve as a buffer from the "immediacies of stress" (p. 143). These conceptual frameworks lend support to the supposition that leisure can provide a buffer to stress by mediating its effects and contributing to the increase in quality of life for caregivers.

Despite a growing awareness of the respite needs of caregivers, however, their lack of leisure due to caregiving responsibilities is still a significant concern for this population (e.g., Arguelles & von Simson, 1999; Bedini & Phoenix, 1999; Gladwell & Bedini, 2004; NFCA, 1998; Seltzer & Li, 2000; Shanks-McElroy & Strobino, 2001; Stevens et al. 2004). To begin to address this concern, this study will examine the relationship of leisure with caregivers' perceived stress and quality of life.

## **Methods**

### **Design**

The design of this study was a mailed survey using a modified Total Design Method (Dillman, 2000) to prepare and send the mailing. The mailing included a six-page questionnaire, cover letter, and return postage. Two weeks after the initial mailing, a reminder card was sent to all subjects who had not returned the survey.

### **Data Collection and Sample**

A mail questionnaire was sent to 1,447 caregivers to examine their (a) leisure (leisure participation, satisfaction with time for leisure, and satisfaction with quality of leisure), (b) perceived stress, (c) quality of life, and (d) demographics. The subjects were selected through stratified random sampling of the membership list of the National Family Caregivers Association ( $N = 29,000$ ) ensuring that the sample represented all 50 states and the District of Columbia as well as both males

and females. In addition, the sample was delimited to include only informal caregivers, excluding professional as well as “ally” caregivers (e.g., friends of caregivers, related professionals).

## Measures

The questionnaire comprised five scales/indices that measured aspects of leisure, perceived stress, and quality of life, as well as 18 demographic items.

**Leisure.** Three leisure scales—Leisure Participation (LP), Satisfaction with Time for Leisure (STL), and Satisfaction with the Quality of the Leisure Experience (SQLE)—were used for this study. All three were modifications of Stevens et al. (2004) Leisure Time Satisfaction Scale (STL) that examined satisfaction with time for leisure. Using a three-point Likert scale, the original STL scale asked how satisfied the respondents were with the amount of time they were able to spend on six specific leisure-related items: (1) in quiet time by yourself, (2) attending church or going to other meetings of groups or organizations, (3) taking part in hobbies or other interests, (4) going out for meals or other social activities, (5) doing fun things with other people, and (6) visiting family and friends. The researchers added two items to the instrument for this study: “participating in leisure travel” and “doing physical activity.” Ratings ranged from (1) “not at all” to (3) “a lot.” Reliability of the modified eight-item scale for this sample was .77. For the current study, the same eight items were also examined in reference to satisfaction with the quality of the leisure experience (SQLE) (using a Likert scale with the same anchors) generating a Cronbach’s alpha of .86. Finally, leisure participation (LP) was measured based on the same eight items, however, using a five-point Likert scale for which ratings ranged from (1) “never” to (5) “daily” to allow for more specificity regarding participation rates. Reliability for this Leisure Participation scale for was .81. Reliabilities, means, and standard deviations for the three leisure scales for this sample are reported in Table 1.

**Perceived stress.** The Perceived Stress Scale (PSS-10) (Cohen, Kamarck, & Mermelstein, 1983) is a 10-item scale that measures the degree to which situations in an individual’s life are judged as stressful. Items determine how “unpredictable, uncontrollable, and overloaded” respondents perceive their lives (Cohen & Williamson, 1988, p. 34). Higher scores on the PSS-10 represent higher levels of perceived stress. Each of the 10 items was rated on a five-point Likert scale from (1) “never” to (5) “very often.” PSS-10 scores were calculated by reversing the scores on the four positive items (items 4, 5, 7, and 8) and summing across all 10 items. Several studies that used the PSS-10 successfully to measure the perceived stress of caregivers had reliability scores ranging from .88 to .91 (e.g., Schwarz & Dunphy, 2003; Stowell, Kielcot-Glaser, & Glaser, 2001). Cronbach alpha reliability for this sample was .88. Reliability, mean, and standard deviation of the PSS-10 for this sample are reported in Table 1.

**Quality of life.** The Quality of Life Index (QLI) (Ferrans & Powers, n.d.) addresses satisfaction with aspects of life that an individual values. The 33-item index produces an overall quality of life score as well as four sub-domain scores (health and functioning, psychological/spiritual, social and economic, and family). Only the overall Quality of Life (QoL) score was used in this study. Scores were calculated

for both importance and satisfaction regarding various aspects of life. Each of the items was rated on a 6-point Likert scale for importance [(1) "very unimportant" to (6) "very important"] as well as for satisfaction [(1) "very dissatisfied" to (6) "very satisfied"]. The importance ratings were used to weight the satisfaction responses, so that the scores represented satisfaction with the aspects of life that were valued by the respondent (Ferrans & Powers, n.d.). Internal consistency reliability for the QLI (overall scale) was supported by Cronbach alphas ranging from .92 to .96 in related studies dealing with individuals with chronic pain (All, Fried, & Wallace, 2000), older adults (Kleinpell & Ferrans, 2002), women (Nesbitt & Heidrich, 2000) and caregivers (Scott, 2000). Content validity of the QLI is supported by the fact that items are based on an extensive literature review of issues related to quality of life and on the reports of patients regarding the quality of their lives (Ferrans & Powers, 1985). Cronbach alpha for this sample was .97. Reliability, mean, and standard deviation of QLI for this sample are reported in Table 1.

**Demographic profile.** The questionnaire also included items about the caregivers that have been identified in the literature as being associated with influencing leisure experience (in all populations). These included age, sex, ethnicity/race, marital status, household income, education level, employment status, relationship to the care-recipient, length of time as a caregiver, living arrangements with the care-recipient, hours per week spent caregiving, and types of caregiving support received. Individual characteristics of the care-recipients included age, sex, marital status, care-recipient's primary disability/illness, care-recipient's secondary disability/illness, and care-recipient's level of primary disability/illness. Frequencies for these items are reported in Tables 2 and 3.

### Data Analysis

Analyses focused on testing the mediation models in two ways. In Figure 1, through a causal steps approach, we portrayed Perceived Stress (PS) as a mediator between the factors Leisure Participation (LP), Satisfaction with Time for Leisure (STL), and Satisfaction with the Quality of the Leisure Experience (SQLE), and the dependent measure, Quality of Life (QoL). This indirect effect of each factor on QoL (which is quantified as the product of paths *a* and *b*) is often referred to as the Sobel test (MacKinnon & Dwyer, 1993), and will be referred to as Baron and Kenny's "causal steps" approach (Baron & Kenny, 1986; MacKinnon, Fairchild, & Fritz, 2007). According to Baron and Kenny, there are three steps to demonstrating partial mediation, and four to demonstrate complete mediation. First, each predictor must be correlated with the outcome to demonstrate that there is an effect that may be mediated. We performed a series of regressions using each leisure variable as a predictor and QoL as the outcome variable to determine this path, *c*. Second, each predictor must be correlated with the mediator. We performed a series of regressions using each leisure variable as a predictor and PS as the outcome to determine this path, *a*. Third, the mediator must affect the outcome variable in a model which includes the predictor, to control for its effects. We performed a series of regression using PS as a predictor, including each leisure variable as a predictor, and QoL as the outcome variable, to produce this path, *b*. If these three effects are significant for a given leisure variable, it means that the



effect of that predictor variable on the outcome variable, Quality of Life, is at least partially mediated by Perceived Stress. The fourth step, to determine that the effect is completely mediated, is to demonstrate that the effect,  $c'$ , of a given leisure variable on Quality of Life while controlling for Perceived Stress is zero. Baron and Kenny's original method used the Sobel test (1982) to test this effect; this version of the Sobel test (Preacher & Hayes, 2008a) divides an estimate of the indirect effect, the product of paths  $a$  and  $b$ , by an estimate of its standard error:

$$z\text{-value} = a * b / \text{SQRT}(b^2 * s_a^2 + a^2 * s_b^2)$$

where  $\text{SQRT}(b^2 * s_a^2 + a^2 * s_b^2) =$  the standard error of path  $a * b$ . We used bootstrapping methods to estimate the indirect effects for each model, so we used these as our estimates of path  $a * b$  and the associated standard errors generated by the bootstrapping program as our estimates of  $se_{a*b}$  (Preacher & Hayes, 2008a). These quotients are reported as  $z$ -scores with their associated probabilities from the standard normal distribution.

We then employed path models (Figure 2) to provide a more nuanced model of mediation. This path analytic approach allowed us to analyze an overall model in which the individual mediation models used in the causal steps approach were analyzed together. In this process we modeled the direct effect of the covariates (i.e., age, sex, income), the mediator (Perceived Stress), and the predictors (the three leisure measures) on Quality of Life. Second, we estimated the direct effects of the three predictors on PS and requested the indirect effects of the three predictors on QoL as "passing" through PS. These indirect effects represent mediation effects and are directly comparable to the estimated used in the Sobel test used in the causal steps approach. We requested bootstrapping in the estimate of the indirect effect as well the standard errors. The final result of this model controls for association between the covariates and QoL, and controls for the correlations among the three predictors as shown in Figure 2. Because the path model takes into account the correlations among the predictors, it provides a more representative modeling of all the data, and reduces the comparative strength of the individual mediation models.

As reported for both causal steps and path analysis approaches, we employed bootstrapping procedures in order to overcome problems associated with the non-normality of the indirect effects in small samples (Preacher & Hayes, 2008b). Bootstrapping is a method in which the data set is repeatedly sampled and the test statistic estimated in each of the samples. Standard deviations are derived from this set of bootstrapped statistics. This process yields an empirical distribution for the hypothesis testing that does not rely on the assumptions required for use of the theoretical distribution. The path analysis modeling was performed using MPlus version 5.21 (Muthen & Muthen, 2008). All other analyses were performed with SPSS version 17 (SPSS, 2008).



## Results

### Respondent Profile

The return rate of useable surveys was 18% ( $n = 267$ ). Although the return rate was relatively low, all 50 states plus the District of Columbia were represented in returned and usable questionnaires. In addition, this sample is similar to other large research samples of caregivers using randomly selected respondents (i.e., Bedini & Phoenix, 2004; NAC/AARP, 2009). The demographic characteristics of the caregivers (respondents) and their care-recipients are summarized in Tables 2 and 3.

The respondents were primarily female (74.5%), white (78.6%), and married or living with a partner (68.9%). The average age of the respondents was 58.3 years (with a range of 25 to 94 years of age), with the average age of their care-recipients at 72.8 years. Approximately three quarters (70.8%) of the caregivers lived with their care-recipients of whom 47.5% were spouses/partners, 30.8% were parents/parents-in-law, and 21.7% were other relationships (e.g., siblings, etc.). The average length of the time the respondents had been caregivers was 8.7 years, with a range of 1 to 69 years of caregiving. Roughly half (49.1%) of the respondents indicated that they spent 40 hours or more per week providing care to their care-recipient. At the same time, over half (53.6%) of the respondents received fewer than 10 hours of assistance per week.

The mean scores for the eight items in each of the three leisure scales are summarized in Table 1. The means for the scales showed that the respondents participated in a moderate amount of leisure participation ( $M = 2.80$ ; out of a possible 5), and had moderate satisfaction (“a little”) with their amount of leisure time ( $M = 1.86$ ; out of a possible 3), as well as “a little” satisfaction with the quality of their leisure experiences ( $M = 1.90$ ; out of a possible 3). The standard deviations (see Table 1) indicated a moderate amount of variability for these measures. In addition, results from the mean score for the PSS-10 ( $M = 3.16$ ; out of a possible 5) suggested the respondents perceived themselves as having stress “sometimes”

Table 1

*Means, Standard Deviations, and Reliability Scores for Measures of Leisure, Perceived Stress, and Quality of Life*

Scale	$M^a$	SD	Reliability Score
Satisfaction with Time for Leisure	1.86	.50	.77
Satisfaction with Quality of the Leisure Experience	1.90	.52	.86
Leisure Participation	2.80	.81	.81
Perceived Stress (PSS-10)	3.16	.69	.88
Quality of Life	3.85	1.07	.97

<sup>a</sup>All three measures used Likert scales, where higher numbers indicate a greater amount of leisure or satisfaction. Satisfaction with Time for Leisure and Satisfaction with Quality of the Leisure Experience used a three-point Likert Scale and Leisure Participation used a five-point scale.

Table 2

*Demographic Profile of Family Caregivers*

	N	%
Sex		
Male	61	25.5
Female	178	74.5
Race of Caregiver		
Black/African American	21	8.8
Hispanic/Latino	13	5.5
White/European American	187	78.6
Other	17	7.1
Marital Status of Caregiver		
Married or living with partner	164	68.9
Not married	74	31.1
Relationship to care-recipient(s). "The care-recipient is my ....."		
Spouse/Partner	114	47.5
Parent	74	30.8
Other	52	21.7
Living Arrangements with your care-recipient		
Care-recipient and I live together	167	70.8
Care-recipient lives independently in own home	21	8.9
Care-recipient lives in a nursing home or assisted living facility	25	10.6
Other	23	9.8
Age of Caregiver		
Range = 25 - 94 years		M = 58.3 years
Age of Care-recipient		
Range = 13 - 102		M = 72.7 years
Number of years as primary family caregiver		
Range = 1 - 69 years		M = 8.6 years
Education Level of Caregiver		
Less than a four-year degree	126	53.3
Four-year degree	48	20.3
Graduate degree	46	19.5
Other	16	6.8
Employment Status of Caregiver		
Employed full-time	68	28.8
Employed part-time	37	14.0
Retired	76	32.2
Not employed	59	25.0
Did you have to give up a job when you became a caregiver?		
Yes	106	48.8
No	110	50.7
Reduced Hours	1	0.5
Household Income of Caregiver		
Under \$15,000	36	16.4
\$15,000 to \$34,999	76	36.9
\$35,000 to \$74,999	69	31.5
\$75,000 or higher	38	17.4

Table 3

*Profile of Caregiving Responsibilities*

	N	%
Care-recipient's Primary Disability/illness		
Alzheimer's/Dementia	44	18.7
Stroke	33	14.0
Heart Disease	23	9.8
Other	72	53.7
Care-recipient's Level of Primary Disability/Illness.		
Level 1 Requires little to no assistance most personal care	32	13.7
Level 2 Requires some assistance with personal care	50	21.4
Level 3 Requires assistance with at least 2 personal care activities daily	59	25.2
Level 4 Requires constant care and assistance	93	39.7
Hours Per Week Caregiver Provides Care to Care-recipient		
Fewer than 10 hours per week	39	16.7
10 to 24 hours per week	44	18.8
25 to 39 hours per week	36	15.4
More than 40 hours per week	115	49.1
Hours Per Week Caregiver Receives Caregiving Support		
Fewer than 10 hours per week	90	53.6
10 to 24 hours per week	36	21.4
25 to 39 hours per week	14	8.3
40 hours or more per week	28	16.7

to "fairly often" during the previous month. The mean scores for the QLI showed that the respondents were only "slightly satisfied" ( $M = 3.85$ ; out of a possible 6) with the quality of their lives; although they indicated the quality of their lives was "moderately important" to "very important" ( $M = 5.34$ ; out of a possible 6) to them.

### Identifying Covariates

To identify covariates that might affect the relationships between the leisure measures Perceived Stress and Quality of Life, we used multiple regression to measure the effects of the demographic variables listed in Table 2 on QoL. We also included quantitative variables that were associated with caregiving responsibilities from Table 3: level of care required, the number of hours per week spent caregiving, and the number of hours per week support with caregiving was received.

To clarify the effects of these variables, we excluded responses before running the regression according to the following criteria: For income and education, we included only those who provided a specific response (i.e., we excluded "no answer" or "other"); for living arrangement, we included only those whose care receiver lived with them or who lived independently or in a nursing home; for relationship, we included only those who cared for a spouse, parent, or parent-in-law. After these exclusions, we retained 204 cases for further analysis.

We also recoded the variables as follows. For living arrangement, we expected the main effect to be due to whether the care recipient lived with or apart from the caretaker, so we combined those who lived independently in their own home and those who lived in a nursing home or assisted living facility. For race, because so few persons who responded reported being Black/African American or Hispanic/Latino, we combined these groups as well as those who reported "other." For education level of caregiver, we expected the main effect to be due to having attended college or not, so we combined those who responded "four year degree" with those who responded "graduate degree." For employment status of caregiver, we expected the main effect to be due to whether or not the person was employed, so we combined "full time" and "part time" into one group, and "retired" or "unemployed" into another group. For whether the caregiver gave up employment, we combined "yes" and "reduced hours."

Using SPSS Version 17, we used multiple linear regression with backward elimination to identify those variables that had a potentially significant effect on QoL. Using the selection criteria of a  $p$ -value of  $\leq .20$  associated with the standardized coefficient, we selected three variables for inclusion in the subsequent analyses: age of caregiver ( $\beta = .41, p < .000$ ), sex ( $\beta = .17, p = .077$ ), and income of caregiver ( $\beta = .32, p = .001$ ). No other variables met the inclusion criteria stated above.

### Causal Steps Approach

Results indicated that Leisure Participation (LP) (Figure 1-A) was significantly associated with Quality of Life (QoL):  $t(204) = 7.51, p < 0.001$ , as well as with Perceived Stress (PS):  $t(204) = -5.23, p < 0.001$  (see Table 3). When controlling for LP, PS was significantly associated with QoL:  $t(204) = -13.35, p < 0.001$ . Since these three conditions were met, results indicated that PS partially mediated the relationship between LP and QoL. Finally, the indirect effect, between LP and QoL, when controlling for the mediator and covariates (age, sex, and income), was significant ( $\beta = .28, p = .06$ ), leading to a significant Sobel test for path  $c'$ ,  $t = 4.68, p < .001$ . Overall, the adjusted  $R^2$  for the model was 0.66. Because the indirect effect is significantly greater than 0, it does not meet the condition for full mediation according to Baron and Kenny. When this mediated relationship was included in the model, the direct relationship between LP and QoL was reduced. These results show that in this study, caregivers who participated in leisure experienced higher quality of life; however, participating in leisure was associated with decreased perceptions of stress, which then was associated with improved quality of life.

Similarly, results showed that satisfaction with time for leisure (STL) (Figure 1-B) was significantly associated with QoL:  $t(204) = 8.03, p < 0.001$ . STL was also significantly associated with PS:  $t(204) = -6.26, p < 0.001$ . When controlling for STL, PS was significantly associated with QoL:  $t(204) = -12.70, p < 0.001$ , indicating that PS partially mediated the relationship between STL and QoL. However, the indirect effect of STL on QoL when controlling for the mediator and covariates was  $b = .52 (.10)$ , also leading to a significant Sobel test for path  $c'$ ,  $t = 5.42, p < .001$ , indicating partial and not full mediation. Overall, adjusted  $R^2$  for the model was 0.65. When this mediated relationship was included, the direct relationship

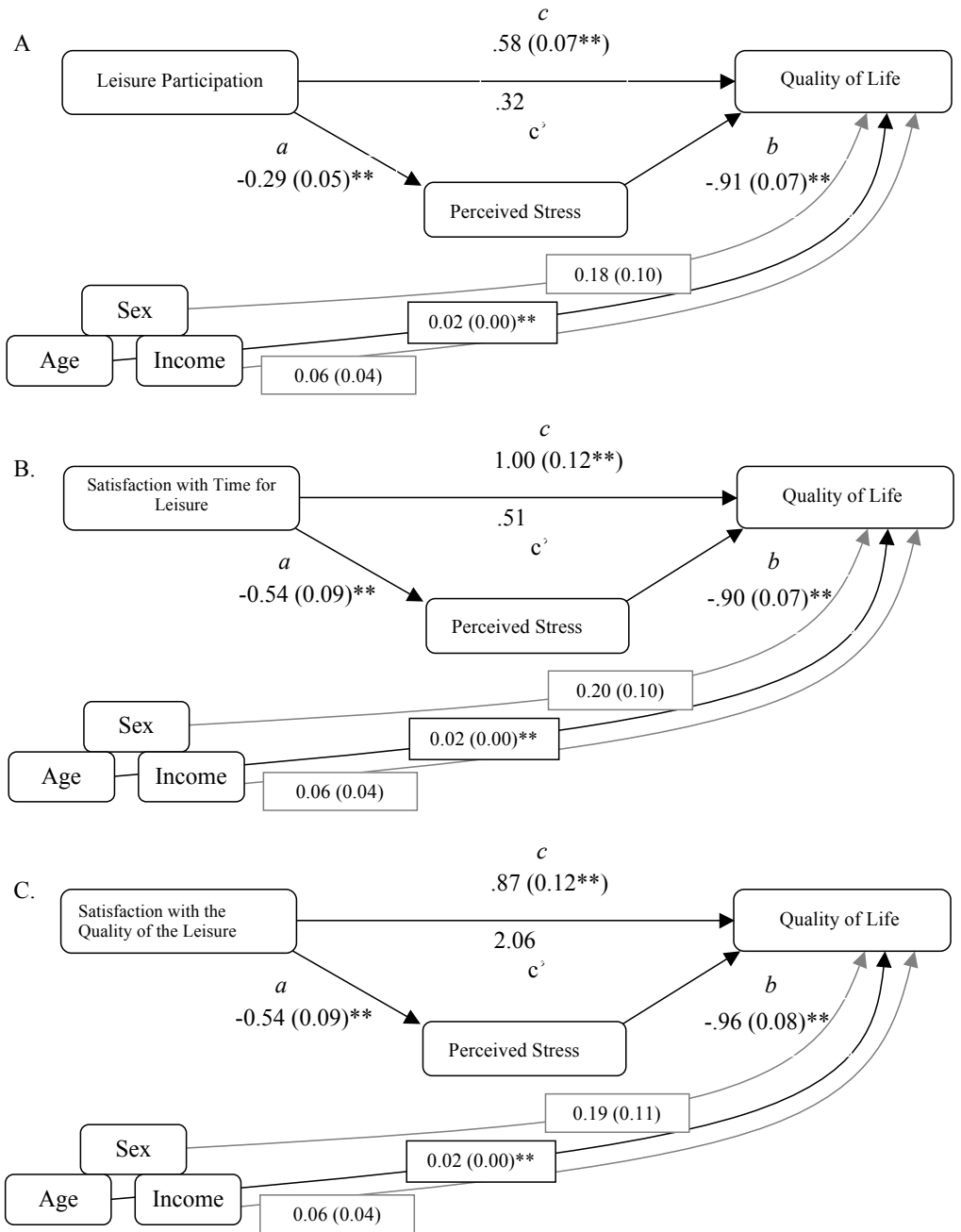


Figure 1. Causal Steps Model

between STL and QoL was reduced. These results show that in this study, caregivers who were satisfied with the time they had for leisure experienced higher quality of life; however, being satisfied with one's leisure time was associated with decreased perceptions of stress, which then was associated with improved quality of life.

Lastly, satisfaction with the quality of the leisure experience (SQLE) (Figure 1-C) was significantly associated with QoL:  $t(204) = 7.03, p < 0.001$ , and significantly associated with PS:  $t(204) = -6.29, p < 0.001$ . When controlling for SQLE, PS was significantly also associated with QoL:  $t(204) = -12.85, p < 0.001$ , indicating that PS partially mediated the relationship between SQLE and QoL. The indirect effect SQLE on QoL when controlling for the mediator and covariates was  $b = .52 (.10)$ , again leading to a significant Sobel test for path  $c'$ ,  $t = 5.35, p < .001$ , indicating partial and not full mediation. The adjusted  $R^2$  for the model was 0.63. When this mediated relationship was included, the direct relationship between SQLE and QoL was reduced. These results show that caregivers who were satisfied with the quality of their leisure experience tended to have a higher quality of life; however, being satisfied with the quality of one's leisure experience was associated with decreased perceptions of stress, which then was associated with improved quality of life.

### Path Analytic Approach

The baseline model included all three predictors (LP, STL, SQLE), PS as the mediator, and QoL as the outcome (see Figure 2). As in the causal steps models, we included age, gender, and income as covariates by regressing quality of life onto all in both models. This model showed an overall moderate fit  $\chi^2(3) = 6.39, p = .09$ , CFI = .988 and RMSEA = .074 (See Table 4). The leisure measures were moderately correlated with each other, as shown in Figure 2. Tests of indirect effects were somewhat different than the findings in the causal steps modeling reported above. As with the causal steps approach, we found a significant indirect path between SQLE and QoL ( $\beta = .31, se = .13, Z = 2.40, p = .016$ ) and STL and QoL ( $\beta = .27, se = .13, Z = 2.06, p = .039$ ). However, the indirect path from LP to QoL ( $\beta = .06, se = .09, Z = .67, p = .503$ ) was not significant. This indicates that when accounting for the effects of all three leisure variables, the effects of SQLE and STL on QoL were mediated by PS.

In order to measure whether the effects were fully or partially mediated, we used the first path model as a base model against which to test two alternative models. We removed the direct path from SQLE in a separate model, retaining every other direct and indirect path from the base model. We also removed the direct path from STL in a second alternative model, retaining every other direct and indirect path from the base model. Then, we examined the change in  $\chi^2$  from the base model to each alternative model. As shown in Table 4, the removal of the direct path of SQLE did not reduce the fit of the model in a significant fashion, indicating that the effect of SQLE on QoL was fully mediated by PS. However, the removal of the direct path of STL was marginally significant, supported by other indicators of fit that suggested this was a poorer model. This indicates that while STL was mediated by PS, its direct effect on QoL was still important for the model; it was only partially mediated. Thus, whereas the linear regression "causal

step” approach indicated partial mediation in all three models, the path analytical approach accommodates correlations among the predictors, and so indicated a more nuanced result. Here we found that the effect of LP on QoL was not mediated through PS, SQLE was fully mediated, and STL was partially mediated. This suggests that in this study, when one’s leisure measures changed, one’s quality of life also changed predictably. However, when one’s SQLE changed, one’s PS also changed predictably, and the change in QoL was entirely accounted for by this change in PS. Further, when one’s STL changed, one’s PS also changed predictably, but there was some change in QoL that was still unique to the STL-QoL relationship, accounted for by factors other than PS. LP was also associated with some change in PS, but this variable’s effect on QoL was statistically independent of PS.

Table 4

*Fit Statistics for Model Comparisons*

Model	$\chi^2(df)$	$\Delta \chi^2(df)$	CFI	RMSEA
Baseline Full Model	6.39(3)	N/A	.988	.074
No Direct Path from LSAT	9.34 (3)	2.98 (1) p = .08	.981	.081
No Direct Path from LQUAL	6.42(4)	.04 (1) p = .85	.991	.054

**Covariates**

In the causal steps models for all variables, age had a direct effect on QoL while holding the predictor and PS constant (see Figure 1). For none of the leisure variables did Income remain in the model with a direct influence on QoL. Sex approached significance in each model, with p-values of .08, .06, and .07 in the models with LP, STL, and SQLE, respectively. In both versions of the path model, both age and sex had significant direct effects on QoL. For both data analysis approaches, higher age was associated with greater reported QoL, and women reported greater QoL than men. These effects are presented in Figure 1 and Figure 2.

A post hoc, separate look at male and female caregivers suggested slightly different patterns. When the causal steps analyses were performed for men and women separately, the effects of each leisure variable on QoL were still mediated by PS. However, for all variables, path a, the effect of leisure on PS, was somewhat stronger for women than for men. Accordingly, the mediated effect, or the product of  $a * b$ , was much stronger for women than for men, and the adjusted  $R^2$  for the mediated model was higher for women than men. One’s age and income also influenced the model differently for men and women. While higher age and income were associated with significantly higher QoL for women, this was not significant for men.



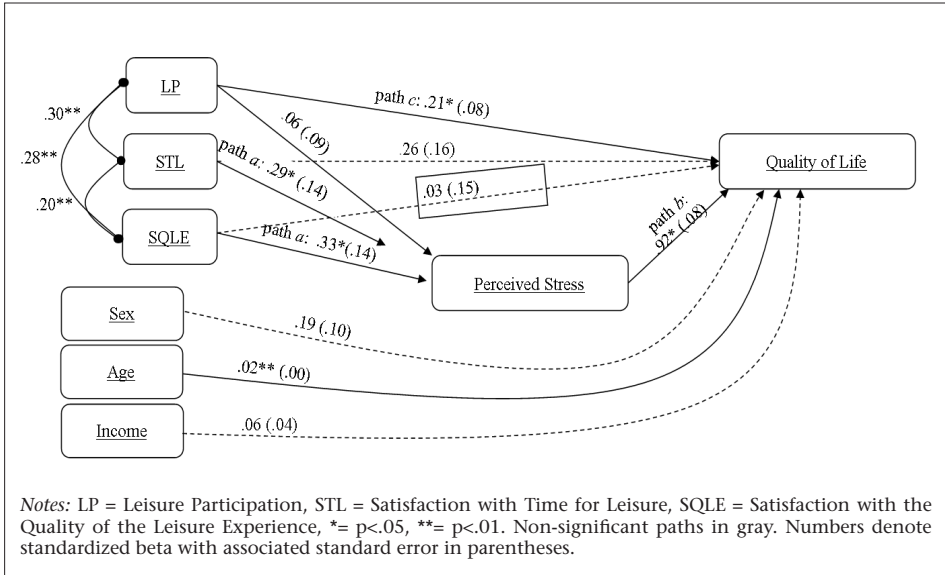


Figure 2. Path Analysis Mediation Model

## Discussion

The results of this study provide additional information to understanding the contribution of leisure to the health and wellbeing of informal caregivers. Current literature cited above, while demonstrating specific relationships between leisure engagement and various health indicators, does not specify among participation, time, and quality as does this study. Overall, results of this study indicated that all three independent variables—Leisure Participation (LP), Satisfaction with Time for Leisure (STL), and Satisfaction with the Quality of the Leisure Experience (SQLE)—had some sort of relationship with Quality of Life; however, only the latter two independent variables showed direct or indirect mediation through Perceived Stress.

The fact that Satisfaction with Time for Leisure was associated with higher Quality of Life but only partially mediated by Perceived Stress and that Satisfaction with the Quality of the Leisure Experience was fully mediated by Perceived Stress in its relationship with Quality of Life suggests that leisure participation alone, and even satisfaction with the amount of time for leisure one has, are not sufficient to address issues of reducing perceived stress in an effort to improve quality of life. These findings were conceptually similar to Cannuscio et al.'s (2002), which suggested that more than merely relieving only task burden (e.g., providing time for respite) should be considered when programming respite for caregivers. The varying associations of the three leisure variables with Perceived Stress and Quality of Life might be explained by the intrinsic nature of the Satisfaction variables.

Simply having the opportunity and/or the time to participate in leisure does not assume that these pursuits will then be meaningful to the participant.

The results of this current study are an important finding in that designing leisure programs specifically for caregivers, we must avoid providing opportunities for leisure without consideration of the amount of time and provision of quality required within the experience. These results have implications for all personnel providing recreation opportunities to caregivers. Results support designing opportunities that provide satisfying blocks of time in which to participate in one's preferred leisure activities. Recreation programmers should also consider, however, the merits of placing more focus on the meaningfulness (quality) of leisure activities when designing opportunities for caregivers. Programmers should also explore ways to assess meaningfulness and perceptions of quality leisure experiences for caregivers. With the knowledge provided by these results, recreation programmers as well as policy makers (e.g., directors in long-term care, community health care workers, adult day care administrators, medical personnel) can facilitate caregivers' justification of taking time for quality leisure experiences to potentially reduce stress and improve their quality of life. These data provide the first steps in establishing leisure as a healthcare intervention for caregivers experiencing stress and poor quality of life.

Future research should consider examining the specific relationship between quality of caregivers' leisure experiences and coping with their perceived stress. In addition, future studies should seek to understand the meaningfulness of caregivers' leisure by examining factors that contribute to satisfaction with time for leisure as well as the quality of the leisure experiences. Deeper understanding of meaningfulness might be best explored through qualitative interviews. In particular, the results suggest that reduction in leisure may lead to greater increases in perceived stress among women than among men. Perceived stress among women in this study was higher on the average than that of men; and higher income (which could be a gender factor) was associated with higher QoL. At this point, these results have many possible interpretations. Future investigations may explore why additional income seems to be a protective factor leading to increased QoL for women and not men.

In addition, longitudinal examination of caregivers' health, stress, and quality of life might provide additional insight into the why and how of leisure's impact on these variables. Similarly, study is warranted to measure the impact of meaningful leisure experiences on a caregiver's level of stress through a physiological indicator of stress prior to and after the leisure experiences. Further, future applications of psychometric work with predictor variables may allow for more specificity with the development of interventions. Finally, it is important for future research to utilize more non-traditional samples that include more underrepresented caregivers such as men and people of color.

### **Limitations**

While this study demonstrated correlations between the variables, several limitations do exist. First, because of the cross-sectional design, we do not have the temporality required to make a causal statement. Second, while the low return

rate may be undesirable, we feel that it did not necessarily compromise the results of the study. Dey (1997) discussed non-response issues in survey research stating that, "... a very low response rate, say 10%, does a fairly good job of representing the population from which the mail-out sample was originally drawn" (p. 217). The demographic profile for this study's sample was consistent with those of large studies of leisure and caregivers (i.e., Bedini & Phoenix, 2004; NAC/AARP, 2009) and represented all 50 states and the District of Columbia to which it was sent. The larger issue of representation, however, was that as with the majority of current studies of caregivers, this study was predominantly white and female. This result could impact the generalizability of the study's results. While this study paralleled many in the field of caregivers in that most respondents were predominantly white and female, the responses from men were still more frequent than they have been for the majority of current studies. Accordingly, we examined sex as a covariate in the current study. While the higher frequency of women and the low return rate could reduce the generalizability of the study's results, we are confident that our sample was representative enough that we are reasonable in drawing conclusions, especially since even when considered separately for men and women, the effects of interest were similar.

In summary, results suggest a potential hierarchy of leisure experience whereby the activity/opportunity for leisure is certainly a benefit for caregivers, however, results suggest that being satisfied with the time one has for leisure has potentially greater benefit. Even more so, based on these results, the satisfaction with the quality of the leisure experience has the greatest potential for reduced perceived stress and improved quality of life. Therefore, the results found here provide a starting point for further investigation into the health and wellness benefits of meaningful leisure experiences for caregivers.

## References

- Administration on Aging (2009). *Projected future growth of the older population*. Washington, DC: Author.
- All, A. C., Fried, J. H., & Wallace, D. C. (2000). Quality of life, chronic pain, and issues for healthcare professionals in rural communities. *Journal of Rural Nursing and Healthcare, 1*(2), 1-14.
- Arguelles, S., & von Simson, A. (1999). Innovative family and technological interventions for encouraging leisure activities in caregivers of persons with Alzheimer's disease. *Activities, Adaptations, and Aging, 24*, 83-97.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.
- Beach, S. R., Schulz, R., Yee, J. L., & Jackson, S. (2000). Negative and positive health effects of caring for a disabled spouse: Longitudinal findings from the caregiver health effects study. *Psychology and Aging, 15*(2), 259-271.
- Beaumont, J. G., & Kenealy, P. M. (2004). Quality of life perceptions and social comparisons in healthy old age. *Aging and Society, 24*, 755-769.

- Bedini, L. A., & Gladwell, N. J. (2006). Barriers to leisure travel of family caregivers: A preliminary examination. *Topics in Geriatric Rehabilitation, 22*(4), 322-333.
- Bedini, L. A., & Guinan, D. M. (1996). "If I could just be selfish...": Caregivers' perceptions of their entitlement to leisure. *Leisure Sciences, 18*, 227-240.
- Bedini, L. A., & Phoenix, T. L. (1999). Recreation programs for caregivers of older adults: A review and analysis of literature from 1990 to 1998. *Activities, Adaptations & Aging, 24*(2), 17-34.
- Bedini, L. A., & Phoenix, T. L. (2004). Perceptions of leisure by family caregivers: A profile. *Therapeutic Recreation Journal, 38*(4), 366-381.
- Bigelow, D. A., Olson, M. M., Smoyer, S., & Stewart, L. (1991). *Quality of life questionnaire: Respondent self-report version I: Interview schedule*. Portland, OR: Oregon Health Sciences University.
- Burckhardt, C. S., & Anderson, K. L. (2003). The quality of life scale (QOLS): Reliability, validity, and utilization. *Health and Quality of Life Outcomes, 1*, 60.
- Cannuscio, C. C., Colditz, G. A., Rimm, E., Berkman L., Jones, C., & Kawachi, I. (2003). Employment status, social ties, and caregivers' mental health. *Social Science and Medicine, 58*(7), 1247-1256.
- Cannuscio, C. C., Jones, C., Kawachi, I., Colditz, G. A., Berkman, L., & Rimm, E. (2002). Reverberations of family illness: A longitudinal assessment of informal caregiving and mental health status in the nurses' health study. *American Journal of Public Health, 92*, 1305-1311.
- Cantor, M. H. (1983). Strain among caregivers: A study of experience in the United States. *The Gerontologist, 23*, 597-604.
- Centers for Disease Control and Prevention. (1995.). *Centers for Disease Control and Prevention Health-Related Quality-of-Life 14-Item Measure: CDC HRQOL-14"Healthy Days Measure"*. Retrieved August 10, 2009, from [http://www.cdc.gov/hrqol/hrqol14\\_measure.htm#3](http://www.cdc.gov/hrqol/hrqol14_measure.htm#3)
- Chenoweth, B., & Spencer, B. (1986). Dementia: The experience of family caregivers. *The Gerontologist, 26*, 267-272.
- Chwalisz, K. (1992). Perceived stress and caregiver burden after brain injury: A theoretical integration. *Rehabilitation Psychology, 37*(3), 189-203.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385-396.
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health: Claremont symposium on applied social psychology* (pp. 31-67). Newbury Park, CA: Sage.
- Coleman, D., & Iso-Ahola, S. E. (1993). Leisure and health: The role of social support and self-determination. *Journal of Leisure Research, 25*(2), 111-128.
- Collins, K. S., Schole, C., Joseph, S., Ducker, L., Simantov, E., & Yellowitz, M. (1999). *Health concerns across women's lifespan*. Commonwealth Fund 1998: Summary of Women's Health.
- Crowe, M., Andel, R., Redusen, N. L., Johansson, B., & Gatz, M. (2003). Does participation in leisure activities lead to reduced risk of Alzheimer's disease?: A prospective study of Swedish twins. *Journal of Gerontology, 58B*(5), 249-255.

- Dey, E. L. (1997). Working with low survey response rates: The efficacy of weighting adjustments. *Research in Higher Education, 38*(2), 215-227.
- Dillman, D. (2000). *Mail and internet surveys: The tailored design method*. New York: John Wiley & Sons.
- Dunn, N. J., & Strain, L. A. (2001). Caregivers at risk?: Changes in leisure participation. *Journal of Leisure Research, 33*(1), 32-56.
- Epel, E. S., Blackburn, E. H., Lin, J., Dhabhar, F. S., Adler, N. E., Morrow, J. D., et al. (2004, December 7) Accelerated telomere shortening in response to life stress. Paper presented at the 2004 National Academy of Sciences, Abstract retrieved February 17, 2010 from <http://www.ncbi.nlm.nih.gov/pubmed/15574496?dopt=Abstract>
- Everard, K. M., Lach, H. W., Fisher, E. B., & Baum, M. C. (2000). Relationship of activity and social support to the functional health of older adults. *Journal of Gerontology, 55B*(4), S208-S212.
- Ferrans, C. F., & Powers, M. (1985). Quality of Life Index: Development and psychometric properties. *Advances in Nursing Science, 8*, 15-24.
- Ferrans, C. F., & Powers, M. (n.d.). Quality of life index. Retrieved August 2, 2009, from <http://www.uic.edu/orgs/qli/>
- Gabriel, Z., & Bowling, A. (2004). Quality of life from the perspectives of older people. *Aging and Society, 24*, 675-691.
- Gaugler, J. E., Linder, J., Given, C. W., Kataria, R., Tucker, G., & Regine, W. F. (2008). The proliferation of primary cancer caregiving stress to secondary stress. *Cancer Nursing, 31*(2), 116-23.
- Gibson, M. J. (2005) In brief: Staying the course: Trends in family caregiving. Research Report AARP Public Policy Institute, Washington, DC Pub ID: INB107.
- Gladwell, N. J., & Bedini, L. A. (2004). In search of lost leisure: The impact of caregiving on leisure travel. *Tourism Management, 25*, 685-693.
- Goldman, N., Gleib, D. A., Seplaki, C., Liu, I., & Weinstein, M. (2005). Perceived stress and physiological dysregulation. Working Paper No. 2004-05, Office of Population Research Princeton University.
- Gove, E. K., Dahl, A. A., Moum, T., & Fossa, S. D. (2005). Anxiety, depression, and quality of caregivers of patients with cancer in late palliative phase. *Annals of Oncology, 16*(7) 1185-1191.
- Herbert, T. B., & Cohen, S. (1993). Stress and immunity in humans: A meta-analytic review. *Psychosomatic Medicine 55*, 364-379.
- Ho, S., Chan, A., Woo, J., Chong, P., & Sham, A. (2009). Impact of caregiving on health and quality of life: A comparative population-based study of caregivers for elderly persons and noncaregivers. *Journals of Gerontology Series A: Biological Sciences & Medical Sciences, 64A*(8), 873-879.
- Houser, A., & Gibson, M. J. (2008). *Valuing the invaluable: The economic value of family caregiving, 2008 update*. Washington, DC: AARP Public Policy Institute.
- Hutchinson, S. L., & Kleiber, D. A. (2005). Leisure, constraints, and negative life events: Paradox and possibility. In E. L. Jackson (Ed.), *Constraints to leisure* (pp. 137-152). State College, PA: Venture.

- Iwasaki, Y., & Mannell, R. C. (2000). The effects of leisure beliefs and coping strategies on stress-health relationships: A field study. *Leisure/Loisir: The Journal of the Canadian Association for Leisure Studies*, 24, 3-57.
- Jain, S., Mills, P. J., von Känel, R., Hong, S., & Dimsdale, J. E. (2007). Effects of perceived stress and uplifts on inflammation and coagulability. *Psychophysiology*, 4(1), 154-160.
- Kesselring, A., Krulik, T., Bichsel, M., Minder, C., Beck, J. C., & Stuck, A. E. (2001). Emotional and physical demands on caregivers in home care to the elderly in Switzerland and their relationship to nursing home admission. *European Journal of Public Health*, 11(3), 267-273.
- Kielcot-Glaser, J. K., & Glaser, R. (2002). Depression and immune function: Central pathways to morbidity and mortality. *Journal of Psychosomatic Research*, 53(4), 873-876.
- Kim, J., & Knight, B. G. (2008). Effects of caregiver status, coping styles, and social support on the physical health of Korean American caregivers. *The Gerontologist*, 48(3), 287-299.
- King, A. C., Baumann, K., O'Sullivan, P., Wilcox, S., & Castro, C. (2002). Effects of moderate-intensity exercise on physiological, behavioral, and emotional responses to family caregiving: A randomized controlled trial. *The Journal of Gerontology*, 57A, M26-M36.
- Kleinpell, R. M., & Ferrans, C. E. (2002). Quality of life of elderly patients after treatment in the ICU. *Research in Nursing & Health*, 25, 212-221.
- Lee, L., Colditz, G. A., Berkman, L. F., & Kawachi, I. (2003). Caregiving and risk of coronary heart disease in U. S. women. *American Journal of Preventive Medicine*, 24(2), 113-119.
- Loucks-Atkinson, A., Kleiber, D. A., & Williamson, G. M. (2006). Activity restriction and well-being in middle-aged and older caregivers. *Topics in Geriatric Rehabilitation*, 22(4), 269-282.
- MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review*, 17(2), 144-158.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, 58, 593-614.
- Mannell, R. C., Salmoni, A. W., & Martin, L. (2002). Older adults caring for older adults: Physically active leisure lifestyles as a coping resource for the health of caregivers. *Loisir et Societe/Society and Leisure*, 25, 397-420.
- McCullagh, E., Brigstocke, G., Donaldson, N., & Kalra, L. (2005). Determinants of caregiving burden and quality of life in caregivers of stroke patients. *Stroke*, 36, 2181-2186.
- Miller, B., & Montgomery, A. (1990). Family caregivers and limitations in social activities. *Research on Aging*, 12(1), 72-93.
- Mills, P. J., Adler, M. S., Dimsdale, J. E., Perez, C. J., Ziegler, M. G., Ancoli-Israel, S., et al. (2004). Vulnerable caregivers of Alzheimer disease patients have a deficit in adrenergic receptor sensitivity and density. *American Journal of Geriatric Psychiatry*, 12, 281-286.



- Muthen, L. K., & Muthen, B. O. (2008). Mplus: Statistical Analysis with Latent Variables (Version 5.21) [Computer Software]. Los Angeles, CA: Muthen & Muthen.
- National Alliance for Caregiving & American Association of Retired Persons. (2009). *Caregiving in the U.S.* Washington, DC: Author.
- National Family Caregivers Association/Fortis. (1998). *Family caregiving demands recognition: Caregiving across the lifecycle.* Milwaukee, WI: Author.
- Nesbitt, B., & Heidrich, S. (2000). Sense of coherence and illness appraisal in older women's quality of life. *Research in Nursing and Health, 23*, 25-34.
- Ory, M. G., Hoffman, R. R., Yee, J. L., Tennstedt, S., & Schulz, R. (1999). Prevalence and impact of caregiving: A detailed comparison between dementia and non-dementia caregivers. *The Gerontologist, 39*, 177-185.
- Preacher, K. J., & Hayes, A. F. (2008a). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891.
- Preacher, K. J., & Hayes, A. F. (2008b). Contemporary approaches to assessing mediation in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The Sage sourcebook of advanced data analysis methods for communication research* (pp. 13-54). Thousand Oaks, CA: Sage.
- Pruessner, J. C., Hellhammer, D. H., & Kirschbaum, C. (1999). Burnout, perceived stress, and cortisol: Responses to awakening. *Psychosomatic Medicine, 61*, 197-204.
- Rogers, N. B. (1997). Centrality of the caregiving role and integration of leisure in every life: A naturalistic study of older wife caregivers. *Therapeutic Recreation Journal, 31*, 230-243.
- Rogers, N. B. (2001). Family obligation, caregiving, and loss of leisure: The experiences of three caregivers. *Activities, Adaptation & Aging, 24*(2), 35-49.
- Schulz, R., Beach, S. R., Lind, B., Martire, L. M., Zdaniuk, B., Hirsch, et al. (2001). Involvement in caregiving and adjustment to death of a spouse: Findings from the caregiver health effects study. *Journal of American Medical Association, 285*(26), 3123-3129.
- Schulz, R., & Beach, S. R. (1999). Caregiving as a risk factor for mortality. *Journal of American Medical Association, 282*(23), 2215-2219.
- Schwarz, K. A., & Dunphy, G. (2003). An examination of perceived stress in family caregivers of older adults with heart failure. *Experimental Aging Research, 29*, 221-235.
- Scott, L. D. (2000). Caregiving and care receiving among a technologically dependent heart failure population. *Advances in Nursing Science, 23*(2), 82-97.
- Seltzer, M. M., & Li, L. W. (2000). The dynamics of caregiving: Transitions during a three-year prospective study. *The Gerontologist, 40*, 165-178.
- Shanks-McElroy, H. A., & Strobino, J. (2001). Male caregivers of spouses with Alzheimer's Disease: Risk factors and health status. *American Journal of Alzheimer's Disease and Other Dementias, 16*, 167-175.
- SPSS Inc. (2008). SPSS 17.0 Guide. SPSS Inc., Chicago IL.
- Stevens, A. B., Coon, D., Wisniewski, S., Vance, D., Arguelles, S., Belle, S., et al. (2004). Measurement of leisure time satisfaction in family caregivers. *Aging and Mental Health, 8*, 450-459.



- Stowell, J. R., Kielcot-Glaser, J. K., & Glaser, R. (2001). Perceived stress and cellular immunity: When coping counts. *Journal of Behavioral Medicine, 24*, 323-340
- Verghese, J., Lipton, R. B., Katz, M. J., Hall, C. B., Derby, C. A., Kuslansky, G., et al. (2003). Leisure activities and the risk of dementia in the elderly. *New England Journal of Medicine, 348*, 2508-2516.
- Vitaliano P. P., Young, H. M., & Zhang, J. (2004). Is caregiving a risk factor for illness? *Current Directions in Psychological Science, 13*, 13-16.
- Vitaliano, P. P., Zhang, J., & Scanlan, J. M. (2003). Is caregiving hazardous to one's physical health: A meta-analysis. *Psychological Bulletin, 129*(6), 946-972.
- Waters, L. E., & Moore, K. A. (2002). Reducing latent deprivation during unemployment: The role of meaningful leisure activity. *Journal of Occupational and Organizational Psychology, 75*, 15-32.
- Weuve, J., Kang, J. H., Manson, J. E., Breteler, M. M. B., Ware, J. H., & Grodstein, F. (2004). Physical activity, including walking, and cognitive function in older women. *Journal of the American Medical Association, 292*, 1454-1461.
- Williamson, G. M., & Schulz, R. (1992). Pain, activity restriction, and symptoms of depression among community-residing elderly. *Journal of Gerontology, 47*(6), 367-372.
- Williamson, G. M., Shaffer, D. R., & Schulz, R. (1998). Activity restriction and prior relationship history as contributors to mental health outcomes among middle-aged and older spousal caregivers. *Health Psychology, 17*(2), 152-162.
- World Health Organization, (1998). Programme on Mental Health, WHOQOL User Manual. Retrieved 3/24/10 from: [http://www.who.int/mental\\_health/evidence/who\\_qol\\_user\\_manual\\_98.pdf](http://www.who.int/mental_health/evidence/who_qol_user_manual_98.pdf)