# POSITIVE ASPECTS OF ALZHEIMER'S CAREGIVING: THE ROLE OF ETHNICITY

by

Kang Sun

M.D., Beijing Medical University, 1998

Submitted to the Graduate Faculty of

The Graduate School of Public Health in partial fulfillment

of the requirements for the degree of

Master of Science

University of Pittsburgh

2005

UNIVERSITY OF PITTSBURGH

This thesis was presented

by

Kang Sun

It was defended on

September 13, 2005

and approved by

**Thesis Advisor**: Ada Youk, Ph.D., Research Assistant Professor, Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh.

Sati Mazumdar, Ph.D., Professor, Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh.

Richard Schulz, Ph.D., Professor, Department of Psychiatry, School of Medicine, University of Pittsburgh.

Ada Youk, Ph.D.

# POSITIVE ASPECTS OF ALZHEIMER'S CAREGIVING: THE ROLE OF ETHNICITY

Kang Sun, M.S.

University of Pittsburgh, 2005

The study examined differences in positive aspects of caregiving (PAC) among 232 Hispanic caregivers and 691 Non-Hispanic Caucasian (NHC) caregivers of individuals with Alzheimer's disease, using baseline data of National Institutes of Health Resources for Enhancing Alzheimer's Care Health (REACH) study. Multiple linear regression models, mediation analysis and Sobel's test were performed to assess the mediating effects of five possible mediators (education, socioeconomic status, behavior bother, social support and religiosity). Hispanics caregivers reported higher scores on PAC than their NHC counterparts. Hispanic caregivers' higher religiosity partially mediated the relationship between ethnicity and PAC. Additional variables that contributed to their higher PAC scores were caregivers' lower education level and lower socioeconomic status. A similar approach was used to compare values of PAC between 77 Mexican and 88 Cuban female caregivers. Mexican female caregivers reported statistically significant higher PAC when compared with Cuban female caregivers. The full mediation of socioeconomic status (SES) and partial mediation of education were seen to exist in the relationship between PAC and ethnicity. The question of how or why the PAC differences exist between ethnic groups was partially answered by employing the mediation analysis. The public health importance of this thesis is to provide the information on the ethnic differences in PAC, which is useful for social and psychological interventions.

**TABLE OF CONTENTS**

# LIST OF TABLES

# LIST OF FIGURES

# 1.    Introduction

Caring for a disabled family member with dementia is usually stressful for caregivers, resulting in high costs in terms of physical health and psychological distress. However, it also can involve a number of positive aspects. Positive aspects of caregiving (PAC) refer to the caregivers' sense that their caregiving experience is generally satisfying and rewarding(1). The positive concepts include caregiver esteem, caregiver satisfaction, gain or benefits in the caregiving experience, uplifts and enjoyment of caregiving, and finding or making meaning through caregiving(2). PAC was identified as a mediator to ameliorate the stresses associated with caregiving to help maintain the quality of life for individuals(1). PAC was also associated with caregivers' lower depression and burden scores, and better self assessed health. These negative consequences of caregiving might be alleviated by PAC (3). This topic has received increased attention during recent years as a counterpoint to the negative aspects of caregiving in the majority of the literature.

Relatively little is known about the PAC experience in the Hispanic population. Hispanics here refers to the population that has the Hispanic or Latino ethnic background. The different groups include Mexican, Cuban, Puerto Rican and Dominican. This thesis will first focus on two groups, Hispanic Caregivers and Non - Hispanic Caucasian (NHC) caregivers. This is followed by a similar comparison between Cuban and Mexican female caregivers.

*Hispanic and NHC caregivers Comparisons:*

Few studies have compared the Hispanic caregivers and NHC caregivers on PAC. In a study comparing 196 Mexican American caregivers to 165 NHC caregivers, Mexican American caregivers evaluated their role performance better than their NHC counterparts. They also indicated less desire to immediately terminate the caregiving role (4). Consistently, it has been showed that the Mexican American caregivers scored significantly higher on PAC than the NHC (Anglo American) caregivers by comparing 45 Mexican American caregivers with 67 NHC caregivers (5). In the study of Resources for Enhancing Alzheimer's Caregiver Health (REACH) (6), Coon and colleagues compared 191 Latina and 229 NHC female dementia family caregivers from two regions of United States. Latina caregivers reported higher level of caregiving perceived benefits(7).

The previous comparisons between Hispanic and NHC caregivers have been less successful to explain why Hispanic caregivers evaluated more positively their caregiving experience. Identification of the mediators of the relationship between ethnicity and PAC might help contribute to theory development by explaining how or why the relationship between the two occurs (8).

A study based on a series of sociocultural multivariate models articulated by Roff and Burgio(9) examined differences in PAC among 275 African Americans and 343 NHC caregivers. PAC was treated as the outcome variable, while the potential mediators were education, caregiver anxiety, caregiver depression, religiosity, behavior bother and social support after controlling for

demographic variables. African Americans reported higher scores on PAC than NHC caregivers. African Americans' higher religiosity, lower anxiety, lower feeling of bother by the care recipient's behavior and lower socioeconomic status partially mediated the relationship between ethnicity and PAC.

The literature suggests that involvement with church or other religious organizations, and/or through personal meditation or prayer sessions might help caregivers cope with depression and other negative affective states with dementia caregiving (10). Religious coping may improve the quality of the relationship between caregiver and care recipients, which was associated with lower level of depression and role submersion (11). Miltiades and Pruchno indicated that caregivers who reported better relationship quality and higher levels of religious coping had higher levels of caregiving satisfaction (12). Levin, Markides and Ray found that religious attendance was associated with reductions in depression among Mexican-American adults and elder (13). In a study by Calderon and Tennstedt, religion was identified as a key coping strategy to help them manage caregiving (14). In Adams' study, Hispanic caregivers scored slightly higher in religiosity than NHC caregivers, although the difference is not significant between these two groups (5). Consistent with the above the findings, Coon found that Latina use greater religious coping than NHC female caregivers, at the same time, Latina perceived more rewards in caregiving than NHC women. Therefore, religiosity may be partially attributed to the more caring benefits of the Hispanic group (7).

Many differences between the Hispanic and NHC caregivers may be a function of socioeconomic status and education. Hispanic caregivers tend to be younger, attain less

education, and have lower incomes than their NHC counterpart. Hispanic caregivers also are more often daughters while NHC caregivers are more frequently spouses. Higher satisfaction is related to lower income and socioeconomics status (15). In addition, caregivers with a lower level of education were able to derive more self-esteem from caregiving (16).

The burden of caregiving was assessed by behavior bother scale, which provides the amount of burden by the care recipient in the caregiving experience. PAC was found to be significantly correlated with caregiving burden. Caregivers who reported more PAC were less likely to report burden in their caregiving experience (3). One analysis showed that Mexican Americans reported significantly higher rates of depression than NHC or African American caregivers (5). However, Philips found that Mexicans felt less burden than their NHC caregivers counterparts in two types, social restrictions, and change in elder-caregiver-family relationships (4). Moreover, Coon found that Latina caregivers reported lower appraisals of stress than NHC caregivers using REACH data (7).

Social support might be another possible mediator for the relationship between the ethnicity and PAC. Prior studies did find that the PAC is positively correlated with satisfaction of social report (17, 18). Chen and Greenberg found that social support, either formal support from mental health professionals or informal support from family members and other sources, has significant, positive associations with caregiving gains (19). Consistently, Harwood found that higher level of social support was a significant predictor of caregiving satisfaction in a sample of 40 Cuban American caregivers of Alzheimer's disease patients (18). The difference of social support between Hispanic and NHC populations is still not clear. Navaie-Waliser (20) reported that

Hispanic caregivers were more likely than NHC caregivers to receive help in care provision from formal care providers in a study of comparison of 67 Hispanic caregivers with 164 NHC counterparts. Compared to NHC caregivers, Tennstedt and coworkers also found that Puerto Rican elders received more informal care (21). Sabogal measured the family values in Hispanic caregivers and NHC caregivers (22). The Hispanics had higher ratings of family integration than their non-Hispanic counterparts. In contrast to these findings, Phillips found that Mexican American caregivers perceived having and using less support although they perceive less social restriction and reported more satisfaction with the caregiving role than NHC caregivers (4). In a study of comparison of four ethnic groups, Mexican Americans even reported the lowest in social support (5). In this paper, the Hispanic caregiver population is hypothesized to acquire higher level of social support than NHC caregivers.

*Cuban and Mexican caregivers Comparisons:*

Mexican-Americans and Cuban-Americans (two subgroups of Hispanic-American populations) share certain cultural links but are largely heterogeneous (23). Information on the ethnic difference of subgroups of Hispanic-American in PAC is useful for social and psychological interventions. To our knowledge, there are no studies that directly compare the PAC between Cuban and Mexican caregivers, a gap in the literature that the present study seeks to address.

Few studies have addressed mediation effect of the potential mediators suggested above for the relationship between PAC and ethnicity (Cuban and Mexican). In a study of social integration of 279 Cubans and 1550 Mexicans, among the three social network characteristics, Cubans reported

slightly higher "number of close friends/relatives" and "weekly contact with friends/relatives", but lower in "weekly church attendance". However, these differences are small (24). Using the data from the National Health interview Survey, 1992-95, Hajat found that Mexican persons had lower levels of educational attainment that did the Cuban Americans. Mexican Americans also tended to have lower incomes and higher rates of living below the poverty line than did Cuban Americans (25).

## 2.    Statement of the Problem

This thesis analyzes baseline data from the Resources for Enhancing Alzheimer's Caregiver Health (REACH) project, to examine the role of ethnicity in Positive aspects of Alzheimer's Caregiving (PAC).

The first phase of the study is to determine whether Hispanic caregivers experienced more positive feelings about Alzheimer's caregiving than NHC caregivers. In the second phase, it compares the PAC between Cuban, Mexican and NHC female caregivers. Multiple linear regression models are used as the main analytical tool.

The role of possible mediators that may influence the relation between ethnicity and PAC are also assessed by mediation analysis.

# 3. REACH Study Background

Sponsored by the National Institute on Aging (NIA) and the National Institute of Nursing Research (NINR), REACH project is a unique 6-year initiative study investigating the effectiveness of innovative interventions to support family caregivers of Alzheimer's disease and related dementias (ADRD). From 1996 to 2000, 1,222 caregivers and recipients dyads were collected at six sites in the United States (Boston, MA; Birmingham, AL; Memphis, TN; Miami, FL; Philadelphia, PA; and Palo Alto, CA). The coordinating center was located in Pittsburgh, PA. The project focused on characterizing and testing the most promising home- and community- based interventions for enhancing family caregiving, particularly with minority families (26).

## 3.1. Participants and Recruitment

The detailed description of eligibility criteria and recruitment procedures for data used in this thesis are described else where (26). Hispanic and NHC caregivers with dementia were recruited from memory disorder clinics, primary care clinics, social service agencies, and physical's office, with special attention to enrolling diverse participants. Strategies to recruit both Hispanic and NHC caregivers included referrals through senior service agencies, diagnostic and primary care centers and through media television, radio, and newspaper outlets.

Family caregivers included in REACH were greater than 21 years of age. They also had to be living with and providing care for a relative with ADRD greater than 4 hours per day for at least the past 6 months. Care recipients had to have a medical diagnosis of probable ADRD or a Mini-Mental State Exam (27) score lower than 24, which reflects moderate to severe cognitive impairment. Additionally, they had to have at least one limitation in basic activities of daily living (ADLs) or at least two dependencies in their instrumental activities of daily living (IADLs) (28). The Palo Alto site recruited only female caregivers while other sites included both sexes.

### 3.2. Measures

*Positive aspects of caregiving*

The Positive Aspects of Caregiving (PAC) is designed to assess the caregiver's perception of benefits associated with the caregiving experience. The scale contains nine items, phrased as statements about the caregiver's mental/affective state in relation to the caregiving experience. (e.g. Made me feel useful, made me feel needed). The possible responses ranges from 1-5 of "Disagree a lot" to "Agree a lot". High scores indicate greater extent of positive gain of caregivers in providing help to care recipients. Sum of these nine items was used in the data analysis.

This developed measure for the positive aspects of caregiving is valid and reliable using whole REACH data. Cronbach's alpha was .89 for entire scales (1).

*Demographic characteristics:*

The caregiver's age, ethnicity, years of education, relationship to care receipt, length of time living with the care recipient, and social economic status (SES) were evaluated. Jobs of caregivers and care receipts were coded using NAM-Powers Socioeconomic Status scores for occupations (29), which range from 0 – 100. The maximum NAM- powers job score in the couple was used to indicate SES.

*Religiosity:*

Religious behaviors of caregivers were assessed by a new measure, religiosity. This measure included three questions, importance of religious faith or spirituality (0, not important, to 4, very important), frequency of attendance at religious services or activities (1, never, to 6 nearly everyday), and frequency of prayer or mediation (1, never, to 6 nearly every day). The sum of respondent's standardized response to each question was used in the analysis. Cronbach's alpha was .80. The higher the score, the greater extent of religiosity of the caregiver.

*Behavioral bother*

The Revised memory and Behavior Problem Checklist (RMBPC) (30) measures the type and the number of care recipient disturbing behaviors. This measure consists of 24 items. Three possible types of the potential behavioral problems were: depressive, disruptive, and memory-related. The caregivers were asked whether or not the behavior was shown within the last week. (0, no, 1,

yes). The follow up item, "How bothered or upset by this?" was asked if the previous answer is positive. Response answers was ranged from (0, not at all, to 4, extremely). Average unconditional behavioral bother scale is formed by averaging the 24 follow up items. (0 is assigned for those who behaviors not exhibited). Cronbach's alpha was .87. The higher the score, the more bothersome the caregiver appraises the behaviors.

*Social support*

This measure included Inventory of Socially Supportive Behaviors (31), Lubben Social Network Index (LSNI) (32), Satisfaction with Support, and Negative Interactions (33);(34). Support satisfaction was evaluated on the three items, ranging from "0, not at all satisfied" to "1, very satisfied". Each response corresponds with the overall satisfaction of tangible, emotional and informational support. Ten items 4- point frequency questions from Lubben Social Network Index ranged from "never" to "very often". Negative Interactions consists of four items, ranging from "never" to "very often". The sum of the 17 questions responses was identified as the overall total score of the social support.

# 4. Statistical Methods Background

## 4.1. Multiple Linear Regression

The purpose of multiple regression is to examine the relationship between several independent or predictor variables and a dependent or criterion variable. In general, multiple regression procedures will estimate a linear equation of the form of $k$ independent variables by

$$Y = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \cdots\cdots + \beta_k * X_k + E$$

where $\beta_0, \beta_1, \beta_2 \cdots\cdots \beta_k$ are the regression coefficients that need to be estimated. The independent variables are $X_1, X_2, \cdots\cdots X_k$.

Assumptions of multiple linear regression are:

1) For each specific combination of the fixed $X$'s, $Y$ is a random variable with a certain probability distribution.

2) The $Y$ values are statically independent of each other.

3) The mean of $Y$ for each specific combination of $X_1, X_2, \cdots\cdots X_k$ is a linear function of $X_1, X_2, \cdots\cdots X_k$.

4) The variance of $Y$ is the same for any fixed combination of $X_1, X_2, \cdots\cdots X_k$.

5) For any fixed combination of $X_1, X_2, \cdots\cdots X_k$, the random variable $Y$ has a normal distribution.

Statistical techniques known as residual analysis are employed to check the assumptions for a multiple regression analysis. Given n observations ($Y_i$, $X_{i1}$, $X_{i2}$, $\cdots\cdots X_{ik}$ ), where $i = 1, 2, \cdots\cdots n$, the model of

$$Y_i = \beta_0 + \beta_1 * X_{i1} + \beta_2 * X_{i2} + \cdots\cdots + \beta_k * X_{ik} + E_i, \quad i = 1, 2, \cdots\cdots n,$$ in which $E_i$ denotes the (unobserved) error term for the $i$th response, has a fitted function given by

$$\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 * X_{i1} + \hat{\beta}_2 * X_{i2} + \cdots\cdots + \hat{\beta}_k * X_{ik}.$$

The residual e$_i$ is defined as $e_i = Y_i - \hat{Y}_i$. The jackknife residual is the residual that would be obtained if the regression was re-run omitting that observation from the analysis. As problems in the data arise, the jackknife residuals analysis will make suspect values more obvious. One of the assumptions of multiple linear regression is the errors should be normally distributed. Histograms of jackknife residuals will be used to check the normality assumption. As errors degrees of freedom increase, the distribution of residuals can be approximated by a standard normal distribution. Thus, in the histograms, we would expect to see a standard normal distribution bell shape curve if the normality assumption holds. Another assumption of multiple linear regression, homogeneity of variance, can be examined by plots of the jackknife residuals versus predicted responses. This assumption requires that the variance of the residuals is homogeneous across levels of the predicted values. If the model is well-fitted, there should be no pattern to the residuals plotted against the fitted values.

## 4.2. Mediation Analysis

In social psychological research, a given variable maybe considered as a mediator if it accounts for the relationship between the independent and the dependent variables. Let X represent the independent variable, Y represent the dependent variable and the given variable is denoted by Z. Z is determined as a mediator when the following conditions are satisfied: 1) variations in X significantly account for the variations in Z, 2) variations in Z significantly account for variations in Y, and 3) when paths (1) and (2) are controlled, a previously significant relationship between X and Y is no longer significant(8). The definition does not take the temporal ordering of X and Z into account. Moreover, it is possible to have mediating effect even if the overall effect of X not significant (35). An updated frame work of the definition of a mediator requires the potential mediator to measure the event or change that follows the independent variables. Mediation can then be examined by the four steps logic outlined by (8, 36, 37). Four steps in a mediation analysis can be stated as follows:

Step 1. Determining whether the independent variable causes a change in the outcome.

Step 2. Determining whether the independent variable causes a change in the mediator.

Step 3. Determining whether the mediator causes a change in the outcome.

If significant relationships are found from step 1 through step 3, then step 4 is used.

Step 4. Determining whether the effect of the independent variable exists after controlling for the mediator. If the mediator explains all of the observed effect of independent variable (X) on the dependent variable(Y) fully, it is concluded that mediator fully mediates the effect of X on Y. If the mediator only explain some of the total effects of X on Y, the mediator is said to partially mediate the effect of X on Y(35, 38).

## 4.3. Sobel's Test

Sobel (39) derived the standard error of the mediation effect. It is an approximation significance test for the indirect effect of the independent variable on the dependent variable via mediator. Three versions of formulae for "Sobel's test" were available. They are listed as below:

Sobel's test equation:

$$z - value = a * b / \sqrt{b^2 * S_b^2 + a^2 * S_a^2}$$

Goodman (I) test equation:

$$z - value = a * b / \sqrt{b^2 * S_b^2 + a^2 * S_a^2 + S_a^2 * S_b^2}$$

Goodman (II) test equation:

$$z - value = a * b / \sqrt{b^2 * S_b^2 + a^2 * S_a^2 - S_a^2 * S_b^2}$$

where, "$a$" equals to the unstandardized regression coefficient for the association between independent variable and mediators, "$b$" equals to the unstandardized regression coefficient for the association between mediators and the dependent variable, $S_a$, $S_b$ are the standard errors of "$a$" and "$b$".

Sobel's test requires the assumption that the product of $S_a$ and $S_b$ is vanishingly small. A Monte Carlo simulation study performed by (40) showed that Sobel test and Goodman (I) test are better than Goodman (II) test, and converge closely with sample sizes greater than 50 or so.

The Goodman (I) version of Sobel's test will be used to examine the indirect effect of the independent variable on the dependent variable via mediator (39). Therefore, if the independent variable is no longer significant in step 4 when mediator is controlled, the finding supports full

mediation.  If the independent variable is still significant, with a significant coefficient found in

Sobel's test, the finding supports partial mediation.

## 5.      Statistical Methods

First, Hispanic (n = 232) and NHC Caregivers (n = 691) are compared by using baseline data from REACH. Then Cuban (n=88) and Mexican (n=77) female caregivers are compared.

*Hispanic and NHC caregivers Comparisons:*

Bivariate correlations between demographic variables and PAC are estimated to decide which demographic variable should be put in regression analyses as a covariate. These potential covariates include caregivers' age, relationship to care recipient, length of time living with the care recipient, marital status and employment status.

Using PAC as the dependent variable and ethnicity as the independent variable (dichotomy variable of Hispanic and NHC caregivers) in one multiple linear regression model, we will determine if differences in PAC perceived by Hispanic caregivers and NHC caregivers exist.

Mediation analysis follows on the basis of the significant difference between these two groups. The potential mediators are: 1) religiosity 2) education 3) SES 4) social support and 5) behavior bother. Based on the previous literature, the hypothesis is that Hispanic caregivers have higher religiosity, lower education and SES, higher social support available, and lower behavior bother than NHC caregivers, and that caregivers who have higher religiosity, lower education and SES, higher social support, and lower behavior bother are expected to be associated with more positive feeling about caregiving.

17

A series of multiple linear regression models are used for testing the mediators. PAC is the dependent variable and the independent variable is ethnicity. The religiosity, education, SES, social support and behavior bother variables are targeted as the potential mediators. These potential mediators meet the first temporal requirement, which is the ability of the potential mediator to measure the event or change that follows the independent variables. Ethnicity is temporally before the religiosity, education, SES, social support and behavior bother. The mediation effect can then be examined by the four steps of the mediation test (8, 36, 37).

Histograms of jackknife residuals will be examined to check the normality assumption of the multiple linear regression model. The assumption of homogeneity of variance of the models will be examined using plots of the jackknife residuals versus predicted responses. Similar statistical data analyses are also presented for the female Cuban and Mexican caregivers. SPSS is used to perform descriptive statistics, bivariate analysis and multivariate modeling in this thesis.

# 6.    Results

## 6.1. Hispanic and NHC caregivers Comparisons

The data used in this thesis included 232 Hispanic caregivers and 691 NHC caregivers from the REACH baseline data. All the caregivers were recruited from six sites, coded from 1 to 6. Response option of ethnicity was dichotomous (0 = Hispanic caregivers and 1 = NHC caregivers). The PAC, religiosity, education, SES, social support and behavior bother were evaluated as scores. The potential covariates were the site, caregivers' age, relationship to care recipient, length of time living with the care recipient, marital status and employment status. Bivariate correlations between demographic variables and PAC were computed to decide which demographic variables would be control variables in the regression models. Table 1 shows the correlations result. Among the potential control variables, only the caregivers' relationship to recipient had statistically significant correlation with PAC. Therefore, relationship was included as a covariate in the multiple regression models.

**Table 1. Correlations between Demographic Variables and PAC (Hispanics and NHC)**

| Demographic Variable | PAC |
| --- | --- |
| Site | -.04 |
| Age | -.03 |
| Relationship with CR (Husband) | .12$^*$ |
| Relationship with CR (Wife) | -.12$^*$ |
| Marital status | <.001 |
| Employment Status | .17 |
| Years lived with Caregivers | -.02 |

Notes: PAC = positive aspects of caregiving. $^*p<.05$

Histograms of jackknife residuals were examined to determine whether the residuals are normally distributed. The histograms for these 11 multiple linear regressions are shown in Figures 1 - 11. Although the residuals are slightly skewed to the right, the histograms suggest that the residuals are still normally distributed. Using plots of the jackknife residuals versus predicted responses, homogeneity of variance was also checked (Figures 12-18). The error variance should be constant if this assumption holds. We found that the distribution of residuals looked random and consistent across the fitted values. Based on these figures, the jackknife residuals from these 11 regressions appear to conform to the assumptions of being normality distributed and the variances are homogeneous across levels of the predicted values.

As shown in Table 2, there is a significant association between ethnicity and PAC. Hispanic caregivers reported significantly higher positive aspects of caregiving than NHC caregivers. The mean of Hispanic caregivers PAC was 36.63 compared with NHC caregivers, 32.02.

The means of PAC and each potential mediator for Hispanic and NHC caregivers are presented in Table 2. Table 2 also includes the correlation of PAC and mediators with ethnicity, and their corresponding P values. Hispanic caregivers had lower SES, attain less education, scored lower behavior bother, perceived lower level of social support, and were more religious than their NHC counterparts. Among these potential mediators, behavior bother does not have significant correlation with the ethnicity.

**Table 2. Demographic Characteristics of Caregivers by Ethnicity (Hispanics and NHC)**

| Variable | Means | | Correlations With Ethnicity | p |
|---|---|---|---|---|
| | Hispanics(n=232) | NHC (n=691) | | |
| PAC | 36.63 | 32.02 | -.22 | <.001 |
| Relationship | | | | |
|    Husband(%) | 10.2 | 15.6 | | |
|    Wife(%) | 30.2 | 44.7 | | |
|    Other(%) | 59.5 | 39.7 | | |
| Possible Mediators | | | | |
|    Education | 11.20 | 13.22 | .30 | <.001 |
|    SES | 54.54 | 68.43 | .26 | <.001 |
|    Behavior bother | .70 | .74 | .04 | .29 |
|    Social support | 23.59 | 26.58 | .16 | <.001 |
|    Religiosity | .71 | -.25 | -.18 | <.001 |

**Table 3. Correlations among Ethnicity (Hispanics and NHC), Mediator Variables, and PAC**

| Variable | Ethnicity | Education | SES | Behavior Bother | Social Support | Religiosity | PAC |
|---|---|---|---|---|---|---|---|
| Ethnicity | 1.00 | .30$^*$ | .26$^*$ | .04 | .16$^*$ | -.18$^*$ | -.22$^*$ |
| Education | | 1.00 | -.52$^*$ | .03 | -.04 | -.10$^*$ | -.22$^*$ |
| SES | | | 1.00 | -.02 | .05 | -.11$^*$ | -.17$^*$ |
| Behavior Bother | | | | 1.00 | -.05 | .02 | -.19$^*$ |
| Social Support | | | | | 1.00 | .11$^*$ | .12$^*$ |
| Religiosity | | | | | | 1.00 | .17$^*$ |
| PAC | | | | | | | 1.00 |

Notes: PAC = positive aspects of caregiving; SES = socioeconomic status. *p<.05

Based on the differences found between the two ethnic groups, mediation analysis was applied to answer the question of why or how PAC differences were seen. The correlations among ethnicity, each potential mediating variable and PAC are shown in Table 3. Education, SES, religiosity, social support and behavioral bother were potential mediating variables. Because the Hispanic caregivers reported lower level of social support than NHC caregivers, and the social support was positively correlated with PAC, this variable was not be considered as a mediator in this thesis. There was no significant correlation between behavior bother scores and ethnicity. Behavior bother is also no longer treated as a mediator.

The education, SES, and religiosity were left as potential mediating variables. Following the four-step procedures for mediating variables, the multiple regression approach was used to examine the relationship between the potential mediators and PAC.

In total, 11 multiple linear regression models were fitted to assess the mediating effect. The regression coefficient, T, P-value for each model are presented in Table 4. Sobel's tests were used to check the significance of these mediating effects. Sobel test statistics and the P values for potential mediators are shown in Table 4.

**Table 4. Standardized Regression Coefficients and Sobel Test Statistics (Hispanics and NHC)**

| Model Number | Dependent Variable | Independent Variable | Regression coefficient | T | P | Sobel Test Statistics | Sobel's p value |
|---|---|---|---|---|---|---|---|
| 1 | PAC | Ethnicity | −.22 | −6.87 | <.001 | | |
| | *Education* | | | | | 5.76 | <.001 |
| 2 | education | Ethnicity | .33 | 10.44 | <.001 | | |
| 3 | PAC | Education | −.22 | −6.94 | <.001 | | |
| 4 | PAC | Ethnicity and education | −.17(ethnicity) | −4.94 | <.001 | | |
| | *SES* | | | | | 4.10 | <.001 |
| 5 | SES | Ethnicity | .25 | 7.60 | <.001 | | |
| 6 | PAC | SES | −.16 | −4.92 | <.001 | | |
| 7 | PAC | Ethnicity and SES | −.25(ethnicity) | −7.78 | .001 | | |
| | *Religiosity* | | | | | 3.87 | <.001 |
| 8 | Religiosity | Ethnicity | −.17 | −5.29 | <.001 | | |
| 9 | PAC | Religiosity | .19 | 5.78 | <.001 | | |
| 10 | PAC | Ethnicity and religiosity | −.20(ethnicity) | −6.01 | <.001 | | |
| | *Ethnicity with four mediators* | | | | | | |
| 11 | PAC | Ethnicity, religiosity SES, and education | −.14(ethnicity) | −5.02 | <.001 | | |

*Notes:* Ethnicity (0 = Hispanic 1 = NHC); PAC= Positive aspects of caregiving; SES = socioeconomic status.

Religiosity, education and SES were examined individually using mediator tests. Significant relationships were found from Steps 1 through 3 for all three variables. Although ethnicity is still significant when controlling for mediators and covariates in step 4, significant Sobel's test statistics showed that the significant indirect mediating effect was seen to exist in the relationship

between the PAC and ethnicity. Based on the results shown in Table 4, we were able to conclude that the religiosity, education, and SES partially mediate the effect of ethnicity on PAC. Thus, the higher positive aspects of caregiving attained by Hispanic caregivers could be partially explained by the lower education and SES level, and higher religiosity.

## 6.2. Cuban, Mexican and NHC Female Caregivers Comparisons

Only Mexican female caregivers (n=77) were included in the REACH baseline data, which were compared with corresponding Cuban female caregivers (n=88) and Caucasian female caregivers (n=550).

**Table 5.   Characteristics of Caregivers by Ethnicity (Mexicans, Cubans and NHC caregivers)**

|  | Means | | |
| --- | --- | --- | --- |
| Variable | Mexicans (n=77) | Cubans (n=88) | NHC (n=550) |
| PAC | 37.81 | 34.06 | .31.26 |
| Possible Mediators | | | |
|     Education | 10.13 | 12.06 | 13.31 |
|     SES | 45.66 | 63.03 | 69.11 |
|     Behavior bother | .75 | .67 | .79 |
|     Social support | 25.39 | 23.48 | 26.88 |
|     Religiosity | 1.21 | .67 | -.17 |

Table 5 provides descriptive results of PAC and potential mediators of three populations of interest, Mexicans, Cubans and NHC caregivers. Among these groups, Mexicans derived highest amount of PAC. Cubans also reported higher PAC than NHC caregivers. Mexican caregivers had

lower level of education attainment and SES than did the other two groups. Means of education attainment and SES level in the Cuban caregivers were slightly less than NHC caregivers. Hispanic caregivers tended to be more religious than NHC caregivers, and the religiosity level of Mexican caregivers was higher than Cubans. NHC caregivers scored highest while Cuban caregivers reported the lowest social support and behavior bother level. Overall, there was an increasing trend in PAC, education and SES level for Mexican, Cuban and NHC caregivers, as well as a decreasing trend in religiosity.

**Table 6.  Correlations between Characteristics and Ethnicity (Mexicans and Cubans)**

| Variable | Correlations With Ethnicity | P |
|---|---|---|
| PAC | .22 | .005 |
| Possible Mediators | | |
| Education | -.24 | .002 |
| SES | -.31 | <.001 |
| Behavior bother | .07 | .39 |
| Social support | .12 | .13 |
| Religiosity | .18 | .02 |

Table 6 shows the correlations of PAC and potential mediators with ethnicity. As Table 5 and Table 6 presented, Mexican caregivers reported significant higher positive aspects of caregiving than Cuban caregivers. The mean of Mexican caregivers' PAC was 37.81 compared with Cuban caregivers, 34.06. Mexican caregivers significantly had lower SES, less education attainment, and were more religious than their Cuban counterpart. Social support and behavior bother level were not significantly different between the two Hispanic subgroups.

Notable differences were found between the two Hispanic subgroups, Cuban and Mexican female caregivers. So mediation analyses were reformed for these two populations. Response option of Hispanic subgroups was dichotomous (0 = Cuban caregivers and 1 = Mexican caregivers). Other variables are as previously defined. Table 7 shows the results of the bivariate correlations between PAC and the demographic variables. Site was the only significant variable in this table. Caregivers of two of the six regions, Palo Alto and Miami, were included in the data. Because all Mexican caregivers were recruited from Palo Alto and most Cuban caregivers (86 of 88) came from the Miami, site was not included as covariates in the multiple regression models.

**Table 7. Correlations between Demographic Variables and PAC (Mexicans and Cubans)**

| Demographic Variable | PAC |
| --- | --- |
| Site | .20[*] |
| Age | -.09 |
| Relationship with CR (Wife) | .02 |
| Married status | .02 |
| Employment Status | -.12 |
| Years lived with Caregivers | .05 |

Similar results of residuals analysis were obtained in comparisons of Cuban and Mexican caregivers as the comparisons of Hispanic caregivers and NHC caregivers. The assumptions of normality of error distribution and homogeneity of variance were not violated. (Figures 19-31).

**Table 8. Correlations among Ethnicity (Mexicans and Cubans), Mediator Variables, and PAC**

| Variable | Ethnicity | Education | SES | Behavior Bother | Social Support | Religiosity | PAC |
|---|---|---|---|---|---|---|---|
| Ethnicity | 1.00 | -.24* | -.31* | .07 | .12 | .18* | .22* |
| Education | | 1.00 | .58* | -.10 | -.22* | -.12 | -.27* |
| SES | | | 1.00 | -.08 | -.13 | -.12 | -.23* |
| Behavior Bother | | | | 1.00 | .07 | -.02 | -.14 |
| Social Support | | | | | 1.00 | .15 | .04 |
| Religiosity | | | | | | 1.00 | -.01 |
| PAC | | | | | | | 1.00 |

Notes: PAC = positive aspects of caregiving; SES = socioeconomic status. *p<.05

The correlations among ethnicity, each potential mediating variable and PAC are shown in Table 8. Potential mediating variables include education, SES, religiosity, social support and behavioral bother. The scores of behavior bother and social support were not significantly different between the two Hispanic subgroups. No significant correlation was detected between religiosity and PAC. Behavior bother, social support and religiosity were not considered as mediators in this thesis.

Table 9 presents regression coefficient, T, P-value for each of 8 multiple linear regression models, which were fitted to assess the mediating effect of education and SES. Sobel test statistics and the P values for potential mediators are also showed in Table 9.

**Table 9. Standardized Regression Coefficients and Sobel Test Statistics (Mexicans and Cubans)**

| Model Number | Dependent Variable | Independent Variable | Regression coefficient | T | P | Sobel Test Statistics | Sobel's p value |
|---|---|---|---|---|---|---|---|
| 12 | PAC | Ethnicity | .22 | 2.83 | .005 | | |
| | *Education* | | | | | 2.38 | .02 |
| 13 | Education | Ethnicity | −.24 | −3.16 | .002 | | |
| 14 | PAC | Education | −.27 | −3.57 | <.001 | | |
| 15 | PAC | ethnicity and education | .16(ethnicity) | 2.09 | .04 | | |
| | *SES* | | | | | 2.42 | .02 |
| 16 | SES | Ethnicity | −.31 | −4.19 | <.001 | | |
| 17 | PAC | SES | −.23 | −2.99 | .003 | | |
| 18 | PAC | ethnicity and SES | .15(ethnicity) | 1.93 | .055 | | |
| | *Ethnicity with two mediators* | | | | | | |
| 19 | PAC | ethnicity, SES, and education | .14(ethnicity) | 1.75 | .083 | | |

*Notes:* **Ethnicity (0 = Cubans, 1 = Mexicans); PAC= Positive aspects of caregiving; SES = socioeconomic status.**

Education and SES were examined individually using mediator tests. Significant relationships were found from Steps 1 through 3 for both SES and education. Ethnicity was no longer significant (P=.055) when adding SES in the model, which indicated that SES was a full mediator. Ethnicity was still significant when controlling for education in step 4, which was determined as a partial mediator. Both SES and education had significant Sobel's test statistics, which showed that the significant full mediation of SES and significant partial mediation of education were seen to exist in the relationship between PAC and ethnicity. Thus, the higher

positive aspects of caregiving attained by Mexican female caregivers could be explained by the

lower education and SES level.

# 7.    Discussion

The main purpose of this thesis was to examine the extent of the differences for PAC experienced between Hispanic and NHC caregivers engaged in caregiving for a family member suffering from Alzheimer's or a related dementia. A statistically significantly difference between these two groups indicated this to be true with the REACH data. Compared with NHC caregivers, Hispanics reported more PAC. This result is consistent with the findings of previous studies (4, 5, 7).

By employing the mediation analysis we are able to provide at least partial answers to the questions of how or why the PAC differences exist between the two groups. First, analysis of the means shows that Hispanic caregivers reported higher level of religiosity than their NHC counterparts, and higher religiosity is significantly associated with the PAC. Our results support previous empirical and practical results (5, 7). Compared to NHC caregivers, Hispanics showed a stronger religious outlook on their role and purpose as a caregiver and appeal to religion or spirituality in dealing with the challenges in their caregiving lives. Thus, the different religious level maybe contributed to the more positive aspects of caregiving experienced by Hispanic caregiver.

Hispanic caregivers' more favorable appraisals of caregiving can also be partially explained by their lower level of education and SES. This finding corroborates the previous findings (16). A possible explanation is that those caregivers with higher level of education or in higher level of SES appeared to achieve more stimulating and rewarding from the outside. Thus, there are

striking stratum differentials between their professional role and their role as caregiver. Compared with those people, caregivers with less education or in lower level of SES tend to derive more PAC during routine caregiving activities (15, 16). Therefore, it is plausible to find that the higher PAC perceived by Hispanic caregivers was partially due to their lower level of education and SES.

The findings about perceived social support suggest that Hispanic caregivers may have less support than NHC caregivers, which is contrary to the initial hypothesis. However, the results show that the social support was significantly associated with PAC, which is in agreement with the previous results. On the basis of mixed findings of the previous research regarding social support perceived by these two groups, it is not surprising that NHC caregivers received more social support even though they reported less PAC (4, 5, 20).

In our original hypothesis, behavior bother was assumed to be a mediator on the relationship between ethnicity and PAC. The Hispanics were anticipated to report less behavior bother scores and the behavior bother scores would help explain higher PAC among Hispanics. Although behavior bother was significant correlated with PAC, the significant difference was not found between these two populations, Therefore, we were not able to support the findings of Coon's study, which indicated the lower level of appraisals of stress perceived by Latina caregivers compared with NHC female caregivers (7).

The findings of this thesis were partially consistent with the study of Roff and Burgio (2004), which compared the African American with NHC caregivers in PAC. Being similar to the

African Americans in their paper, Hispanic caregivers reported higher scores on PAC than did NHC caregivers. Hispanic caregiver's higher religiosity and lower socioeconomic status partially mediate the relationship between ethnicity and PAC, which is consistent with the findings in their study.

There is also some distinction between Hispanic caregivers and African American caregivers when compared with NHC caregivers. Hispanic caregiver's lower level of education was found to contribute to the relationship between ethnicity and PAC, which was not supported in African American caregivers group. However, the lower feeling of bother by the care recipient's behavior perceived was not significantly different between Hispanic and NHC caregiver, which was found in African American caregivers group. Contrary to the prediction, Hispanic caregivers group reported lower lever of social support available than their NHC counterparts. In study of Roff and Burgio, there was no significant difference between African American caregivers and NHC caregivers in social support scores (9).

Comparisons of characteristics among Cubans, Mexican and NHC female caregivers revealed that notable differences exist in the two Hispanic subgroups. In summary, compared with Mexicans, Cubans were closer to NHC in PAC, SES, education attainment and religiosity. Mexican caregivers reported higher PAC than their Cuban counterparts. The inter–Hispanic mediation analysis between Cuban and Mexican female caregivers showed that higher levels of education and socioeconomic status of Cuban caregivers mediate the relationship between ethnicity and PAC.

A limitation of this study is that the comparisons between Cuban and Mexican caregivers were limited to the females, while gender would likely explain some of ethnic differences observed in the study. In addition, female Mexican caregivers were only recruited at the Plato Alto site, while most of the Cuban female caregivers came from Miami.

In conclusion, our results corroborate earlier findings that Hispanic caregivers express more positive appraisals of caregiving than their NHC counterparts. The religiosity partially mediates this relationship. In addition, our data indicate other mediators that contribute to the relationship between ethnicity and PAC include caregivers' education and SES. Compared with Mexicans, Cubans were closer to NHC in PAC, SES, education attainment and religiosity. Mexican female caregivers reported significant higher PAC than Cuban caregiver. The full mediation of SES and partial mediation of education were seen to exist in the relationship between PAC and ethnicity.

# Appendix Figures

*Hispanic and NHC caregivers Comparisons:*

Model 1: ethnicity predicts PAC

## Histogram

## Dependent Variable: Positive Aspects of Caregiver



Mean = -3.57E-4
Std. Dev. = 1.001
N = 923
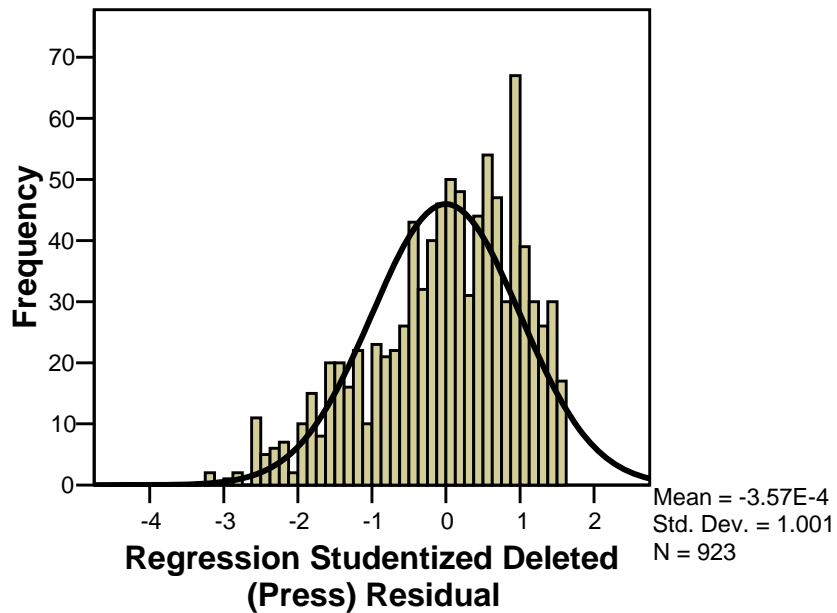
**Figure 1. Frequency of Jackknife residuals of Model 1**

Model 2: ethnicity predicts education

**Histogram**

**Dependent Variable: centralized education**



Mean = -6.43E-4
Std. Dev. = 1.004
N = 923
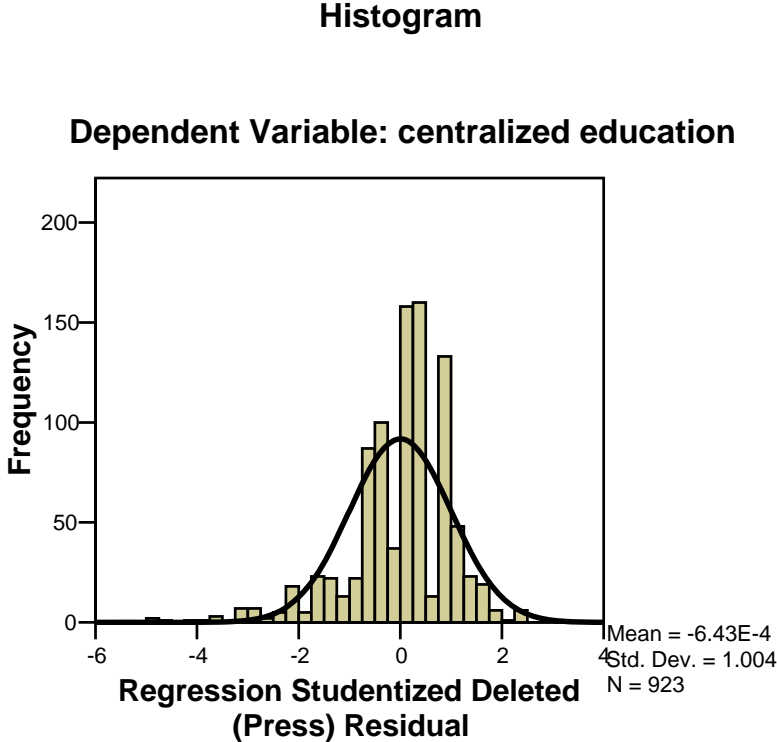
**Figure 2. Frequency of Jackknife residuals of Model 2**

Model 3: education predicts PAC

## Histogram

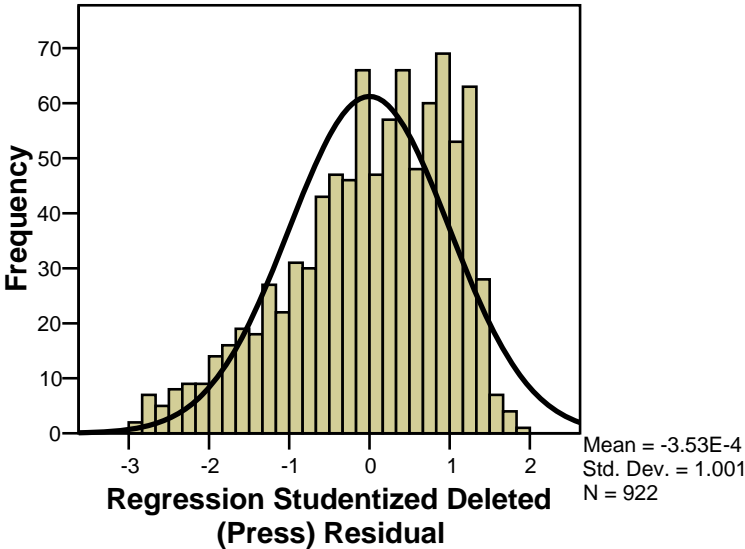**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.38E-4
Std. Dev. = 1.001
N = 923
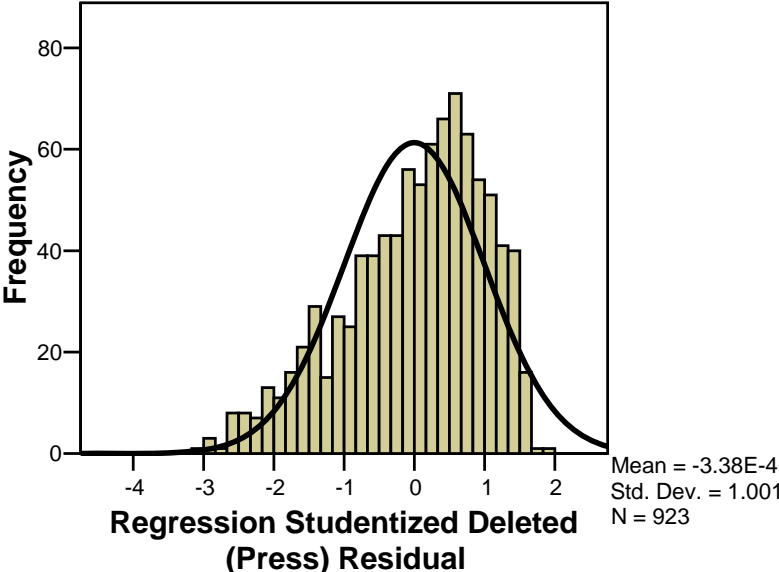
**Figure 3. Frequency of Jackknife residuals of Model 3**

Model 4: ethnicity and education predicts PAC

**Histogram**
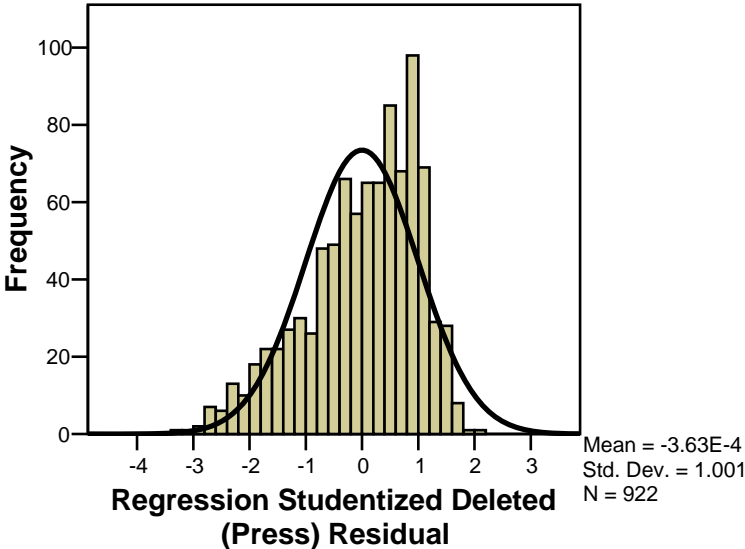
**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.64E-4
Std. Dev. = 1.001
N = 923
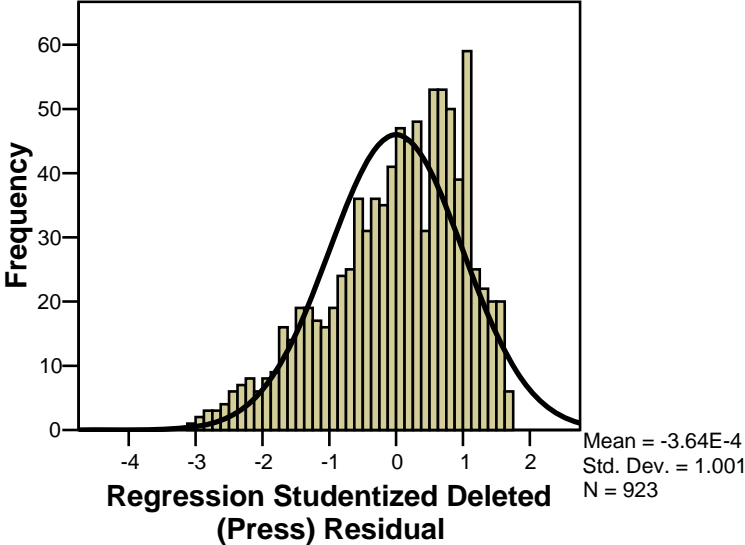
**Figure 4. Frequency of Jackknife residuals of Model 4**

Model 5: ethnicity predicts SES

**Histogram**

**Dependent Variable: centralized ses**



Mean = -2.51E-4
Std. Dev. = 1.001
N = 918
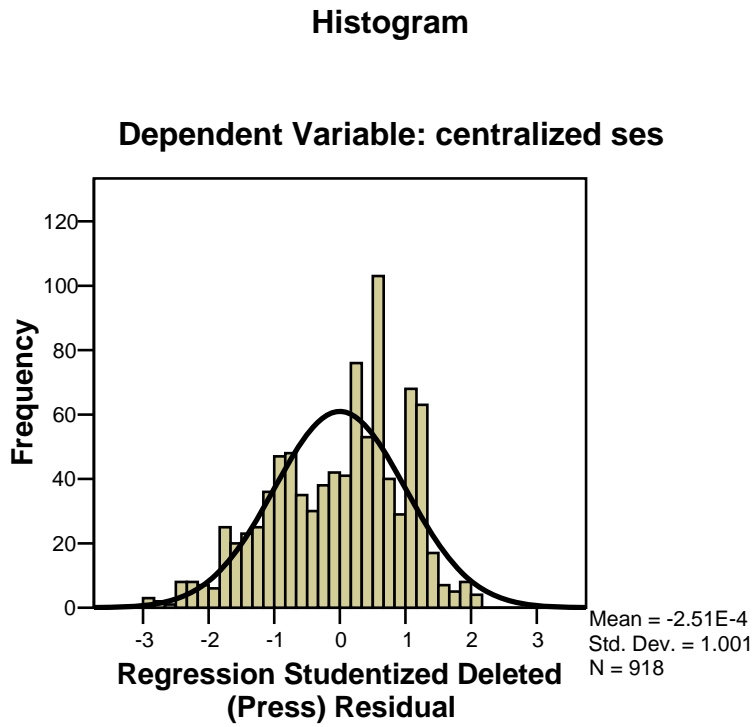
**Figure 5. Frequency of Jackknife residuals of Model 5**

Model 6: SES predicts PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.27E-4
Std. Dev. = 1.001
N = 918
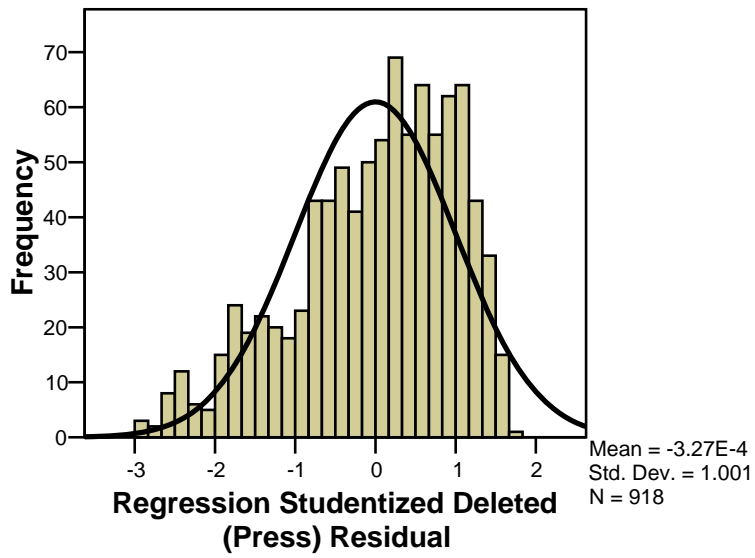
**Figure 6. Frequency of Jackknife residuals of Model 6**

Model 7: SES and ethnicity predict PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.59E-4
Std. Dev. = 1.001
N = 918
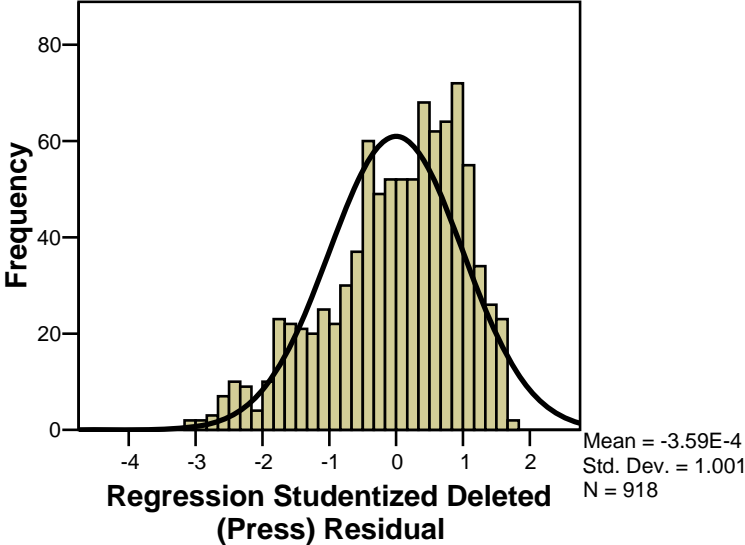
**Figure 7. Frequency of Jackknife residuals of Model 7**

Model 8: ethnicity predicts religiosity

**Histogram**

**Dependent Variable: religiosity sum score based on z-standardized items**



Mean = -6.03E-4
Std. Dev. = 1.002
N = 922
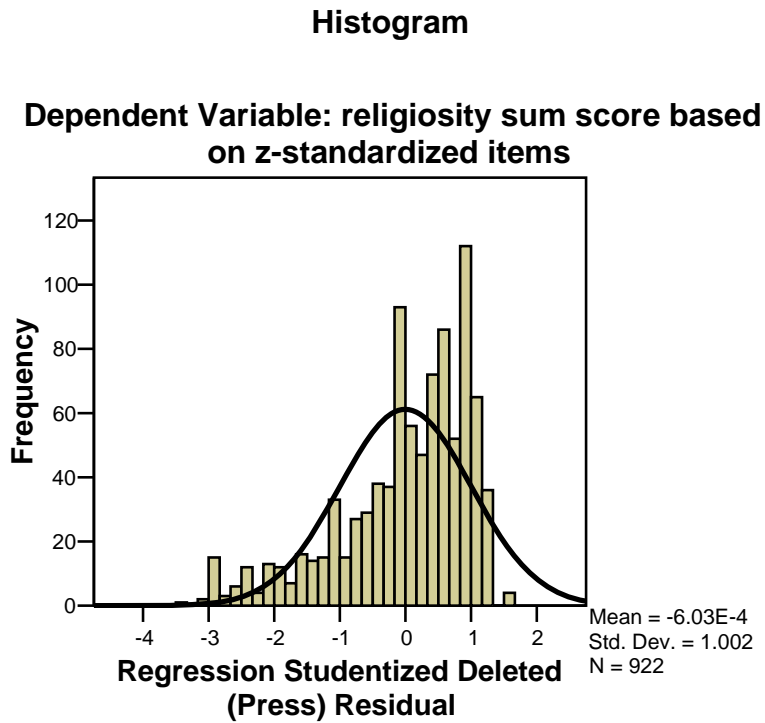
**Figure 8. Frequency of Jackknife residuals of Model 8**

Model 9: religiosity predicts PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.53E-4
Std. Dev. = 1.001
N = 922

**Figure 9. Frequency of Jackknife residuals of Model 9**

Model 10: religiosity and ethnicity predict PAC

## Histogram

**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.63E-4
Std. Dev. = 1.001
N = 922

**Figure 10. Frequency of Jackknife residuals of Model 10**

Model 11: religiosity, SES, education and ethnicity predict PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**



Mean = -3.5E-4
Std. Dev. = 1.001
N = 917
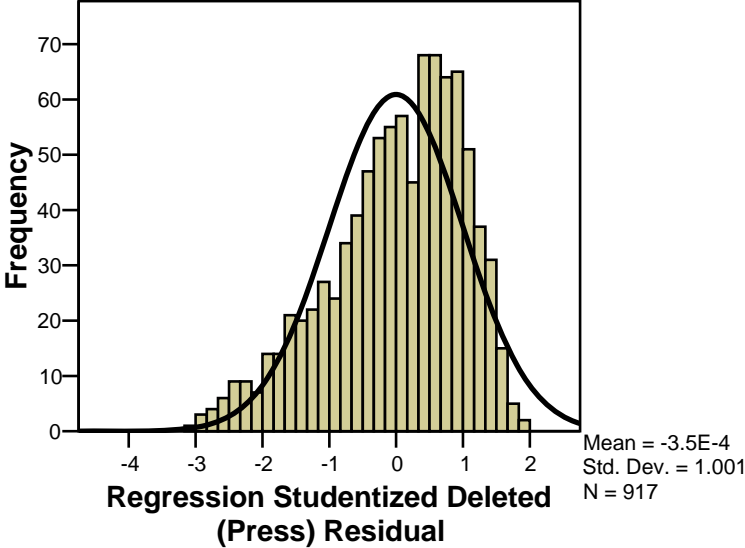
**Figure 11. Frequency of Jackknife residuals of Model 11**

**Scatterplot**

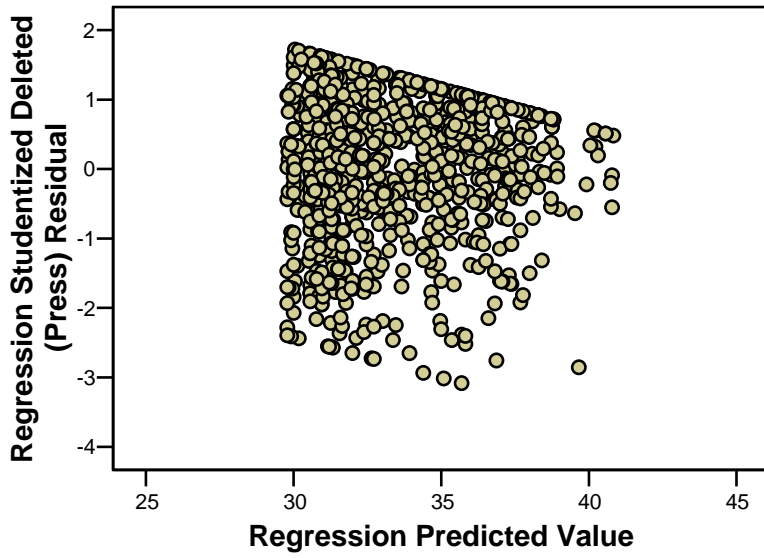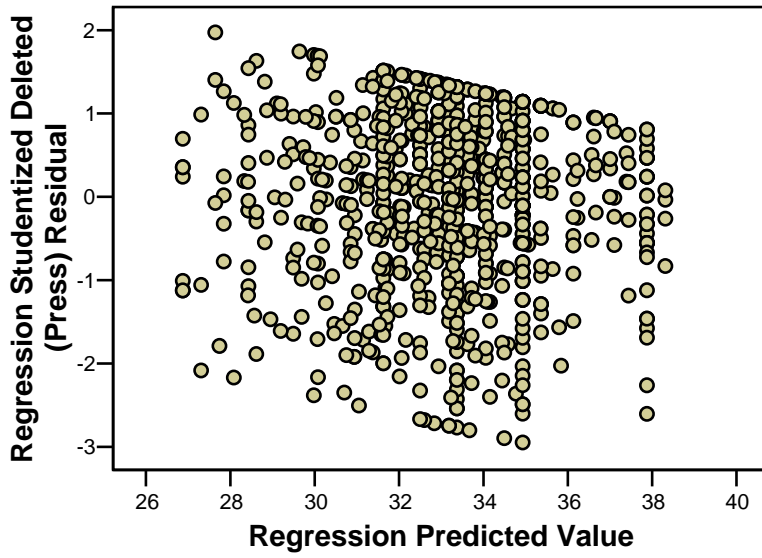**Dependent Variable: Positive Aspects of Caregiver**
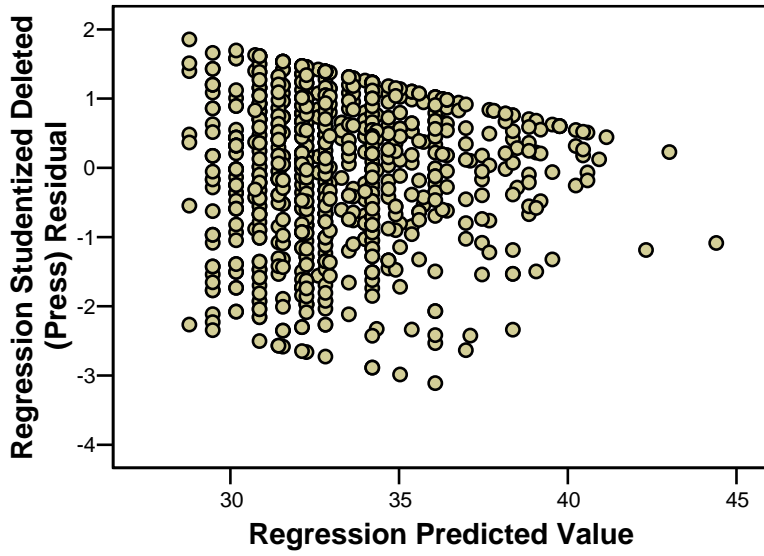


Figure 12.  Scatterplot of Jackknife residuals vs. Predicted PAC of Model 3

**Scatterplot**

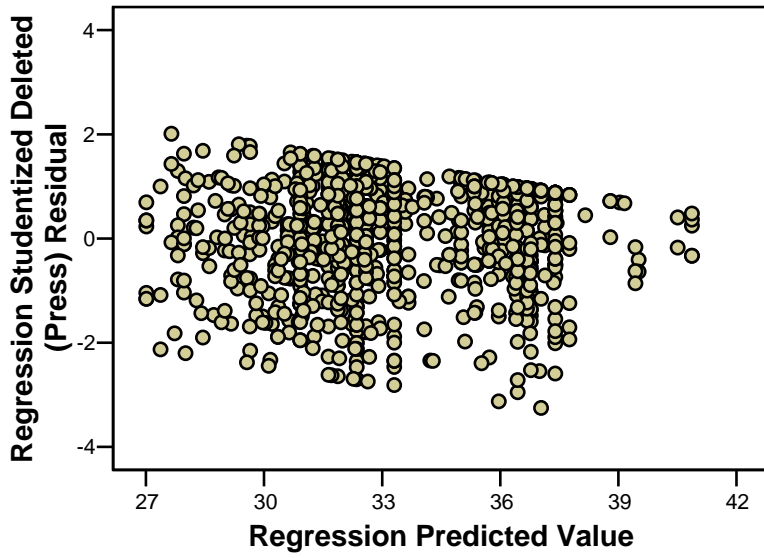**Dependent Variable: Positive Aspects of Caregiver**
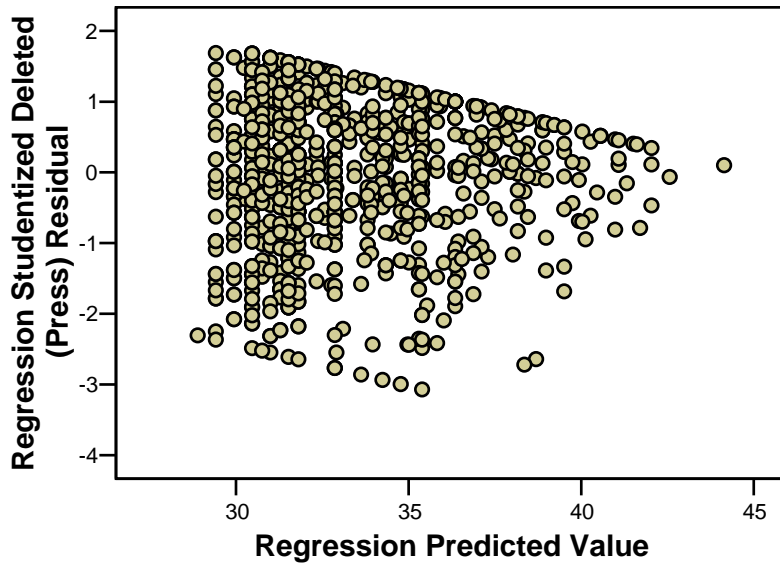


Figure 13. Scatterplot of Jackknife residuals vs. Predicted PAC of Model 4

**Scatterplot**

**Dependent Variable: Positive Aspects of Caregiver**
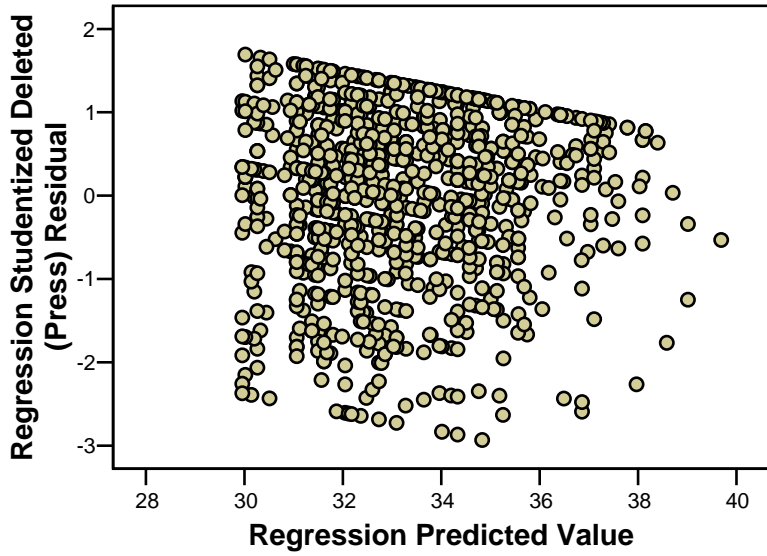


**Figure 14.  Scatterplot of Jackknife residuals vs. Predicted PAC of Model 6**

**Scatterplot**

**Dependent Variable: Positive Aspects of Caregiver**



Figure 15. Scatterplot of Jackknife residuals vs. Predicted PAC of Model 7

**Scatterplot**
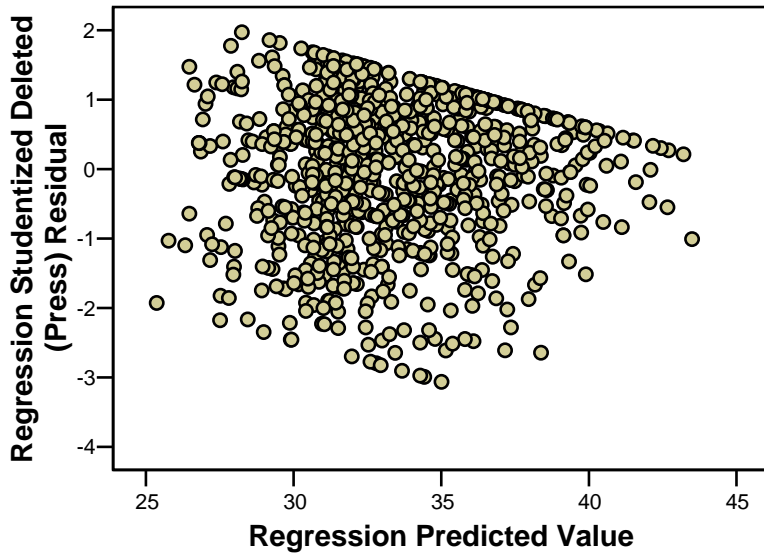
**Dependent Variable: Positive Aspects of Caregiver**



Figure 16. Scatterplot of Jackknife residuals vs. Predicted PAC of Model 9

**Scatterplot**

**Dependent Variable: Positive Aspects of Caregiver**



Figure 17.  Scatterplot of Jackknife residuals vs. Predicted PAC of Model 10

**Scatterplot**

**Dependent Variable: Positive Aspects of Caregiver**



Figure 18.  Scatterplot of Jackknife residuals vs. Predicted PAC of Model 11

*Cuban and Mexican female caregivers Comparisons:*
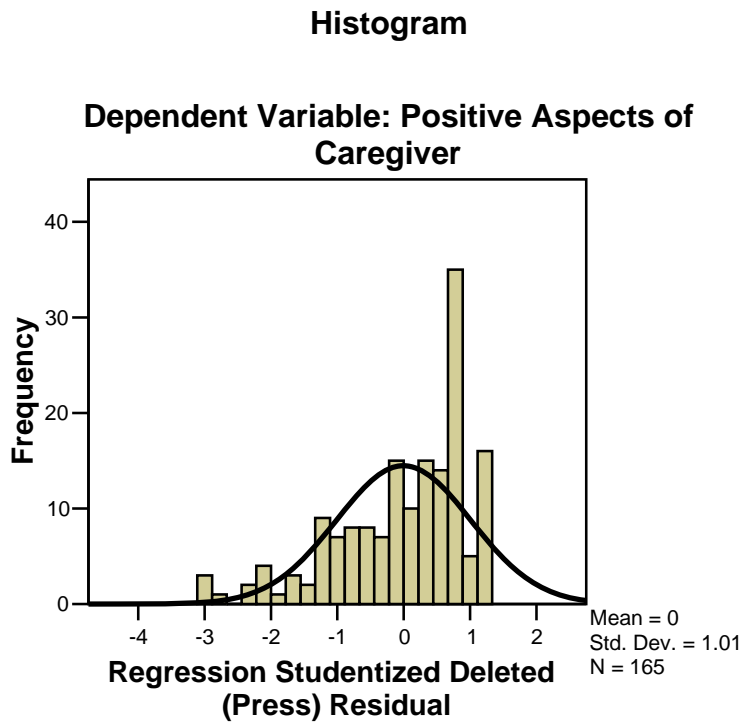
Model 12: ethnicity predicts PAC

**Histogram**



**Dependent Variable: Positive Aspects of Caregiver**

Mean = 0
Std. Dev. = 1.01
N = 165

**Figure 19.  Frequency of Jackknife residuals of Model 12**

Model 13: ethnicity predicts education

**Histogram**

**Dependent Variable: centralized education**



Mean = 0
Std. Dev. = 1.007
N = 165
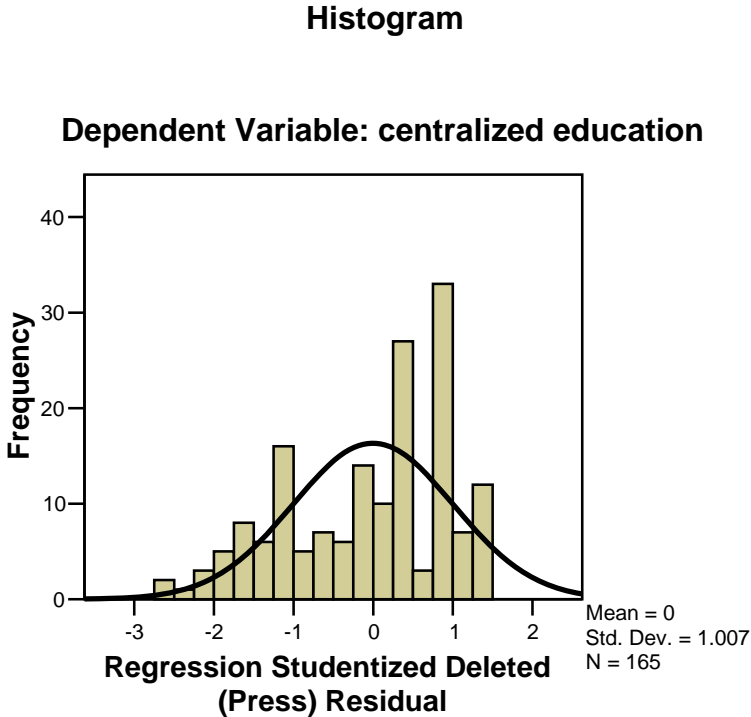
**Figure 20. Frequency of Jackknife residuals of Model 13**

Model 14: education predicts PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**
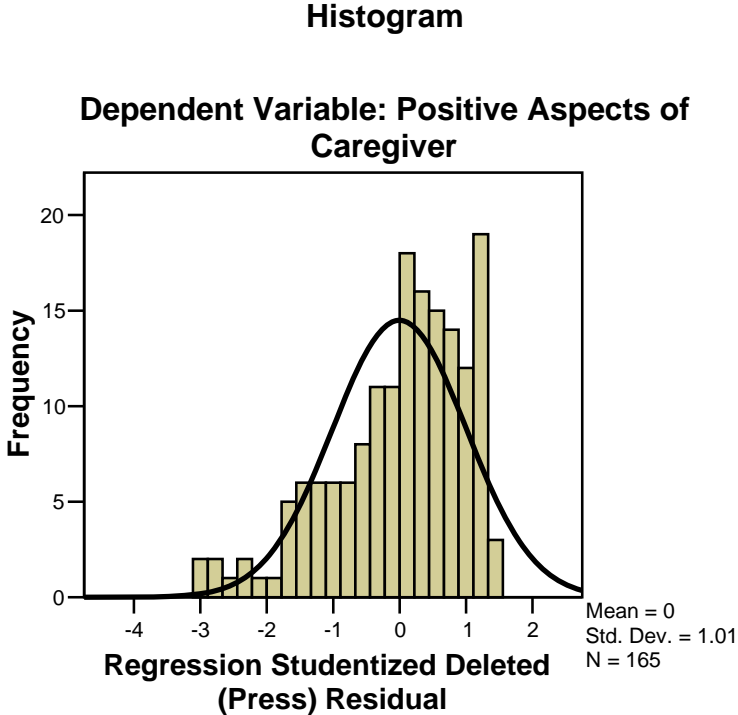


**Figure 21. Frequency of Jackknife residuals of Model 14**

Model 15: ethnicity and education predicts PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**



Mean = 0
Std. Dev. = 1.009
N = 165
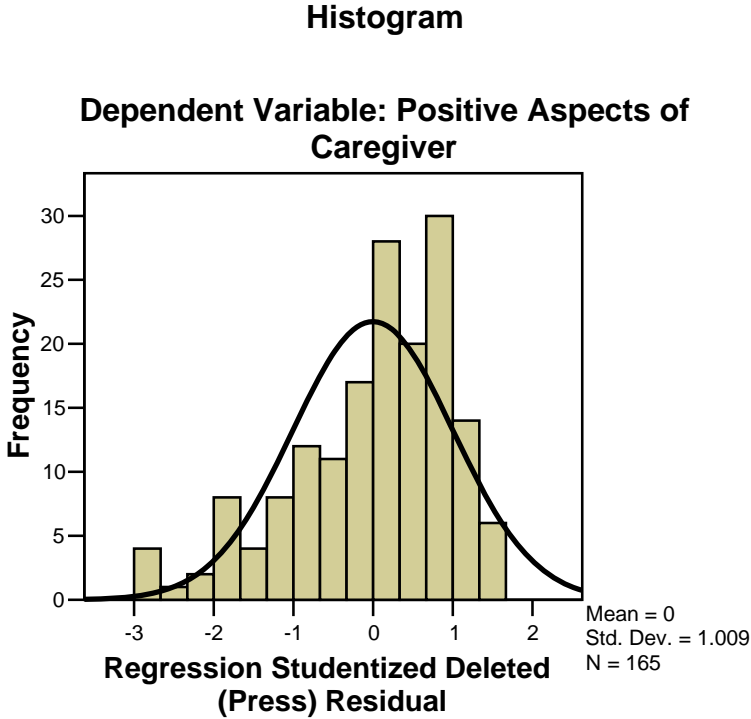
**Figure 22. Frequency of Jackknife residuals of Model 15**

56

Model 16: ethnicity predicts SES

**Histogram**

**Dependent Variable: centralized ses**



Mean = -3.16E-4
Std. Dev. = 1.006
N = 164
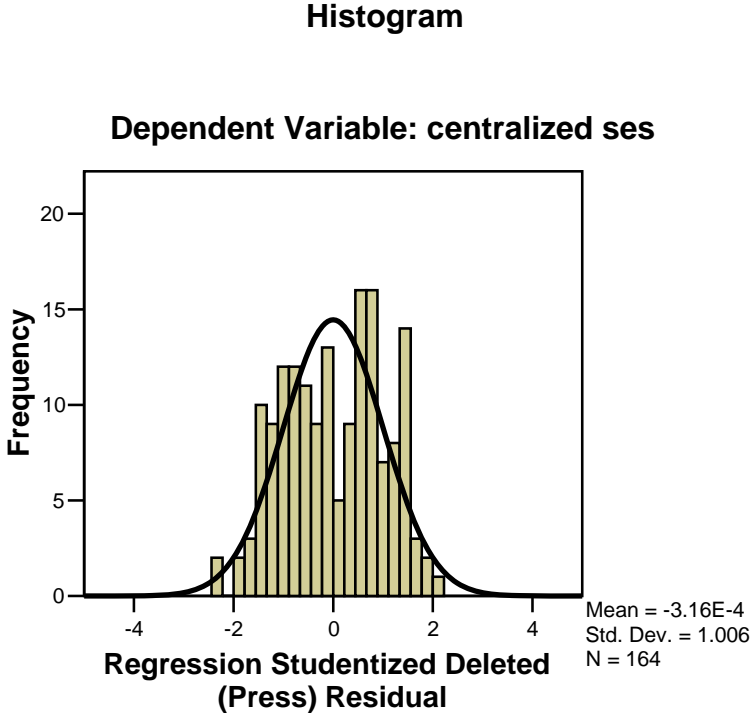
**Figure 23.  Frequency of Jackknife residuals of Model 16**

Model 17: SES predicts PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**



Mean = 0
Std. Dev. = 1.01
N = 164
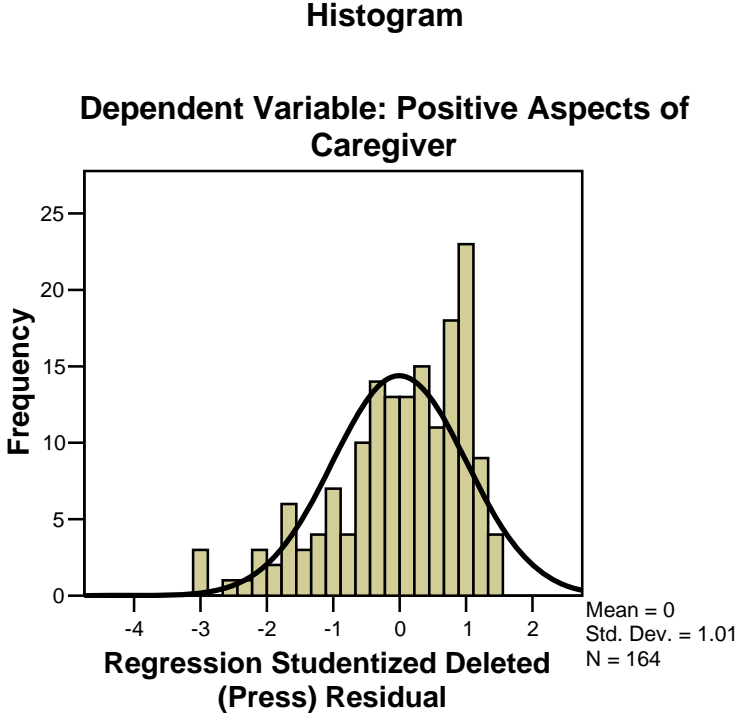
**Figure 24. Frequency of Jackknife residuals of Model 17**

Model 18: SES and ethnicity predict PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**
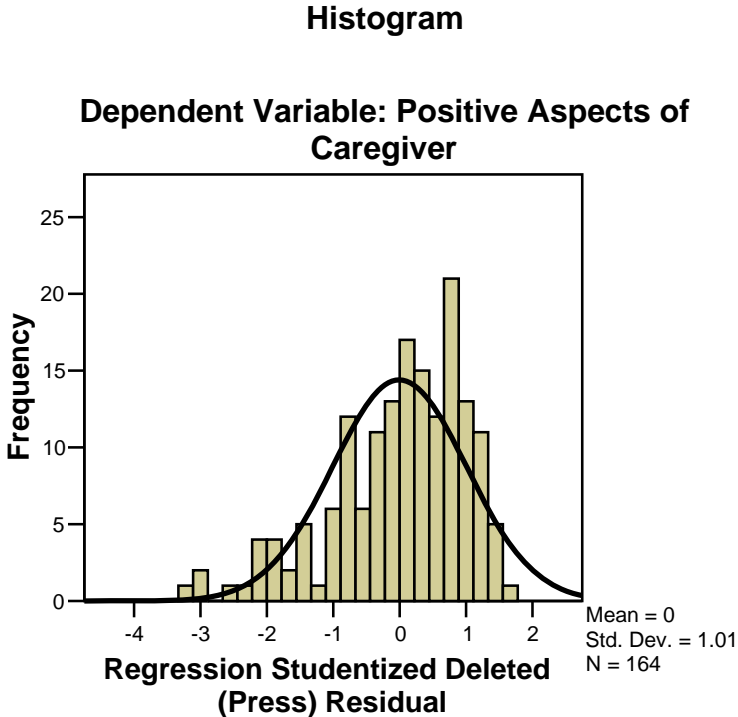


**Figure 25. Frequency of Jackknife residuals of Model 18**

Model 19: ethnicity, education and SES predicts PAC

**Histogram**

**Dependent Variable: Positive Aspects of Caregiver**
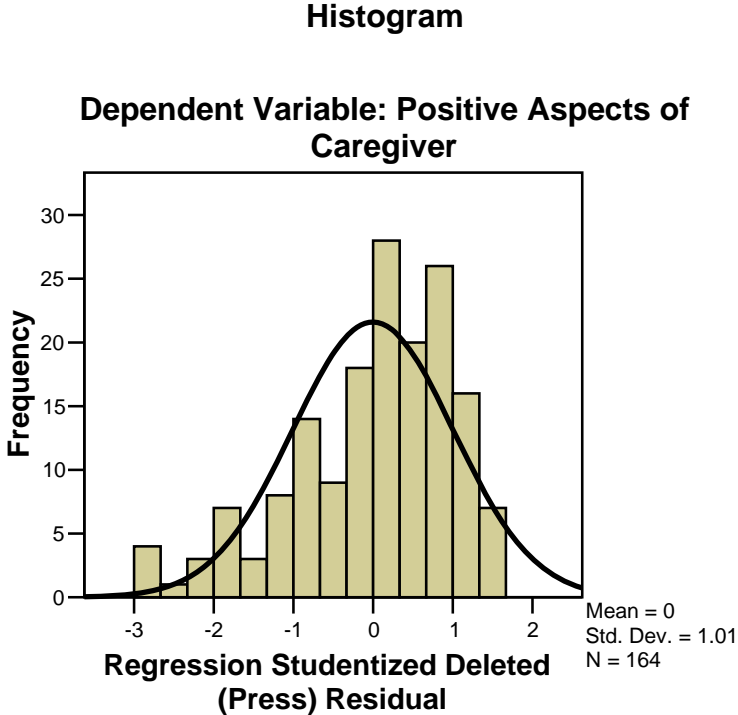


Mean = 0
Std. Dev. = 1.01
N = 164

**Figure 26.  Frequency of Jackknife residuals of Model 19**

**Scatterplot**

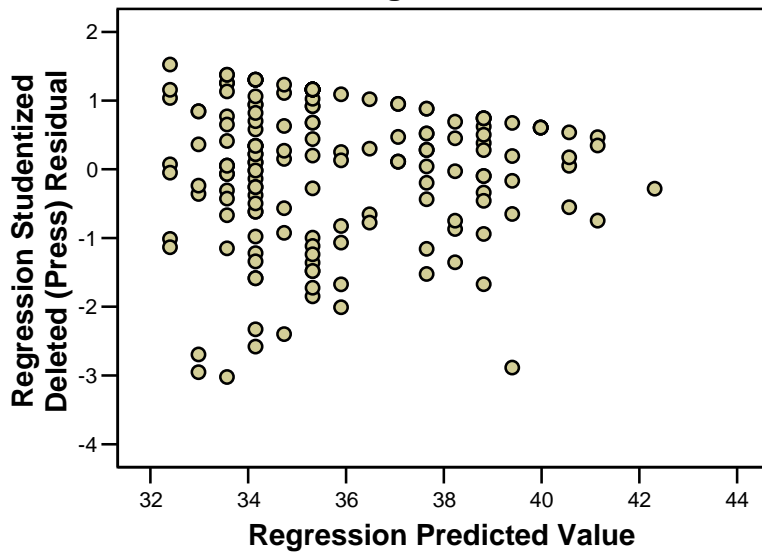**Dependent Variable: Positive Aspects of Caregiver**



Figure 27. Scatterplot of Jackknife residuals vs. Predicted PAC of Model 14

**Scatterplot**

**Dependent Variable: Positive Aspects of Caregiver**



Figure 28.  Scatterplot of Jackknife residuals vs. Predicted PAC of Model 15

**Scatterplot**

**Dependent Variable: Positive Aspects of Caregiver**



Figure 29. Scatterplot of Jackknife residuals vs. Predicted PAC of Model 17

**Scatterplot**

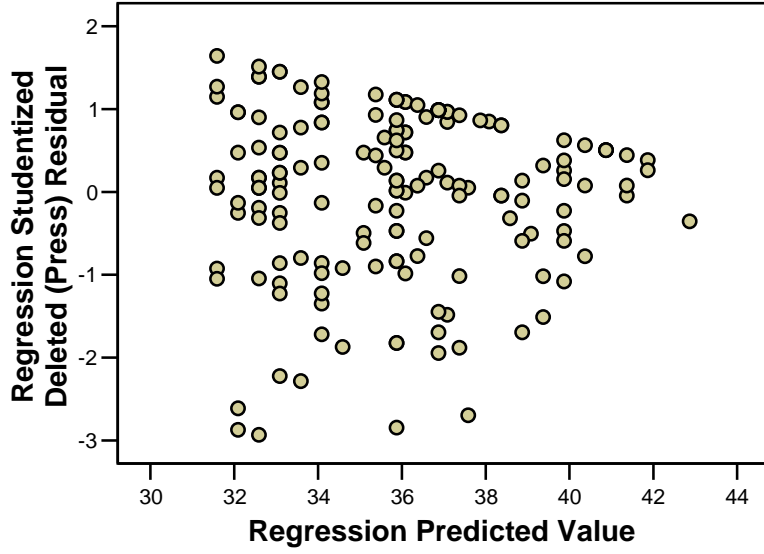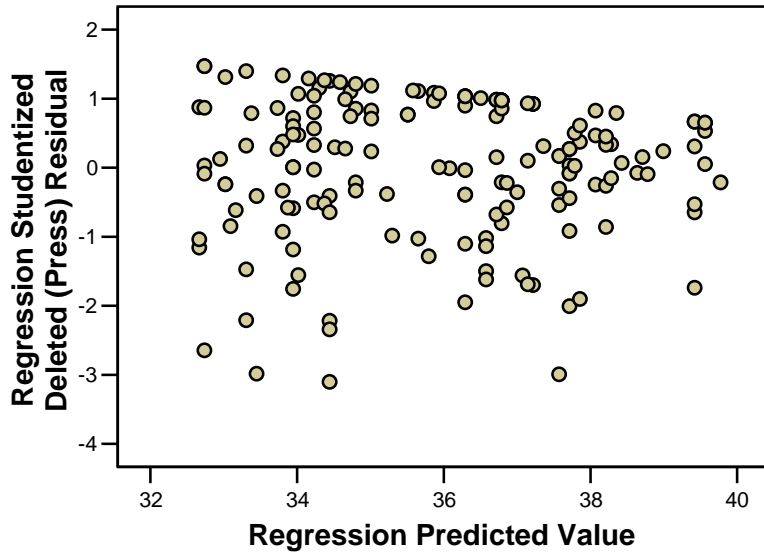**Dependent Variable: Positive Aspects of Caregiver**
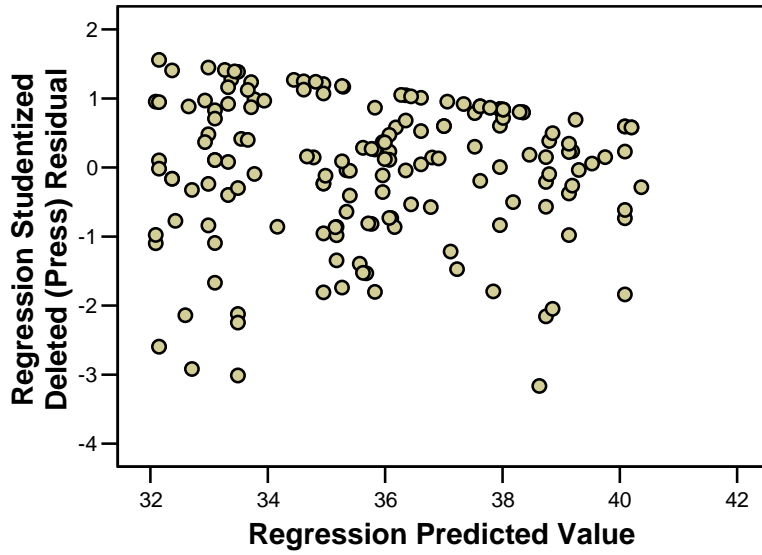


**Figure 30.  Scatterplot of Jackknife residuals vs. Predicted PAC of Model 18**

**Scatterplot**

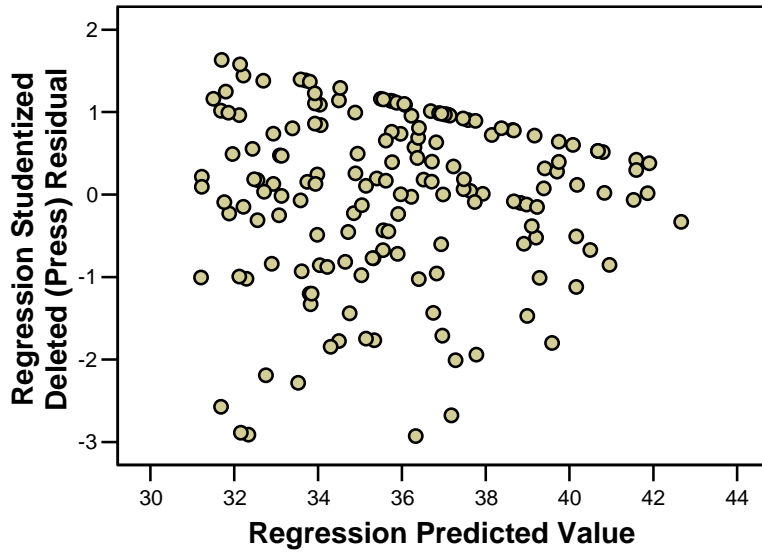**Dependent Variable: Positive Aspects of Caregiver**



Figure 31. Scatterplot of Jackknife residuals vs. Predicted PAC of Model 19

**Bibliography**

1.      Tarlow BJ, Wisniewski SR, Belle SH, Rubert MG, G TD. Positive Aspects of Caregiving:Contributions of the REACH Project to the Development of New Measures for Alzheimer's Caregiving. Research on aging 2004;26(4):429-453.
2.      Hunt CK. Concepts in Caregiver Research. Journal of Nursing Scholarship 2003;35(1):27-32.
3.      Cohen C, Colantonio A, Vernich L. Positive aspects of caregiving: rounding out the caregiver experience. International Journal of Geriatric Psychiatry 2002;17(2):184-188.
4.      Phillips LR, Ardon ETd, Komnenich P, Killeen M, Rusinak R. The Mexican American Caregiving Experience. Hispanic Journal of Behavioral Sciences 2000;22(3):296-313.
5.      Adams B, Aranda MP, Kemp B, Takagi K. Ethnic and Gender Differences in Distress Among Anglo American, African American, Japanese American, and Mexican American Spousal Caregivers of Persons with Dementia. Journal of Clinical Geropsychology 2002;8(4):279-301.
6.      Schulz R, Burgio L, Burns R, Eisdorfer C, Gallagher-Thompson D, Gitlin L, et al. Resources for Enhancing Alzheimer's Caregiver Health (REACH): overview, site-specific outcomes, and future directions. Gerontologist 2003;43(1):514-520.
7.      Coon DW, Rubert M, Solano N, Mausbach B, Kraemer H, T A, et al. Well-being, appraisal, and coping in Latina and Caucasian female dementia caregivers: findings from the REACH study. Aging and Mental Health 2004;8(4):330-345.
8.      Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality & Social Psychology. 1986;51(6):1173-1182.
9.      Roff L, Burgio L, Gitlin L, Nichols L, Chaplin W, Hardin JM. Positive aspects of Alzheimer's caregiving: the role of race. Journals of Gerontology Series B: Psychological Sciences and Social Sciences 2004;59(4):185-190.
10.     Krause N. Religiosity and self-esteem among older adults. Journals of Gerontology Series B: Psychological Sciences and Social Sciences 1995;50(5):236-246.
11.     Chang BH, Noonan AE, Tennstedt S. The role of religion/spirituality in coping with caregiving for disabled elders. Gerontologist 1998;38(4):463-470.
12.     Miltiades HB, Pruchno R. The Effect of Religious Coping on Caregiving Appraisals of Mothers of Adults With Developmental Disabilities. The Gerontologist 2002;42(1):82-91.
13.     Levin J, Markides K, Ray L. Religious attendance and psychological well-being in Mexican Americans: a panel analysis of three-generations data. The Gerontologist 1996;36(4):454-463.
14.     Calderon V, Tennstedt SL. Ethnic differences in the expression of caregiver burden: results of a qualitative study. Journal of Gerontological Social Work 1998;20:159-178.
15.     Nijboer C, Triemstra M, Tempelaar R, Mulder M, Sanderman R, Bos GAMvd. Patterns of Caregiver Experiences Among Partners of Cancer Patients. Gerontologist 2000;40:738-746.
16.     Nijboer C, M.Sc., Triemstra M, Tempelaar R, 2 MS, Sanderman R, et al. Determinants of caregiving experiences and mental health of partners of cancer patients. Cancer 1999;86(4):577-588.
17.     Cohen C, Teresi J, Blum C. The role of caregiver social networks in Alzheimer's disease. Social Science and Medicine 1994;38(11):1483-1490.

18.     Harwood DG, Barker WW, Ownby RL, Bravo M, Aguero H, Duara R. Predictors of positive and negative appraisal among Cuban American caregivers of Alzheimer's disease patients. International Journal of Geriatric Psychiatry 2000;15:481-487.

19.     Chen F-p, Greenberg JS. A Positive Aspect of Caregiving: The Influence of Social Support on Caregiving Gains for Family Members of Relatives with Schizophrenia. Community Mental Health Journal 2004;40(5):423-435.

20.     Navaie-Waliser M, Feldman PH, Gould DA, Levine C, Kuerbis AN, Donelan K. The Experiences and Challenges of Informal Caregivers: Common Themes and Differences Among Whites, Blacks, and Hispanics. Gerontologist 2001;41(6):733-741.

21.     Tennstedt SL, Chang BH, Delgado M. Patterns of long-term care: A comparison of Puerto Rican, African-American, and Non-Latino White elders. Journal of Gerontological Social Work 1998;30:179-199.

22.     Sabogal F, Marin G, Otero-Sabogal R, Marin BV, Perez-Stable EJ. Hispanic familism and acculturation: What changes and what doesn't? Hispanic Journal of Behavioral Sciences 1987;9:397-412.

23.     Pousada L. Hispanic-American elders. Implications for health-care providers. Clinics in Geriatric Medicine 1995;11(1):39-52.

24.     Tran T. Ethnicity, gender and social stress among three groups of elderly Hispanics. Journal of cross-cultural gerontology 1997;12(4):341-356.

25.     Hajat A, Lucas J, Kington R. Health outcomes among Hispanic subgroups: data from the National Health Interview Survey, 1992-95. Advance Data 2000;25:1-14.

26.     Wisniewski SR, Belle SH, Coon DW, Marcus SM, Ory MG, Burgio LD, et al. The Resources for Enhancing Alzheimer's Caregiver Health (REACH): Project design and baseline characteristics. Psychology and Aging 2003;18(3):375-384.

27.     Folstein MF, Folstein SE, McHugh PR. Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research 1975;12:189-198.

28.     Lawton MP, Brody E. Assessment of older people: Self-maintaining and instrumental activities of daily living. Gerontologist 1969;9:179-186.

29.     Nam CB, Terrie EW. 1980-based NAM-Powers Occupational Status Scores. Working Paper Series 1988:88-148.

30.     Teri L, Truax P, Logsdon R, Uomoto J, Zarit S, Vitaliano PP. Assessment of behavioral problems in dementia: The revised memory and behavior problems checklist (RMBPC). Psychology and Aging 1992;7:622-631.

31.     Barrera M, Sandler IN, Ramsay TB. Preliminary development of a scale of social support: Studies on college students. American Journal of Community Psychology 1981;9:435-447.

32.     Lubben JE. Assessing social networks among elderly populations. Journal of Family and Community Health 1988;11:42-52.

33.     Krause N. Negative interaction and satisfaction with social support among older adults. Journals of Gerontology Series B: Psychological Sciences and Social Sciences 1995;50(2):59-73.

34.     Krause N, Markides KS. Measuring Social Support among Older Adults. International Journal of Aging and Human Development 1990;30:37-54.

35.     Kraemer HC, Stice E, Kazdin A, Offord D, Kupfer D. How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. American Journal of Psychiatry 2001;158:848-856.

36.     Judd CM, Kenny DA. Process analysis: Estimating mediation in treatment evaluations. Evaluation Review 1981;5:602-619.
37.     MacKinnon DP, Dwyer JH. Estimating mediated effects in prevention studies. Evaluation Review 1993;17:144-158.
38.     Kraemer H, Wilson G, Fairburn C, Agras W. Mediators and moderators of treatment effects in randomized clinical trials. Archives of General Psychiatry 2002;59(10):877-83.
39.     Sobel ME. Asymptotic confidence intervals for indirect effects in structural equation models. Sociological methodology 1982:290-312.
40.     MacKinnon DP, Warsi G, Dwyer JH. A simulation study of mediated effect measures. Multivariate Behavioral Research 1995;30:41-62.