The Moderating Influence of Demographic Characteristics, Social Support, and Religious Coping on the Effectiveness of a Multicomponent Psychosocial Caregiver Intervention in Three Racial Ethnic Groups

Chin C. Lee,[1] Sara J. Czaja,[2] and Richard Schulz[3]

[1]Center on Aging and [2]Department of Psychiatry and Behavioral Sciences, University of Miami Miller School of Medicine, Florida.
[3]Department of Psychiatry and University Center for Social and Urban Research, University of Pittsburgh, Pennsylvania.

This article extends the findings from the Resources for Enhancing Alzheimer's Caregiver Health (REACH II) program, a multisite randomized clinical trial of a multicomponent psychosocial intervention, to improve the well-being of informal caregivers (CGs) of persons with dementia. We used residual change scores and stepwise hierarchical regression analyses to explore separately in 3 racial ethnic groups (Hispanic or Latino, Black or African American, and White or Caucasian) how the effects of the intervention were moderated by CG characteristics (sex, age, education, and relationship), CG resources (social support), and religious coping. The results indicated that CG's age and religious coping moderated the effects of the intervention for Hispanics and Blacks. The older Hispanic and Black CGs who received the intervention reported a decrease in CG burden from baseline to follow-up. Black CGs with less religious coping who received the intervention also reported a decrease in depressive symptoms from baseline to follow-up.

Key Words: Caregiving—Psychotherapy—Social support—Well-being.

BACKGROUND

Recent estimates indicate that 5.2 million Americans have Alzheimer's disease (AD), and this number is projected to increase to about 8 million by 2030 (Alzheimer's Association, 2008). Most patients who have AD live at home and are cared for by family members. There is strong evidence that providing care to someone who suffers from dementia has a significant impact on the caregiver's (CG's) well-being and is associated with an increased risk for distress, depression, and medical comorbidities (Pinquart & Sörensen, 2005; Schulz & Martire, 2004). Therefore, it is important to understand factors that influence a CG's adaptation to the caregiving role and to identify strategies to alleviate CG distress.

There have been numerous studies testing interventions designed to alleviate CG burden and depression and other health-related effects of caregiving. However, there are relatively few well-controlled randomized trials with sufficient sample size and ethnic diversity (Schulz, Martire, & Klinger, 2005). The Resources for Enhancing Alzheimer's Caregiver Health (REACH) initiative established in 1995 (Schulz et al., 2003) was designed to address some of the existing limitations in the literature. The study was carried out in two phases. In Phase 1 (REACH I), multiple different interventions were tested at six sites in the United States to identify the most promising approaches to decreasing CG distress. Results from this study showed that active treatments were superior to control conditions in reducing CG

burden and that active engagement in skills training significantly reduced CG depression (Gitlin et al., 2003; Schulz et al., 2003). The findings also indicated that the effectiveness of the various treatment strategies varied according to the ethnic or cultural background of the CG (Burgio, Stevens, Guy, Roth, & Haley, 2003; Eisdorfer et al., 2003; Gitlin et al.).

REACH II, a multisite, randomized controlled clinical trial, was guided by the findings from REACH I and designed to maximize outcomes by systematically targeting multiple problem areas, tailoring the intervention to respond to individual variation in need, and actively engaging the CG in the intervention process. Quality of life was operationalized as a multivariate construct composed of five indicators (CG depression, caregiving burden, CG self-care, CG social support, and care recipient [CR] problem behaviors). Overall, the data from the REACH II trial (Belle et al., 2006) indicated that the intervention improved the quality of life for Hispanic and White CGs but not for Black CGs. Planned follow-up analyses showed a significant interaction between CG and CR relationship for the Blacks, indicating improved quality of life for spouse CGs who received the intervention but not other family members who served as primary CGs (Belle et al.). The treatment group by CG relationship interaction effect found for the Blacks coupled with differences in response to the intervention among the three ethnic groups underscores the importance of systematically exploring the effects of potential moderators, such as CG characteristics on the effects of the intervention.

Ultimately, understanding how responses to interventions vary among racial ethnic groups will allow us to more effectively design and target intervention programs for diverse CG populations.

The goal of the article was to extend the findings of REACH II to further understand the differences in response to the intervention among the three racial ethnic groups (Hispanic or Latino, Black or African American, and White or Caucasian, hereinafter referred to as Hispanic, Black, and White, respectively) included in the REACH II sample. Specifically, we examined (a) how responses to the intervention in each of the three racial ethnic groups were moderated by CG background characteristics (e.g., sex, age, relationship, education), resources (social support), and coping processes (religious coping) and (b) how resources and coping processes varied across the racial ethnic groups. The CG outcome measures included in the analyses were CG depression and CG burden. We selected these measures because they are widely used outcome measures in evaluating the effectiveness of caregiving interventions.

Our analyses were guided by the Stress Process Model (SPM) of caregiving (Pearlin, Mullan, Semple, & Skaff, 1990), which views the consequences of caregiving as resulting from the interrelationships among several factors including the socioeconomic characteristics (e.g., age, sex, relationship) and resources (e.g., social support) of the CGs, the primary and secondary stressors to which they are exposed, and the CG's appraisal of these stressors. The literature also suggests that race or ethnicity of the CG is an important component of this model as differences exist in CG characteristics (e.g., education, sex), the intensity of CG stressors, the availability of resources, and coping processes (Hilgeman et al., 2009; Pinquart & Sörensen, 2005) among racial and ethnic groups. Furthermore, these differences have been linked to differences in CG outcomes (e.g., Pinquart & Sörensen). Thus, we hypothesized that these differences may have moderated responses to the REACH II intervention program.

In terms of CG characteristics, we chose to examine CG age as a potential moderator as the results of a recent meta-analysis examining the effectiveness of CG interventions showed that interventions yielded larger improvements on measures of burden, subjective well-being, and knowledge for older CGs (Sörensen, Pinquart, & Duberstein, 2002). Although the findings are mixed, data also suggest that age differences in response to the caregiving experience vary somewhat according to ethnicity. For example, studies have shown a positive association between age and CG burden among Whites but a negative association among Blacks (Cox, 1993; Lawton, Rajagopal, Brody, & Kleban, 1992). We hypothesized that the influence of age on response to the REACH intervention might vary according to the ethnicity of the CG, with larger treatment effects for older than younger Whites and no differences in treatment effects among younger and older Blacks and Hispanics.

We also examined interactions between sex and ethnicity as there are findings that suggest that sex differences in caregiving outcomes may be moderated by ethnicity. For example, Sörensen and Pinquart (2005) found that female CGs who were Black and Hispanic reported worse perceived health than male CGs, but no differences were found among Whites. Other studies have shown that CG burden is lower among Black men compared with White men (Zuroff et al., 2000). Thus, we predicted that responses to the intervention among the three ethnic groups might vary according to the gender of CG.

The literature also suggests that the influence of CG relationship on CG outcomes also varies according to the ethnicity of CG (Sörensen & Pinquart, 2005). In general, differences between spouses and nonspouses in response to caregiving are more pronounced among minority CGs than White CGs. Thus, we expected that CG relationship would emerge as an important moderator of intervention effects. Finally, we examined education as minority CGs tend to be less educated than White CGs (Pinquart & Sörensen, 2005), thus placing them at a greater potential risk for negative outcomes.

Religious coping was selected as a potential moderator in our analyses because of ethnic differences in the use of these strategies to cope with caregiving demands (Cox, 1993; Navaie-Waliser et al., 2001; Picot, Debanne, Namazi, & Wykle, 1997). In the REACH I sample, religious coping was greater for the Hispanic and Black CGs compared with the White CGs (Haley et al., 1996). Morano and King (2005) also found that significant differences existed among Black, Hispanic, and White CGs in religiosity (i.e., attendance at religious events, perception of the role of religion as a source of comfort). The results indicated that Black CGs had the highest level of religiosity, followed by Hispanic and White CGs. Higher levels of religiosity may buffer a CG's exposure to stressors.

We chose to examine social support as a moderator because of the substantive evidence suggesting that these resources are linked to CG outcomes (Gallagher-Thompson et al., 2003; Haley et al., 1996; Kiecolt-Glaser, Dura, Speicher, Trask, & Glaser, 1991; Roth, Mittleman, Clay, Madan, & Haley, 2005). The literature also indicates that CGs from ethnic minorities tend to have more support from family and friends than White CGs (Pinquart & Sörensen, 2005). We hypothesized that ethnic differences in religious coping and social support would also emerge as important moderators of the REACH intervention effects.

In summary, psychosocial interventions have been shown to be effective in alleviating CG's burden and depression and increasing CG well-being and knowledge (Brodaty, Green, & Koschera, 2003; Schulz et al., 2005). However, the effectiveness of these interventions varies among CGs, and there is not a "one size fits all" intervention strategy. Understanding how CG background variables, resources, and coping processes moderate responses to caregiving interventions will help identify those CGs who are at greatest

risk for adverse outcomes and who might benefit more from psychosocial interventions. In addition, these types of analyses may also provide guidance regarding how interventions need to be changed to make them more effective.

METHODS

Overview of REACH II Program

The REACH II program was designed to systematically evaluate a structured multicomponent intervention that targeted several areas associated with CG risk (depression, burden, self-care and healthy behaviors, social support, and problem behaviors) (Belle et al., 2006). Eligible participants completed an initial baseline assessment and were randomized to an active intervention or information-only control group. A follow-up assessment battery, on the basis of CR status at follow-up (full follow-up, bereavement, or placement assessment battery), was administered to study participants 6 months after randomization. All intervention and assessment materials were standardized, available in English and Spanish, and administered by certified assessors. (For a further description of the assessment material and intervention protocol, see Belle et al.)

Sample

A total of 642 CG and CR dyads participated in the REACH II program across all the five sites (Birmingham, Memphis, Miami, Palo Alto, and Philadelphia). The sample included 212 (33.0%) Hispanic, 219 (34.1%) White, and 211 (32.9%) Black CGs. CGs had to be (a) living with or sharing cooking facilities with the CR, (b) providing care for at least 4 hr per day for at least the past 6 months for a relative who is diagnosed with AD or related disorders, and (c) reporting distress (e.g., felt overwhelmed, angry, frustrated) with caregiving. CGs were excluded if (a) they were involved in another caregiving intervention study, (b) had participated in REACH I, or (c) had an illness that would prevent study participation. CRs were excluded if they had a history of severe mental illness, head injury, Parkinson's disease, or stroke. In addition, CRs were excluded if they were bedbound and scored 0 on the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975). CRs who scored more than 23 on the MMSE were required to provide a physician's diagnosis of AD or related disorder. The CR's level of activities of daily living (ADL) impairment was measured using a revised version of the Activities of Daily Living scale (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963), and instrumental activities of daily living (IADL) impairment was measured using the Lawton IADL scale (Lawton & Brody, 1969).

Outcome Measures

Depression.—The 10-item version of the Center for Epidemiological Studies-Depression scale (CES-D) (Irwin,

Artin, & Oxman, 1999; Radloff, 1977) was used to assess symptoms of depression. Scores ranged from 0 through 30, with higher scores indicating more depressive symptoms; a score of 8 (equivalent to 16 on the full 20-item scale) reflects depressive symptomotology (Andresen, Malmgren, Carter, & Patrick, 1994; Irwin et al.) (Cronbach's alpha for Hispanics, Blacks, and Whites = .851, .800, and .807, respectively).

CG burden.—The brief version (12 items) of the Zarit Caregiver Burden Interview (Bedard et al., 2001; Zarit, Orr, & Zarit, 1985) was used to assess CG burden. One item was removed because it was not applicable to CGs whose CR was institutionalized. The burden score was based on the sum of 11 questions. CGs rated each item on a 5-point scale from 0 (*never*) to 4 (*nearly always*). Score ranged from 0 to 44, where a higher score indicated a higher level of burden (Cronbach's alpha for Hispanics, Blacks, and Whites = .844, .820, and .865, respectively).

Moderating Variables

CG characteristics.—CG characteristics included as moderator variables were age, sex, educational level, and caregiver–care recipient (CG-CR) relationship (i.e., spouse vs. nonspouse).

Social support.—The measure of social support encompassed 10 items from three domains: received support (Barrera, Sandler, & Ramsay, 1981; Krause, 1995), satisfaction with support (Krause; Krause & Markides, 1990), and negative interactions (Krause). All items had a 4-point scale that ranged from 0 (*never*) to 3 (*very often*) (Belle et al., 2006). We used a composite measure as social support represents a multidimensional construct that encompasses available support and both positive and negative aspects of that support. The total score reflected the sum of all items after recoding the negative interactions' responses and ranged from 0 to 30, with higher scores indicating higher social support (Cronbach's alpha for Hispanics, Blacks, and Whites = .690, .770, and .772, respectively).

Religious coping.—The short form of the Brief Religious Coping (six items) was used to assess the positive and negative aspects of religious coping (Pargament, Smith, Koenig, & Perez, 1998). All items had a 4-point scale ranging from 0 (*a great deal*) to 3 (*not at all*). The total score reflects the sum of all six items after recoding the positive factor items and ranged from 0 to 18, with higher scores indicating higher levels of religious coping (Cronbach's alpha for Hispanics, Blacks, and Whites = .695, .685, and .807, respectively).

Statistical Procedures

Analysis of variance (ANOVA) was used to examine differences among the three racial ethnic groups in CGs' age,

years of education, perceived social support, religious coping, and CG burden and depression. Differences in CRs' characteristics (e.g., age, level of impairments) were also analyzed using ANOVA. Post hoc analyses for significant effects were performed using Scheffé's multiple comparison ($\alpha = .05$). For categorical variables such as sex, CG-CR relationship, and income level, the chi-square test was used. The alpha level (α) was set at .05 (two-sided test) for all analyses.

Repeated measures analyses were used to examine the main effect of the intervention on CG depression and burden for each ethnic group. In order to obtain a measure of change in these outcome measures, residualized change scores were calculated by regressing the follow-up value on the baseline value. Stepwise hierarchical regression analyses were then used to test for the effect of the intervention on change in CG depression and burden and interactions between treatment condition and the moderating variables. Separate regression analyses were conducted for each outcome variable and for each racial ethnic group to reflect study design. Each moderator was tested using a separate equation. Treatment condition (intervention vs. information-only control group) was entered in the first step. The moderating variables were entered in the second step, and the two-way interactions (treatment condition by each of the moderating variables) were entered in the third step. Following the individual regressions, a final hierarchical regression model was used to simultaneously test all the significant main effect variables, moderating variables, and interactions.

The effect weighted coding scheme (Aiken & West, 1991) was applied to the dichotomous variables (e.g., CG sex, treatment condition) in order to facilitate interpretation of the interaction terms. The variables and the interaction terms were mean or weighted centered prior to entry into the regression model. Separate simple regression equations were computed for each of the significant interaction terms by plotting values at 1 *SD* below and above the mean (Cohen, West, Cohen, & Aiken, 2002), and tests of simple slopes were performed at $\alpha = .05$ (Aiken & West).

RESULTS

Sample Description

CGs ranged in age from 24 to 91 years ($M = 61.76$, $SD = 13.39$). The White CGs were significantly older than Black and Hispanic CGs, $M = 65.23$, $SD = 12.31$; $M = 60.13$, $SD = 13.26$; $M = 59.81$, $SD = 13.94$, respectively; $F(2, 639) = 11.521$, $p < .000$. Most of the CGs were women (82.9%); there was no significant difference in the sex of the CGs among the three racial ethnic groups. In terms of CG-CR relationship, there was a significant difference in relationship by ethnicity such that more than half of the Hispanic CGs (60.8%) and Black CGs (70.1%) were nonspouses compared with the majority of White CGs who were spouses (57.5%).

There was a significant difference in CG education among the three racial ethnic groups, $F(2, 639) = 60.133$, $p < .001$. On average, the Hispanic CGs had the least amount of education, followed by Black CGs. CG income level was also significantly different among the three racial ethnic groups, $\chi^2(8, N = 642) = 95.976$, $p < .001$. Income level was generally higher among the White CGs. Hispanic CGs had been taking care of their CR for significantly more years than the White and Black CGs, $F(2, 639) = 5.616$, $p < .01$ (Table 1).

Perceived social support, $F(2, 636) = 5.670$, $p < .05$, and religious coping, $F(2, 637) = 21.401$, $p < .001$, were also significantly different among the three racial ethnic groups. Hispanic CGs reported significantly less social support than White and Black CGs. The White CGs reported significantly lower religious coping than Hispanic and Black CGs, and the Black CGs reported significantly higher religious coping than the Hispanic CGs.

At baseline, no significant difference was observed among the CGs in symptoms of depression. There was, however, a difference in CG burden. White CGs reported significantly more burden than Black CGs, $F(2, 639) = 9.905$, $p < .0001$. No significant difference in burden was observed between Hispanic and White CGs or between White and Black CGs. As indicated by Belle et al. (2006), within each racial ethnic group, CGs in both intervention and control groups reported similar levels of depression and burden at baseline. The results of the repeated measures analyses indicated that there was no significant overall effect of the intervention on CG depression or burden for any of the three ethnic groups.

There was no difference in age of the CRs across the three racial ethnic groups ($M = 80.20$, $SD = 9.25$) or in ADL or IADL functioning. On average, the CRs needed help in performing about three ADLs activities ($M = 3.30$, $SD = 2.09$) and about six IADLs activities ($M = 6.57$, $SD = 1.88$). There was, however, a difference among the racial ethnic groups with respect to the CRs' level of cognitive impairment (MMSE) such that the White CRs were significantly less impaired than the Hispanic and Black CRs, $F(2, 639) = 11.655$, $p < .001$.

Regression Analyses for Depression (CES-D)

Hispanic or Latino CGs.—Overall, there was no effect of treatment on the change in depression from baseline to follow-up for Hispanics. As shown in Table 2, CG age ($B = .061$, $p < .05$) influenced the amount of change in depression from baseline to follow-up. Older Hispanic CGs reported significantly more depressive symptomatology than the younger Hispanic CGs.

Black or African American CGs.—For the Black CGs, the effect of the intervention on change in depressive symptoms was moderated by religious coping ($B = .618$, $p < .05$)

Table 1. Characteristics of CGs and CRs

	Hispanic/Latino (*n* = 212)	Black/African American (*n* = 211)	White/Caucasian (*n* = 219)
CG characteristics			
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
Age***	59.81 (12.94)	60.13 (13.26)	65.23 (12.31)
Years of education***	10.84 (4.08)	13.07 (2.17)	13.78 (1.97)
Years taking care of CR*	6.13 (9.91)	4.22 (5.24)	4.02 (5.39)
Perceived social support**	16.53 (5.47)	18.08 (5.86)	18.15 (5.52)
Religious coping***	14.67 (3.29)	15.81 (2.76)	13.62 (4.17)
	n (%)	*n* (%)	*n* (%)
Sex			
Male	38 (17.9)	34 (16.1)	38 (17.4)
Female	174 (82.1)	177 (83.9)	181 (82.6)
Relationship to CR***			
Spouse	83 (39.2)	63 (29.9)	126 (57.5)
Nonspouse	129 (60.8)	148 (70.1)	93 (42.5)
Income level***			
Refuse/unknown	9 (4.3)	11 (5.2)	10 (4.6)
<$20,000	113 (53.3)	77 (36.5)	32 (14.6)
$20,000–$39,999	56 (26.4)	67 (31.8)	65 (29.7)
≥$40,000	34 (16.0)	56 (26.5)	112 (51.1)
Religious events' attendance***			
Low	115 (54.2)	53 (25.1)	104 (47.5)
High	97 (45.8)	158 (74.9)	115 (52.5)
CR characteristics			
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
Age*	79.17 (9.52)	81.34 (8.98)	80.10 (9.16)
ADL limitation	3.39 (2.14)	3.34 (2.01)	3.18 (2.13)
IADL limitation	6.55 (2.02)	6.52 (1.71)	6.64 (1.90)
MMSE***	11.42 (7.01)	12.48 (7.37)	14.40 (7.53)
	n (%)	*n* (%)	*n* (%)
Sex**			
Male	77 (36.3)	78 (37.0)	114 (52.1)
Female	135 (63.7)	133 (63.0)	105 (47.9)

Notes: ADL = activities of daily living; IADL = instrumental activities of daily living; CG = caregivers; CR = care recipients; MMSE = Mini-Mental State Examination.

*p < .05; **p < .01; ***p < .001.

(Table 2). The test of simple slopes indicated that among CGs with less religious coping, those who received the intervention reported a significantly greater decrease in depressive symptoms at follow-up than those who received the control condition, $t(185) = 2.280$, $p < .05$ (Figure 1).

White or Caucasian CGs.—There was no effect of the intervention on change in depression symptoms among the White CGs. The interaction effects were also not significant (Table 2).

Regression Analyses for CG Burden

Hispanic or Latino CGs.—Among Hispanic CGs, treatment effects on change in burden were moderated by CG age ($B = -.155$, $p < .05$). The test of simple slopes indicated that among the older CGs, those who received the intervention reported a decrease in burden from baseline to follow-up, whereas those in the control condition reported an increase in burden, $t(169) = -1.859$, $p > .05$ (Figure 2).

Black or African American CGs.—The results for Black CGs are summarized in Table 3. Overall, CGs who received the intervention reported a decrease in burden from baseline to follow-up. When examining each of the CG characteristic variables separately, the effects of the treatment on change in burden from baseline to follow-up for Blacks were moderated by CG age ($B = -.188$, $p < .01$) and CG-CR relationship ($B = -4.694$, $p < .05$). With respect to the moderating effect of age, the test of simple slopes indicated that older CGs who received the intervention reported a significant decrease in burden at follow-up, whereas those assigned to the control condition reported an increase in burden, $t(169) = -3.380$, $p < .01$ (Figure 3). Among the younger CGs, the intervention did not have a significant effect on change in burden, $t(169) = .704$, $p > .05$. With respect to the moderating effect of CG-CR relationship (Figure 4), spouses who received the intervention reported a decrease in burden at follow-up, whereas those assigned to the control condition reported an increase in burden.

A final hierarchical regression analysis was conducted in which all the main effect variables (CG age, CG-CR

Table 2. Hierarchical Regression Model for the Predicted Change of Depression (CES-D) at Follow-up for Each Race or Ethnic Group

	Moderating variables											
	Social support		CG age		CG-CR relationship		CG sex		CG education		Religious coping	
	B	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*
Hispanic												
Tx	−1.076	.728	−1.039	.715	−1.094	.721	−1.105	.725	−1.032	.733	−1.076	.723
Mod	.006	.068	.061*	.026	1.339	.738	−.592	.968	−.044	.089	−.022	.113
Tx × Mod	−.089	.136	.027	.051	.068	1.476	2.274	1.931	−.047	.179	−.346	.226
R^2	.014		.044		.030		.021		.014		.024	
Adj. R^2	−.002		.028		.014		.005		−.002		.008	
ΔR^2	.002		.001		.000		.007		.000		.012	
ΔF	.428		.266		.002		1.387		.070		2.332	
Black/African American												
Tx	−.520	.699	−.617	.712	−.591	.706	−.609	.702	−.597	.706	−.616	.695
Mod	−.114	.061	.006	.028	−.194	.766	−1.044	1.004	−.059	.161	.084	.130
Tx × Mod	−.143	.121	−.028	.055	−.097	1.532	2.299	2.007	−.056	.322	.618*	.260
R^2	.027		.006		.004		.016		.005		.038	
Adj. R^2	.011		−.011		−.012		.000		−.011		.022	
ΔR^2	.007		.001		.000		.007		.000		.029	
ΔF	1.391		.251		.004		1.312		.030		5.657*	
White/Caucasian												
Tx	−.608	.634	−.559	.632	−.606	.635	−.580	.635	−.588	.636	−.583	.637
Mod	−.079	.057	.046	.026	.866	.640	.552	.820	−.181	.158	−.005	.076
Tx × Mod	−.062	.114	.053	.052	.536	1.281	1.773	1.643	−.083	.316	−.183	.151
R^2	.016		.024		.014		.013		.012		.012	
Adj. R^2	.001		.009		−.001		−.002		−.003		−.003	
ΔR^2	.001		.005		.001		.006		.000		.007	
ΔF	.298		1.027		.175		1.165		.068		1.460	

Notes: Adj. R^2 = adjusted R^2; CG = caregiver; CR = care recipients; Mod = moderator; Tx = treatment.
*$p < .05$.

relationship, and treatment condition) and all significant interactions (Treatment × CG Age and Treatment × CG-CR relationship) were entered simultaneously. The results indicated that none of the terms remained significant. The treatment condition approached significance in predicting change in burden at follow-up ($p = .06$); however, this might be due to the covariation between CG relationship and age.

White or Caucasian CGs.—As indicated in Table 3, White CGs who reported more perceived social support at baseline reported a decrease in CG burden at follow-up ($B = −.226, p < .01$). There was no effect of treatment.
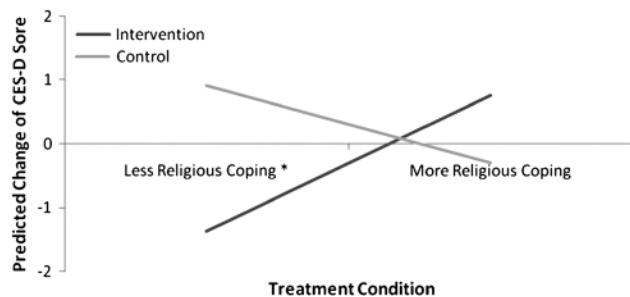

Figure 1. Interaction of Treatment Condition × Religious Coping for Black or African American caregiver depression score at the 6-month follow-up. *$p < .05$. CES-D = Center for Epidemiological Studies-Depression scale.

DISCUSSION

This article complements the previous findings of Belle et al. (2006) by examining the influence of moderating variables on outcomes of the REACH II intervention program. Previous analyses showed that Hispanic and White CGs who received the intervention had significant improvement in quality of life as measured by five indicators (CG depression, caregiving burden, CG self-care, CG social support, and CR problem behaviors), whereas for Black CGs, the improvement was observed only for spouse CGs (Belle et al.).

This article systematically explores the effects of CG demographic characteristics (age, sex, education, and relationship), resources (social support), and coping processes (religious coping) in moderating CGs' responses to the intervention for each of the three racial ethnic groups (Hispanic, Black, and White). The analyses were guided by the SPM of caregiving and recent findings indicating racial ethnic differences in background variables, the intensity of CG stressors, the availability of resources, and coping processes (Hilgeman et al., 2009; Pinquart & Sörensen, 2005).

Across all three racial ethnic groups, interaction effects were found only for Black and Hispanic CGs. Among the Black CGs, the results showed that religious coping moderated the effect of the intervention on change in depression symptoms from baseline to follow-up. Black CGs who had lower religious coping at baseline and received the intervention reported a decrease in depressive symptoms at follow-up.
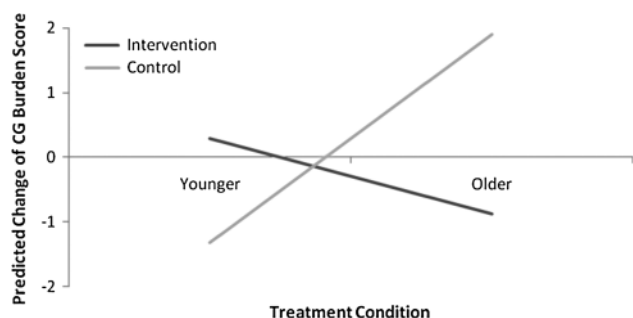
Figure 2. Interaction of Treatment Condition × Caregiver (CG) Age for Hispanic CG burden score at the 6-month follow-up.
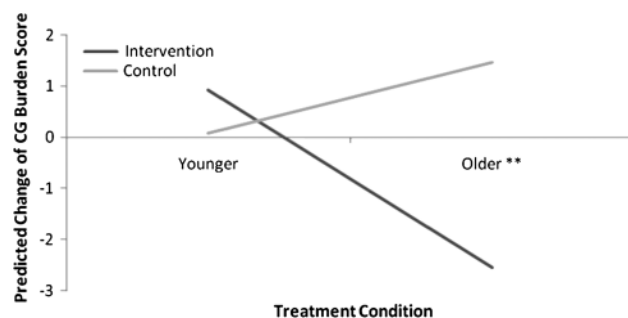

Figure 3. Interaction of Treatment Condition × Caregiver (CG) Age for Black or African American CG burden score at the 6-month follow-up. $**p < .01$.

Our data also showed, similar to findings of other investigators (Cox, 1993; Haley et al., 1996), that the Black CGs reported higher levels of religious coping than the White CGs. The fact that those with lower coping benefited more from the intervention is consistent with the idea that religious coping may make CGs more resilient and less prone to the negative consequences of stress associated with caregiving. Thus, Black CGs who reported low levels of religious coping at baseline may have been more vulnerable and in need of alternative resources for managing caregiving demands. In fact, a recent study (Sörensen & Pinquart, 2005) found that higher levels of religious coping were related to lower levels of CG depression. These findings also suggest that religiosity may be an important screening variable for targeting interventions for Black CGs. Moreover, interventions might be made more effective by linking them to religious belief systems and practices.

We also found that for Black CGs, age influenced the amount of change in burden from baseline to follow-up. The older CGs who received the intervention experienced a decrease in burden at follow-up compared with younger CGs. These findings may be due to the greater need for this type of intervention program among older minority CGs because they are less knowledgeable about the nature of AD, available resources, and strategies for dealing with the stresses and responsibilities associated with caregiving. As a result, the intervention was more effective for these CGs when compared with younger CGs. In addition, because

Table 3. Hierarchical Regression Model for the Predicted Change of Caregiver Burden Score at Follow-up for Each Race or Ethnic Group

	Moderating variables											
	Social support		CG age		CG-CR relationship		CG sex		CG education		Religious coping	
	B	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*	*B*	*SE (B)*
Hispanic												
Tx	−.630	1.064	−.576	1.051	−.590	1.061	−.509	1.058	−.683	1.072	−.598	1.063
Mod	−.109	.101	.037	.037	.393	1.078	2.446	1.400	.104	.130	.185	.168
Tx × Mod	−.110	.201	−.155*	.075	−3.000	2.156	.487	2.797	.083	.261	−.007	.337
R^2	.010		.030		.014		.020		.006		.009	
Adj. R^2	−.007		.013		−.004		.003		−.011		−.009	
ΔR^2	.002		.025		.011		.000		.001		.000	
ΔF	.299		4.316*		1.936		.030		.101		.000	
Black/African American												
Tx	−1.708*	.856	−1.590	.842	−1.715*	.841	−1.743*	.860	−1.727*	.859	−1.759*	.850
Mod	−.041	.075	−.037	.033	−.750	.917	−.311	1.278	.044	.209	.291	.156
Tx × Mod	.160	.149	−.188**	.065	−4.694*	1.834	.909	2.548	−.141	.416	.053	.311
R^2	.033		.077		.064		.024		.024		.044	
Adj. R^2	.016		.060		.047		.007		.007		.027	
ΔR^2	.007		.045		.036		.001		.001		.000	
ΔF	1.153		8.291**		6.547*		.127		.114		.029	
White/Caucasian												
Tx	−.256	.927	−.283	.947	−.278	.949	−.274	.945	−.293	.946	−.184	.935
Mod	−.226**	.083	−.014	.039	−.221	.959	1.199	1.208	.114	.229	−.198	.111
Tx × Mod	−.117	.166	.033	.078	−.841	1.918	.882	2.422	−.334	.460	.307	.221
R^2	.045		.002		.002		.007		.004		.032	
Adj. R^2	.029		−.014		−.015		−.010		−.012		.016	
ΔR^2	.003		.001		.001		.001		.003		.010	
ΔF	.497		.177		.192		.132		.528		1.926	

Notes: Adj. R^2 = adjusted R^2; CG = caregiver; CR = care recipients; Mod = moderator; Tx = treatment.
$*p < .05$; $**p < .01$.

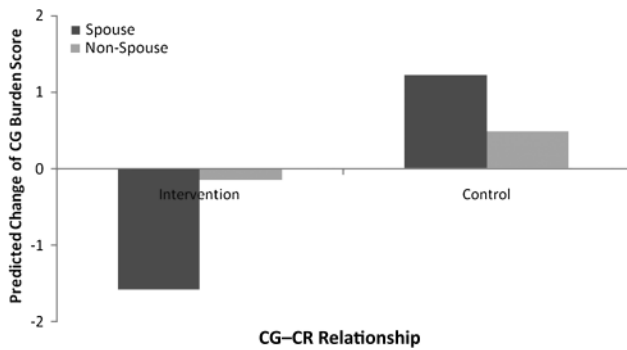Figure 4. Interaction of Treatment Condition × Caregiver–Care Recipient Relationship for Black or African American Caregiver (CG) burden score at the 6-month follow-up.

age covaries with relationship, it is likely that there are a higher proportion of spousal compared with nonspousal CGs among the older CGs. Spousal CGs are typically more involved in providing care to their partners than adult children and are more distressed by the challenges of caregiving. The finding that the age and the relationship interactions became nonsignificant when they were both entered in the regression analysis is probably due to the covariation between these two variables.

With respect to the Hispanic CGs, age was a significant predictor of change in depression such that older Hispanic CGs reported more depression from baseline to follow-up than those who were younger. This finding is in contrast to others who show that the positive association between age and CG outcomes is less among CGs who are members of minority groups (e.g., Cox, 1993). However, a recent analysis based on the REACH I sample (Sörensen & Pinquart, 2005) found that being younger was associated with higher levels of depression for Black and White CGs but not for Hispanic CGs.

A significant interaction between age and treatment was also found for Hispanic CGs. Older Hispanics who received the intervention reported a decrease in burden at follow-up, whereas those who were in the control condition reported an increase in burden. Overall, the Hispanics reported less social support than the Black CGs and White CGs. They also had lower levels of education and lower incomes. These differences may have made them more at risk to the demands of caregiving, especially those who were older and typically have less reserve and more health problems.

There were no interaction effects for the White CGs; only perceived social support had significant impact on the change in CG burden from baseline to follow-up. White CGs with more perceived social support reported lower levels of burden at follow-up when compared with baseline. These findings are consistent with other literature showing the beneficial effects of social support on the caregiving experience (Mittelman et al., 1995; Pinquart & Sörensen, 2005).

Overall, this study demonstrates that age and religiosity may be important moderators of the effects of CG interventions to members of racial ethnic minority groups. These findings have two implications. First, they can be used to target individuals most likely to benefit from treatment. The benefits of the REACH II program are likely to be greater when targeting individuals who have greater need, are older, and are less likely to use religious coping strategies. Because intervention programs are typically expensive to implement, it would be useful to have guidelines as to whom to target for maximal impact. Second, the moderators identified in this article, age, religious coping, and social support, suggest mechanisms thought to mediate the effects of the intervention on outcomes. The common denominator for these moderators is that they identify individuals who have limited external and internal coping resources and would most benefit from this type of intervention program. The findings also suggest that the intervention may need to be further adapted for CGs who have more extensive resources, such as those who are younger or those who have greater coping resources due to higher levels of religious coping in order to enhance its effectiveness for these individuals. Future research might use these findings as a general principle for applying the REACH II program.

Similar to all moderation analyses of data from randomized clinical trials (Holmbeck, 1997; Kraemer, Wilson, Fairburn, & Agras, 2002; Whisman, 1993), these analyses have a number of limitations that suggest that we need to view the results cautiously. The effects observed in the analyses were modest, and the findings of this article should be viewed as associations and not as causal relationships. Causal conclusions about the role of moderators such as age and religion would require new randomized clinical trials that stratified study participants on these dimensions. Furthermore, we were only able to examine a limited range of moderators. We chose those that the literature suggests might be important. It is possible that other moderators, such as CR's characteristics, are equally important to explore. Nevertheless, our findings provide important new directions for future studies and randomized clinical trials in caregiving research. Also, we did not find moderating effects for gender, education, or social support for any of the three racial ethnic groups. This may be due to the adaptive nature of the intervention. The REACH II program was tailored to the needs of the CG using a risk appraisal (Belle et al., 2006). For example, social support was an area targeted by the intervention, and although all CGs received this component of the intervention, the emphasis on social support varied according to the CGs' needs. Thus, if the intervention provides the CGs with what they need, it may be difficult statistically to generate interaction effects because the treatment is variable, whereas the CG characteristics are fixed. This is an issue worthy of future exploration.

Other limitations of the study are that we only had one follow-up assessment point, which makes it difficult to

assess the long-term effects of the intervention. Second, we combined Hispanic CGs from several different subgroups including Cuban, Mexican, and Puerto Rican CGs who were recruited from different sites. These groups have distinct cultures and may appraise the caregiving situation differently and have access to different resources. Finally, we did not include other minority populations such as Asians and Haitians whose numbers are increasing in CG populations.

CORRESPONDENCE

Address correspondence to Chin C. Lee, MS, MSPH, Center on Aging, University of Miami Miller School of Medicine, 1695 N.W. 9th Avenue, Suite 3208, Miami, FL 33136. Email: clee@med.miami.edu

REFERENCES

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.

Alzheimer's Association. (2008). *2008 Alzheimer's disease facts and figures*. Retrieved November 15, 2008, from http://www.alz.org/national/documents/report_alzfactsfigures2008.pdf

Andresen, E. M., Malmgren, J. A., Carter, W. B., & Patrick, D. L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D. *American Journal of Preventive Medicine*, 10, P77–P84.

Barrera, M., Sandler, I., & Ramsay, T. (1981). Preliminary development of a scale of social support: Studies on college students. *American Journal of Community Psychology*, 9, P435–P441.

Bedard, M., Molloy, D. W., Squire, L., Dubois, S., Lever, J. A., & O'Donnel, M. (2001). Zarit Burden Interview: A new short version and screening version. *The Gerontologist*, 41, P652–P657.

Belle, S. H., Burgio, L., Burns, R., Coon, D., Czaja, S. J., Gallagher-Thompson, D., Gitlin, L., Klinger, J., Koepke, K. M., Lee, C. C., et al. (2006). Enhancing the quality of life of dementia caregivers from different ethnic or racial groups. *Annals of Internal Medicine*, 145, P727–P738.

Brodaty, H., Green, A., & Koschera, A. (2003). Meta-analysis of psychosocial interventions for caregivers of people with dementia. *Journal of the American Geriatrics Society*, 51, P657–P664.

Burgio, L., Stevens, A., Guy, D., Roth, D. L., & Haley, W. E. (2003). Impact of two psychosocial interventions on White and African American family caregivers of individuals with dementia. *The Gerontologist*, 43, P568–P579.

Cohen, J., West, S. G., Cohen, P., & Aiken, L. (2002). *Applied multiple regression/correlation analysis for behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Assoc.

Cox, C. (1993). Service needs and interests: A comparison of African-Americans and White caregivers seeking Alzheimer assistance. *American Journal of Alzheimer's Disease and Other Dementias*, 3, P33–P40.

Eisdorfer, C., Czaja, S. J., Loewenstein, D. A., Rubert, M. P., Arguelles, S., Mitrani, V. B., & Szapocznik, J. (2003). The effect of a family therapy and technology-based intervention on caregiver depression. *The Gerontologist*, 43, P521–P531.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, 12, P189–P198.

Gallagher-Thompson, D., Haley, W., Guy, D., Rupert, M., Arguelles, T., Zeiss, M, Long, C., Tennstedt, S., & Ory, M. (2003). Tailoring psychological interventions for ethnically diverse dementia caregiver. *Clinical Psychology: Science and Practice*, 10, P423–P438.

Gitlin, L., Belle, S. H., Burgio, L. D., Czaja, S. J., Mahoney, D., Gallagher-Thompson, D., Burns, R., Hauck, W. W., Zhang, S., Schulz, R., et al. (2003). Effect of multi-component interventions on caregiver burden and depression: The REACH multisite initiative at 6-month follow-up. Resources for enhancing Alzheimer's caregiver health (REACH). *Psychology and Aging*, 18, P361–P374.

Haley, W. E., Roth, D. L., Coleton, M. I., Ford, G. R., West, C. A. C., Collins, R. P., & Isobe, T. L. (1996). Appraisal, coping, and social support as mediators of well-being in Black and White family caregivers of patients with Alzheimer's disease. *Journal of Consulting and Clinical Psychology*, 64, P121–P129.

Hilgeman, M. M., Durkin, D. W., Sun, F., DeCoster, J., Allen, R. S., Gallagher-Thompson, D., & Burgio, L. D. (2009). Testing a theoretical model of the stress process in Alzheimer's caregivers with race as a moderator. *The Gerontologist*, 49, P248–P261.

Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology*, 65, P599–P610.

Irwin, M., Artin, K. H., & Oxman, M. N. (1999). Screening for depression in the older adult: Criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). *Archives of Internal Medicine*, 159, P1701–P1704.

Katz, S., Ford, A. B., Moskowitz, R. W., Jackson, B. A., & Jaffe, M. W. (1963). Studies of illness in the aged. The Index of ADL: A standardized measure of biological and psychosocial function. *Journal of the American Medical Association*, 185, P914–P919.

Kiecolt-Glaser, J. K., Dura, J. R., Speicher, C. E., Trask, J., & Glaser, R. (1991). Spousal caregivers of dementia victims: Longitudinal changes in immunity and health. *Psychosomatic Medicine*, 53, P345–P363.

Kraemer, H. C., Wilson, T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*, 59, P877–P883.

Krause, N. (1995). Negative interaction and satisfaction with social support among older adults. *Journal of Gerontology: Psychological Sciences*, 50, P59–P73.

Krause, N., & Markides, K. (1990). Measuring social support among older adults. *International Journal of Aging & Human Development*, 30, P37–P53.

Lawton, M. P., & Brody, E. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist*, 9, P179–P186.

Lawton, M. P., Rajagopal, D., Brody, E., & Kleban, M. H. (1992). The dynamics of caregiving for a demented elder among Black and White families. *Journal of Gerontology: Social Sciences*, 47, S156–S164.

Mittelman, M. S., Ferris, S. H., Shulman, E., Steinberg, G., Ambinder, A., Mackell, J. A., & Cohen, J. (1995). A comprehensive support program: Effect on depression in spouse-caregivers of AD patients. *The Gerontologist*, 35, P792–P802.

Morano, C. L., & King, D. (2005). Religiosity as a mediator of caregiver well-being: Does ethnicity make a difference? *Journal of Gerontological Social Work*, 45, P69–P84.

Navaie-Waliser, M., Feldman, P. H., Gould, D. A., Levine, C., Kuerbis, A. N., & Donelan, K. (2001). The experiences and challenges of informal caregivers: Common themes and differences among Whites, Blacks, and Hispanics. *The Gerontologist*, 41, P733–P741.

Pargament, K. I., Smith, B. W., Koenig, H. G., & Perez, L. M. (1998). Patterns of positive and negative religious coping with major life stressors. *Journal for the Scientific Study of Religion*, 37, P710–P724.

Pearlin, L., Mullan, J. T., Semple, S., & Skaff, M. M. (1990). Caregiving and the stress process: An overview of concepts and their measures. *The Gerontologist*, 30, P583–P594.

Picot, S. J., Debanne, S. M., Namazi, J. K., & Wykle, M. L. (1997). Religiosity and perceived rewards of Black and White caregivers. *The Gerontologist*, 37, P80–P101.

Pinquart, M., & Sörensen, S. (2005). Ethnic differences in stressors, resources, and psychological outcomes of family caregiving: A meta-analysis. *The Gerontologist*, *45*, P90–P106.

Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, P385–P401.

Roth, D. K., Mittleman, M. S., Clay, O. J., Madan, A., & Haley, W. E. (2005). Changes in social support as mediators of the impact of a psychosocial intervention for spouse caregivers of persons with Alzheimer's disease. *Psychology and Aging*, *20*, P634–P644.

Schulz, R., Burgio, L., Burns, R., Eisdorfer, C., Gallagher-Thompson, D., Gitlin, L. N., & Mahoney, D. F. (2003). Resources for enhancing Alzheimer's caregiver health (REACH): Overview, site-specific outcomes, and future directions. *The Gerontologist*, *43*, P514–P520.

Schulz, R., & Martire, L. M. (2004). Family caregiving of persons with dementia: Prevalence, health effects, and support strategies. *American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, *12*, P240–P249.

Schulz, R., Martire, L. M., & Klinger, J. N. (2005). Evidence-based caregiver interventions in geriatric psychiatry. *Psychiatric Clinics of North America*, *28*, P1007–P1038.

Sörensen, S., & Pinquart, M. (2005). Racial and ethnic differences in the relationship of caregiving stressors, resources, and socio-demographic variables to caregiver depression and perceived physical health. *Aging & Mental Health*, *9*, P482–P495.

Sörensen, S., Pinquart, M., & Duberstein, P. (2002). How effective are interventions with caregivers? An updated meta-analysis. *The Gerontologist*, *42*, P356–P372.

Whisman, M. (1993). Mediator and moderators of change in cognitive therapy of depression. *Psychological Bulletin*, *114*, P248–P265.

Zarit, S. H., Orr, N. K., & Zarit, J. M. (1985). *The hidden victims of Alzheimer's disease: Families under stress*. New York University Press.

Zuroff, D. C., Blatt, S. J., Sotsky, S. M., Krupnick, J. L., Martin, D. J., Sanislow, C. A., III, & Simmens, S. (2000). Relation of therapeutic alliance and perfectionism to outcome in brief outpatient treatment of depression. *Journal of Consulting and Clinical Psychology*, *68*, P114–P124.