Predictors of caregiver depression in Alzheimer’s disease

Heather Dumser
Pacific University

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Predictors of caregiver depression in Alzheimer’s disease

Abstract
Depression for caregivers of Alzheimer’s disease (AD) is a widely studied factor; however, few studies to date have examined how caregivers’ perceptions (i.e., internal attributions) and resentment level in conjunction with premorbid and current relationship quality predict depression levels of these family caregivers. Hierarchical multiple regression was used to explore the predictive power of these factors in conjunction with the covariates of caregiver gender and days of care provided each week on caregiver depression. Seventy-nine AD caregivers completed a 30-min online survey consisting of demographic information, modified Steinmetz Control Scale (SCS), shortened CERAD Behavior Rating Scale for Dementia (BRSD), Caregiver Resentment Scale (CRS), retrospective premorbid and current General Functioning Scale (GFS) from the McMaster Family Assessment Device, and Center for Epidemiologic Studies Depression Scale-Revised (CESD-R). Contrary to hypotheses, current relationship quality was not the most significant predictor of depression levels nor did premorbid relationship quality or internal attributions significantly predict caregiver depression. Consistent with hypotheses, caregiver resentment level was significantly correlated with depression; in addition, it was most predictive of depression level ($p < .05$). These results indicate that higher levels of depression are predicted by the following: family caregiver identifying as female, caregiver providing less days of care for loved one each week, and higher resentment levels. Contrary to the literature, study outcome suggested that, although current relationship quality was significantly correlated with depression, it was not a significant predictor of depression.

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PREDICTORS OF CAREGIVER DEPRESSION IN ALZHEIMER’S DISEASE

A DISSERTATION PROPOSAL

SUBMITTED TO THE FACULTY

OF

SCHOOL OF PROFESSIONAL PSYCHOLOGY

PACIFIC UNIVERSITY

HILLSBORO, OREGON

BY

HEATHER DUMSER

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

DOCTOR OF PSYCHOLOGY

JULY 25, 2014

APPROVED BY THE COMMITTEE:

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Christiane Brems, Ph.D., Dean
AD CAREGIVER DEPRESSION PREDICTORS

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Abstract
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Predictors of Caregiver Depression in Alzheimer’s Disease

If no major medical advances are made, then the number of older adults who have Alzheimer’s disease (AD) in the United States will nearly triple by 2050 (Administration on Aging, 2010). As a result, more caregivers will be needed, a role often filled by family members. The caregiving role often entails feelings of both satisfaction and stress as caregivers adjust to their loved ones’ changes in terms of cognitive decline, behavior, personality, and care needs (Raina et al., 2004). Given that providing care to loved ones with AD has been shown to cause a greater decrease in caregiver quality of life than it does for caregivers of loved ones without dementia (Ory, Hoffman, Yee, Tennstedt, & Schulz, 1999) and that the mental health of caregivers negatively affects care provided to loved ones as well as the trajectory of their disease (Norton et al., 2013), much research has been conducted to determine what factors contribute to caregiver burden and depression (e.g., Pinquart & Sorensen, 2003).

Caregiver Depression and Burden

Resilience, education, resourcefulness, living arrangement, social support, self-efficacy, age, gender, ethnicity, loved ones’ level of independence, coping mechanisms, socioeconomic status, problematic behaviors, loved ones’ depression level, and physical health systems are factors associated with caregiver depression, which in turn is a significant factor in caregiver burden (Covinsky et al., 2003; Gallagher et al., 2011; Gallagher-Thompson & Powers, 1997; Mahoney, Regan, Katona, & Livingston, 2005; O’Rourke et al., 2010; Ornstein et al., 2013; Semiatin & O’Connor, 2012; Valimaki, Vehvilainen-Julkunen, Pietila, & Pirttila, 2009). Caregiver burden can be defined as how much “caregivers perceive their emotional or physical health, social life, and financial status as suffering as a result of caring for their relative” (Neundorfer, 1991, p. 49). Caregiver depression is quite high among dementia caregivers; the
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literature indicates that somewhere between 10% and 32% of AD caregivers are depressed and may meet criteria for a depression diagnosis (see more in Appendix A).

**Caregiver Resentment**

Few studies have examined caregiver resentment, which is an element of caregiver burden that involves hostility toward loved ones and feelings of obligation and under-appreciation (Martin-Cook, Remakel-Davis, Svetlik, Hynan, & Weiner, 2003). Poor communal relationships, feeling unappreciated, and activity restriction have been found to be associated with greater caregiver resentment (Thompson, Medvene, & Freedman, 1995; Williamson, Shaffer, & Schulz, 1998). Martin-Cook et al. (2003) found that AD care recipient behaviors identified by caregivers as manipulative were associated with higher levels of resentment. Also, a pilot study by the present researcher (Dumser, 2011) found significant associations between caregiver resentment and current relationship quality as well as strong trends with premorbid relationship quality and internal attributions (see below). Finally, although Davis and colleagues (Davis, Martin-Cook, Hynan, & Weiner, 2006) found that decreasing resentment does not necessarily result in changing caregivers’ perceptions of their loved ones’ functional ability, lower levels of resentment are associated with greater quality of life for both caregiver and care-recipient, which in turn may decrease the economic impact of caregiving and AD. When present, caregiver resentment is associated with greater harm to the physical and mental health of family caregivers and their loved ones (Shaffer, Dooley, & Williamson, 2007; Williamson et al., 2005; Williamson, Shaffer, & The Family Relationships in Late Life [FRILL] Project, 2001).
Internal and External Attributions in AD Family Caregiving

As AD progresses, individuals may engage in behaviors that are at times inappropriate, and they may also become easily confused and disoriented (Alzheimer’s Association, 2012). The internal nature of the disease (i.e., being situated in the brain) may result in caregivers attributing their loved ones’ problematic behaviors (e.g., agitation and irritability) as under their conscious control and even having intended to be difficult. When a behavior is thought to be caused by the person rather than another factor, this is called internal attribution; whereas, positing the behavior as something outside of the person’s control and the result of AD would be an example of external attribution. Negative behaviors and outcomes are more likely to be internally attributed, potentially resulting in AD caregivers providing decreased quality of care if they believe this to be true (Sebald, 2010; see Appendix B).

Relationship Quality in AD Caregiving

Some research has determined that internal attributions made by caregivers of those with AD are often present in conjunction with depression and resentment (Martin-Cook et al., 2003; Williamson et al., 2005). Martin-Cook et al. (2003) examined depression, resentment, and internal attributions in 37 dementia caregivers and found that resentment and depression were significantly related ($r(37) = .72, p < .001$), as were internal attributions and depression ($r(37) = .59, p < .001$); however, relationship quality was identified as an important component but was not examined in conjunction with these variables. Several studies have demonstrated that higher caregiver-care recipient relationship quality is associated with increased caregiver and care recipient mental and physical health (Boylstein & Hayes, 2012). In contrast, caregivers who had current and/or historically strained relationships with their loved ones have been found more
likely to make internal attributions, have higher depression levels, and provide decreased quality of care; however, caregivers reported higher premorbid relationship quality when studied in conjunction with current relationship quality, which may be due to recall bias (Hassan, 2006; Mahoney et al., 2005; Quinn, Clare & Woods, 2009; see Appendix C). Morris, Morris, and Britton (1988) explored how relationship intimacy and depression were related in a study of 20 spousal dementia caregivers and found current relationship quality to be more highly correlated with depression ($r(20) = .76, p < .05$) than premorbid relationship quality ($r(20) = .58, p < .05$). These findings are supported by Wright (1998), who found AD spousal caregiver relationship affection, as measured by the Dyadic Adjustment Rating Scale (Spanier & Thompson, 1982) and asks questions about frequency of holding hands and sleeping in same bed, significantly decreased from premorbid to current relationship. Further, Harris et al. (2011) suggested that premorbid relationship quality is associated with current relationship quality, but it is unclear whether this is in a positive or negative way.

To address the above issues, a pilot study of seven AD family caregivers was conducted by the present researcher (Dumser, 2011) examining caregiver resentment, premorbid and current relationship quality, and external and internal attributions, finding a significant correlation between caregiver resentment and current relationship quality ($r(7) = .78, p < .05$). In addition, strong trends that did not reach significance given the small sample size were found between internal attributions and caregiver resentment, $r(7) = .70, p = .08$, and internal attributions and premorbid relationship quality, $r(7) = .70, p = .08$. Smaller trends were found between caregiver resentment and premorbid relationship level, $r(7) = .50, p = .26$, and between premorbid relationship and current relationship quality, $r(7) = .43, p = .34$. 
Current Study

Given the significant relationships found between caregiver depression, resentment, internal attributions, and relationship quality, this study explored how resentment, internal attributions, and relationship quality impacted caregiver depression. Based on studies by Dumser (2011), Martin-Cook et al. (2003), and Morris et al. (1988), resentment level was identified as having more potential for predicting caregiver depression than internal attributions. Additionally, given the potential that current relationship quality biases perceptions of premorbid relationship quality, current relationship quality was identified as having more potential for predicting caregiver depression, and premorbid relationship quality as having the least.

This study examined the predictive ability of factors that contribute to depressive symptoms for caregivers in order to (1) develop more effective treatment and support for caregivers and thus potentially decrease societal financial burden, (2) facilitate better caregiver self-care as well as better quality of care provided for those with AD, and (3) expand on the current literature relating to AD caregiver resentment and burden.

Hypotheses

The following hypotheses were proposed:

1. It was hypothesized that internal attributions would explain more variance in depression scores than would premorbid relationship quality.
2. It was hypothesized that caregiver resentment will account for the majority of caregiver depression when compared to the prior variables.
3. Current relationship quality would independently account for the greatest amount of variance; therefore, the other predictor variables would not add significant additional variance.

In addition, given the fact that some studies have found that premorbid relationship quality was a significant predictor of caregiver depression, while other studies have suggested that recall bias affects these results, the predictive ability of premorbid relationship quality was further explored in this study.

Method

Participants and Setting

The 30-min anonymous survey was administered online via surveygizmo.com, and data collection was conducted for approximately one year (April 8, 2013 to April 23, 2014). Participants were recruited through Craigslist, local and online caregiver support groups, various Alzheimer’s Association state chapters, and a local Portland, OR private practice. Power analysis using G*Power of .80 and a small to medium effect size of 0.15 indicated that a sample size of 98 participants was needed. A total of 115 responses were recorded and 89 participants completed the entire survey. Twenty-six participants agreed to informed consent but only partially completed the survey, resulting in a 23% dropout rate. Of those who dropped out, eight completed the demographics section and would have qualified for this study (see Tables 1 and 2). This dropout group was comprised only of women, 63% were ethnic minorities, none identified years of education past an undergraduate degree, and half had provided care for more
AD CAREGIVER DEPRESSION PREDICTORS

than five years. Roughly 63% of care recipients were also identified as being ethnic minorities and AD stage was evenly distributed between four of the stages.

Table 1

Dropout Caregiver Demographics

<table>
<thead>
<tr>
<th>Demographics and Caregiver Characteristics</th>
<th>n</th>
<th>%</th>
<th>M</th>
<th>SD</th>
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</thead>
<tbody>
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<td>100</td>
<td>41.38</td>
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</tr>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity (n = 8)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
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<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
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<td>25</td>
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<td>White/Caucasian</td>
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<td>37.5</td>
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<td></td>
</tr>
<tr>
<td>Other (multiracial)</td>
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<td>12.5</td>
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</tr>
<tr>
<td>Education (n = 8)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>3</td>
<td>37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college/college graduate</td>
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<td>62.5</td>
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<td></td>
</tr>
<tr>
<td>Income (n = 8)</td>
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<td>$25,000-$50,000</td>
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<td>$75,000-$100,000</td>
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<td></td>
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<tr>
<td>≥ $100,000</td>
<td>1</td>
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<td>Living with loved one (n = 8)</td>
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<tr>
<td>No</td>
<td>3</td>
<td>37.5</td>
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<tr>
<td>Yes</td>
<td>5</td>
<td>62.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days of care provided (n = 8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4 days/wk</td>
<td>1</td>
<td>12.5</td>
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<tr>
<td>5+ days/wk</td>
<td>7</td>
<td>87.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of time in caregiver role (n = 8)</td>
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<td></td>
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<tr>
<td>Less than 3 months</td>
<td>1</td>
<td>12.5</td>
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<td></td>
</tr>
<tr>
<td>3 months-1 year</td>
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<td>3-5 years</td>
<td>1</td>
<td>12.5</td>
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<tr>
<td>5 or more years</td>
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<td>50</td>
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Table 2

**Dropout Care Recipient Demographics**

<table>
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<th>M</th>
<th>SD</th>
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<td>Age</td>
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<td>80.38</td>
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<td>Female</td>
<td>5</td>
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<td></td>
</tr>
<tr>
<td>Intersex</td>
<td>1</td>
<td>12.5</td>
<td></td>
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<tr>
<td>Ethnicity (n = 8)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>2</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>3</td>
<td>37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>3</td>
<td>37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dementia primary condition for which care is provided (n = 8)</td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>37.5</td>
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<tr>
<td>Yes</td>
<td>5</td>
<td>62.5</td>
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<tr>
<td>AD stage (n = 8)</td>
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<tr>
<td>6</td>
<td>2</td>
<td>25</td>
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Of the 89 completed surveys for this study, 10 participants were excluded because they did not meet inclusion criteria. Specifically, three participants were excluded because they did not provide the majority of care for their loved ones (e.g., provided care for 3+ days per week). Four participants were excluded because they answered “no” to the following: care must be ongoing and comprise of instrumental/basic responsibilities. Three participants were excluded because they were paid caregivers.

The sample of caregivers who participated in this study was from 11 US states, with one Canadian participant. The majority of participants were from Oregon, California, Texas, Pennsylvania, and Florida. Of the 79 caregivers studied, the average age was 46.6 years, which is slightly younger than the average age of participants in similar studies (e.g., 68; Morris et al.)
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1988). The majority were female (n = 62) and 69.6% identified as White/Caucasian, whereas 30.4% identified as being an ethnic minority. Most caregivers (32.1%) had an income between $25,000 and $50,000 (n = 26), and the majority of caregivers (48.1%) had a college degree or some college education (n = 38). Roughly 70% of caregivers lived with their loved ones, and 86.1% of caregivers provided five or more days of care. Most caregivers (82.3%) had been providing care for one or more years (see Table 3).

Table 3

Caregiver Demographics, Potential Covariates, and Predictor Variables

<table>
<thead>
<tr>
<th>Demographics and Caregiver Characteristics</th>
<th>n</th>
<th>%</th>
<th>M</th>
<th>SD</th>
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<tbody>
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<td>46.62</td>
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<tr>
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<td>62</td>
<td>78.5</td>
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<td>Ethnicity (n = 79)</td>
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<td>11.4</td>
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<tr>
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<td>1.3</td>
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<tr>
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<td>48.1</td>
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<td>32.9</td>
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<tr>
<td>$50,000-$75,000</td>
<td>14</td>
<td>17.7</td>
<td></td>
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<td>$75,000-$100,000</td>
<td>8</td>
<td>10.1</td>
<td></td>
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<tr>
<td>≥ $100,000</td>
<td>8</td>
<td>10.1</td>
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<tr>
<td>Living with loved one (n = 79)</td>
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<tr>
<td>No</td>
<td>24</td>
<td>30.4</td>
<td></td>
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<tr>
<td>Yes</td>
<td>55</td>
<td>69.6</td>
<td></td>
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<tr>
<td>Days of care provided (n = 79)</td>
<td></td>
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<tr>
<td>3-4 days/wk</td>
<td>11</td>
<td>13.9</td>
<td></td>
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<tr>
<td>5+ days/wk</td>
<td>68</td>
<td>86.1</td>
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<tr>
<td>Length of time in caregiver role (n = 79)</td>
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AD CAREGIVER DEPRESSION PREDICTORS

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Count</th>
<th>Percentage</th>
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<tr>
<td>Less than 3 months</td>
<td>4</td>
<td>5.1</td>
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<tr>
<td>3 months-1 year</td>
<td>10</td>
<td>12.7</td>
</tr>
<tr>
<td>1-3 years</td>
<td>29</td>
<td>36.7</td>
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<td>3-5 years</td>
<td>19</td>
<td>24.1</td>
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<tr>
<td>5 or more years</td>
<td>17</td>
<td>21.5</td>
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<table>
<thead>
<tr>
<th>Problematic behaviors (BRSD)</th>
<th>Count</th>
<th>Percent</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79</td>
<td>100</td>
<td>14.28</td>
<td>7.88</td>
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</table>

<table>
<thead>
<tr>
<th>Resentment (CRS)</th>
<th>Count</th>
<th>Percent</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79</td>
<td>100</td>
<td>51.72</td>
<td>14.81</td>
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<table>
<thead>
<tr>
<th>Internal Attributions (Steinmetz)</th>
<th>Count</th>
<th>Percent</th>
<th>M</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>79</td>
<td>100</td>
<td>11.05</td>
<td>6.38</td>
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<table>
<thead>
<tr>
<th>Premorbid Relationship Quality (GFS)</th>
<th>Count</th>
<th>Percent</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79</td>
<td>100</td>
<td>27.57</td>
<td>8.01</td>
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</table>

<table>
<thead>
<tr>
<th>Current Relationship Quality (GFS)</th>
<th>Count</th>
<th>Percent</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79</td>
<td>100</td>
<td>30.71</td>
<td>5.96</td>
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</table>

<table>
<thead>
<tr>
<th>Caregiver Depression (CESD-R)</th>
<th>Count</th>
<th>Percent</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79</td>
<td>100</td>
<td>27.94</td>
<td>18.20</td>
</tr>
</tbody>
</table>

As shown in Table 4, caregivers reported that average age of care recipients was 78.7 years; 52 were female, 26 were male, and one was transgender. Roughly 66% were identified as White/Caucasian (n = 52), whereas 34.2% identified as an ethnic minority (n = 27). Over 68% of care recipients were identified as having progressed to AD stage 5 or further based on the description of each stage provided, and 17.7% of care recipients were receiving care primarily for another major medical condition while also having AD.

Table 4

**Care Recipient Demographics and Potential Covariates**

<table>
<thead>
<tr>
<th>Demographics and Care Recipient Characteristics</th>
<th>n</th>
<th>%</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>79</td>
<td>100</td>
<td>78.66</td>
<td>8.42</td>
</tr>
<tr>
<td>Gender (n = 79)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>26</td>
<td>32.9</td>
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</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>65.8</td>
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<td></td>
</tr>
<tr>
<td>Transgender</td>
<td>1</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity (n = 79)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/East Indian</td>
<td>3</td>
<td>3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>12</td>
<td>15.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>10</td>
<td>12.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>52</td>
<td>65.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (multiracial)</td>
<td>1</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dementia primary condition for which care is provided (n = 79)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>14</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>65</td>
<td>82.3</td>
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</table>
AD CAREGIVER DEPRESSION PREDICTORS

AD stage \((n = 79)\)

<table>
<thead>
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<th>Stage</th>
<th>Count</th>
<th>AD Stage</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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<tr>
<td>3</td>
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<td>11.4</td>
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<td>4</td>
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<td>15.2</td>
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<td>5</td>
<td>23</td>
<td>29.1</td>
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<tr>
<td>6</td>
<td>21</td>
<td>26.6</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Measures

**Demographic survey.** Caregivers were asked to provide their and their care recipient’s age, gender, and ethnicity. They were asked to provide information about income, education, and answer questions regarding the amount of care provided to loved one and length of time caregiving. Caregivers were also asked to state if they were providing care primarily for AD or another medical condition and to provide and their loved ones’ AD stage, using descriptions from the seven-stage model by Reisberg and Franssen (1999; see Appendix D).

**Attributions.** External and internal attributions were measured in a manner similar to the Williamson et al. (2005) study. Researchers in this study did not directly ask caregivers to ascribe blame but instead utilized a modified version of the Steinmetz Control Scale (Steinmetz, 1988). This measure consists of seven instead of 15 items on a Likert-type scale \((0=never, 4=always)\) and includes questions about the caregiver attributing the care recipient’s behavior to being controlling or manipulative (See Appendix E). Williamson et al. found Cronbach’s alpha to be .84 for this abbreviated measure. External attributions, or problematic behaviors, were determined by seven items from the 46-item CERAD Behavior Rating Scale for Dementia (BRSD; Mack & Patterson, 1997; see Appendix F), which asks questions about AD behaviors. The seven items utilized in this study were provided free of charge by Duke University, and
Pierre Tariot, Jim Mack, and Marian Patterson were primary contributors to the development of the BRSD. The BRSD asks the caregiver about the frequency (0= has not occurred, 4= 16 or more days) of their loved one’s problematic behaviors (e.g., agitation, wandering). This dementia measure is used by many researchers in the field, and validity and reliability are adequate (Ramsden, 2005). Williamson et al. reported Cronbach’s alpha was .76 for these seven items.

**Resentment.** To measure resentment, seven items from the Caregiver Burden Scale (Zarit, Reever, & Bach-Peterson, 1980) and 10 items from a resentment scale (Thompson et al., 1995) were used to create the Caregiver Resentment Scale (see Appendix G). The scales have Likert-type items (1 = never, 5 = almost always), asking caregivers questions about how often they feel frustrated about giving up time or activities because of caregiving. Williamson et al. (2005) reported that the Caregiver Resentment Scale (CRS) had a Cronbach’s alpha of .92.

**Relationship quality.** The General Functioning Scale (GFS) from the McMaster Family Assessment Device (FAD) was administered twice to measure premorbid and current relationship quality (Epstein, Baldwin, & Bishop, 1983), with directions being modified to measure premorbid relationship retrospectively (see Appendix H). The measure has 12 items about family functioning and communication using a Likert-type scale (1= strongly agree, 4= strongly disagree). A healthier relationship is indicated by a lower score on this measure. The McMaster FAD has a Cronbach’s alpha of .92, good test-retest reliability, and it appears to accurately differentiate between healthy and unhealthy relationships (Miller, Epstein, Bishop, & Keitner, 1985).

**Depression.** Caregiver depressive symptoms were measured by the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R; Eaton, Smith, Ybarra, Muntaner, &
AD CAREGIVER DEPRESSION PREDICTORS

Tien, 2004; see Appendix I). This 20-item measure of depressive symptoms uses a 5-point Likert-type scale (0=not at all, 4=nearly every day for 2 weeks). The CESD-R and its predecessor, the CESD, are widely used by medical and mental health researchers. The CESD has demonstrated a Cronbach’s alpha of .85 (Zimmerman & Coryell, 1994), and two samples from a recent study of the CESD-R found an average Cronbach’s alpha of .93. The CESD-R also had good convergent and divergent validity when compared to measures of anxiety and schizotypy. The CESD-R’s only change from the CESD was to ensure that it was consistent with the DSM-IV-TR criteria; the CESD-R has been found to have sound psychometric properties similar to those of the CESD (Van Dam & Earleywine, 2011).

Results

Data Preparation

Missing data points were excluded pairwise to ensure maximization of participant data. Five participants’ responses to education level were uninterpretable (i.e., could not distinguish if responses were total education or education after high school) and therefore excluded, in addition to two participants not providing their education level. Education level was divided into three categories for analysis: high school or less, some college/college graduate, and post college. As only one care recipient was identified as transgender, only male and female gender categories were examined statistically. Ethnicity of caregivers and care recipients were collapsed into two categories for analysis due to small sample sizes: Caucasian and ethnic minorities. Due to small sample size in the less than three month category, length of time in caregiving role was also collapsed to one year or less, one to three years, three to five years, and five years or more. Again, due to sample size, AD stage was collapsed as follows: stages one to three, stage four,
stage five, stage six, and stage seven. Tables 3 and 4 provide participants’ demographics and information about categorical variables.

**Preliminary Analyses**

As noted above, five participants’ education level was uninterpretable and therefore excluded, and two participants did not provide their education level. As such, an independent samples t test was conducted for education level and the dependent variable (CESD-R scores) to verify that no pattern of missing data existed. Included data did not significantly differ from excluded and missing data \((t(77) = 1.46, p = .15)\). Since results suggested that excluded data were random, education level values were excluded pairwise to maximize data.

**Identifying covariates.** Potential covariates (caregiver age, gender, ethnicity, and education level; care recipient age, gender, and ethnicity; days of care provided; length of time caregiving, living with or without care recipient; stage of AD; problematic behaviors; and presence of another major medical condition for care recipient) were examined through correlation and means comparison analyses to determine if they were significantly related to caregiver depression level. Covariates that were significantly related to caregiver depression were included in the primary regression analysis (see Table 5).

Pearson product-moment correlations were computed for depression and the variables of caregiver and care recipient age and care recipient problematic behaviors. No significant relationship with caregiver depression was found for caregiver age \((r(79) = -.19, p = .10)\), care recipient age \((r(79) = -.01, p = .95)\), nor problematic behaviors \((r(79) = .11, p = .34)\). A biserial correlation was computed for days of care provided and depression, which is also found through utilizing a Pearson product-moment correlation and converting \(r(79) = -.25, p < .05\) by
AD CAREGIVER DEPRESSION PREDICTORS

referencing Terrell’s (1982b) point-biserial $r$ to biserial $r$ table and standard error equation (Terrell, 1982a) to $r(79) = -.40, p < .05$.

Table 5

Analysis of Potential Covariates Related to Caregiver Depression

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r$</th>
<th>$t$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver age (n = 78)</td>
<td>-.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caregiver gender</td>
<td></td>
<td>-2.11*</td>
<td></td>
</tr>
<tr>
<td>Caregiver ethnicity</td>
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<td>1.06</td>
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</tr>
<tr>
<td>Care recipient age (n = 78)</td>
<td>-.01</td>
<td></td>
<td></td>
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<tr>
<td>Care recipient gender</td>
<td></td>
<td>1.93</td>
<td></td>
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<tr>
<td>Care recipient ethnicity</td>
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<td>0.02</td>
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</tr>
<tr>
<td>Days of care provided (n = 78)</td>
<td>-.40*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problematic behaviors (n = 78)</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living w/ or w/o care recipient</td>
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<td>1.41</td>
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<tr>
<td>Dementia primary condition</td>
<td></td>
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</tr>
<tr>
<td>Income</td>
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<td>1.18</td>
<td></td>
</tr>
<tr>
<td>Education</td>
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<td>0.44</td>
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<tr>
<td>Length of time caregiving</td>
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</tr>
<tr>
<td>AD stage</td>
<td></td>
<td>1.68</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$

Independent-samples $t$ tests were conducted for gender and ethnicity of caregiver and care recipient, living with or without care recipient, and whether or not dementia was the primary medical condition for which caregiver provided the primary care. This analysis found significant differences in caregiver depression based on caregiver gender ($t(77) = -2.11, p < .05$). Since Levene’s Test for Equality of Variances was significant, equal variance could not be assumed and care recipient gender was found not significant ($t(76) = 1.93, p = .06$). The analysis also was not significant for caregiver depression based on caregiver ethnicity ($t(77) = 1.06, p = .29$), care recipient ethnicity ($t(77) = 0.02, p = .99$), living with or without care recipient ($t(77) = 1.41, p = .16$), or dementia as the primary medical condition for which care was provided ($t(77) = 0.13, p = .90$).
A one-way analysis of variance (ANOVA) was conducted for income, education level, length of time caregiving, and stage of AD. There were no statistically significant differences in depression severity between the different income levels ($F(4,74) = 1.18, p = .33$). As there were four outliers observed via boxplot for income, an independent-samples Kruskal-Wallis test, which is less sensitive to outliers, was conducted and found similar results ($\chi^2(4) = 4.53, p = .34$).

The assumption of homogeneity of variances for conducting an ANOVA was violated for education level, as assessed by Levene's Test of Homogeneity of Variance ($p = .00$). No statistically significant differences were found for level of depression and education level, Welch's $F(2,29.69) = 0.44, p = .65$. Because Shapiro-Wilk's test of normality ($p < .05$) indicated abnormal distribution for depression scores and education level, Kruskal-Wallis test was conducted and found to be insignificant, consistent with ANOVA findings ($\chi^2(2) = 0.30, p = .86$). Assumption of homogeneity of variances was also violated when conducting an ANOVA for length of time in caregiving role, as assessed by Levene's Test of Homogeneity of Variance ($p = .03$); no statistically significant differences were found for level of depression and length of time caregiving, Welch's $F(3,34.94) = 1.25, p = .31$. Because Shapiro-Wilk’s test of normality ($p < .05$) indicated abnormal distribution, Kruskal-Wallis test was conducted and confirmed these results, $\chi^2(3) = 3.15, p = .37$. Although not significant, it was noted that mean level of depression was lower at less than one year in the caregiving role ($M = 30.7, SD = 16.7$) than at one to three years ($M = 24.1, SD = 15.1$), which was in turn lower than for caregivers providing care for three to five years ($M = 25.5, SD = 17.8$) and five years or more ($M = 34.9, SD = 23.2$). Given that two outliers were visually identified by boxplot for depression and AD stage, the
insignificant ANOVA results ($F(4,74) = 1.68, p = .16$) were confirmed by Kruskal-Wallis test, $\chi^2(4) = 6.12, p = .19$.

Based on results from these preliminary analyses, days of care provided and caregiver gender were included as covariates in the primary analysis (see below).

**Internal consistency.** Previously shortened or altered measures were analyzed for internal consistency. All scales were found to have high levels of internal consistency. Specifically, Cronbach’s alpha was the following: .88 for the modified Steinmetz Control Scale (i.e., internal attributions), .81 for the shortened BRSD (i.e., problematic behaviors), .93 for premorbid GFS (i.e., relationship quality), and .94 for Caregiver Resentment Scale (i.e., resentment).

**Prescreening data analysis.** Several assumptions of hierarchical multiple regression were reviewed. First, the Durbin-Watson statistic was reviewed, and its value of 1.62 was close to 2, ensuring that no correlation existed between residuals. No univariate outliers that exceeded +/-3.0 standard deviations were found when examining standardized and studentized deleted residuals (i.e., $z$ scores). There were no highly influential data points as indicated by only two Leverage statistics slightly exceeding a cutoff of .2 (i.e., .23); because these statistics are measured on outcome variables and not predictors, they are not likely to impact the regression coefficients. Further, no Cook’s distance value, which examines how each individual case influences the model, was above a value of 1. No multivariate outliers were identified as no Mahalanobis distance values exceeded a critical value of 22.46, based on six degrees of freedom (i.e., number of predictor variables) and $p < .001$. 
In order to assess for linearity, normality, and homoscedacity, a simple residual plot was examined (see Figure 1). The plot was dispersed in a random pattern with no clumping observed, and linearity was evident as no curved shape was displayed. It appeared cloud-like, and no funnel shape was present to indicate homoscedasticity that would indicate differential variance amongst residuals. The assumption of normality appears to be met as points were equally dispersed above and below the y-axis 0-point line and less than 5% of the outliers fell outside of two standard deviations from the mean. To further explore the assumption of normality, as study data exceeded 50 participants, normal Q-Q plots were examined for the continuous dependent (i.e., CESD-R) and independent (i.e., Steinmetz, pre/post GFS, and Resentment scales) variables; a normal distribution and no skewness or kurtosis were observed. No skewness or kurtosis was found for standardized coefficient values of residuals as the skewness and kurtosis values fell within two times the absolute value of the standard error, and the plot was normally distributed and could be described as bell-shaped (see Figure 2). Predictor variable bivariate correlations were examined to ensure none exceeded a cutoff of > .90, and all were within normal limits and do not indicate multicollinearity (see Table 6). Tolerance statistics were reviewed to verify that predictors were not excessively overlapping, and all coefficients were well above the cutoff of < .10 that would suggest multicollinearity.
Figure 1. Simple residual plot assessing assumptions of the data (linearity, normality, and homoscedasticity).
Figure 2. A distribution plot of residuals revealed a normal distribution. M (SD) = .00 (0.96), n = 79, Skewness = 0.36, Skewness SE = 0.27, Kurtosis = -0.49, Kurtosis SE = 0.54

Table 6

Bivariate Correlations, Means, and Standard Deviations Among Predictors

<table>
<thead>
<tr>
<th></th>
<th>CESD-R</th>
<th>Gender</th>
<th>Contact</th>
<th>PreGFS</th>
<th>Steinmetz</th>
<th>Resentment</th>
<th>PostGFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CESD-R</td>
<td>--</td>
<td></td>
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<td></td>
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<tr>
<td>Gender</td>
<td>.23*</td>
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</tr>
<tr>
<td>Contact</td>
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<td>-.03</td>
<td>--</td>
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<tr>
<td>PreGFS</td>
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<td>.23*</td>
<td>-.18</td>
<td></td>
<td>.28*</td>
<td>--</td>
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<tr>
<td>Steinmetz</td>
<td>.12</td>
<td>-.11</td>
<td>.06</td>
<td>.28*</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Resentment</td>
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<td>.02</td>
<td>-.05</td>
<td>.16</td>
<td>.50**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>PostGFS</td>
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<td>.22*</td>
<td>-.18</td>
<td>.43**</td>
<td>.27*</td>
<td>.45**</td>
<td>--</td>
</tr>
</tbody>
</table>
Primary analysis. The following hypotheses were proposed for this study: (1) internal attributions would account for more variance than premorbid relationship quality; (2) resentment would account for more variability than prior predictors; and (3) current relationship quality would account for the most variance after controlling for the prior variables, such that increased level of resentment would indicate higher levels of depression but good relationship quality would indicate lower levels of depression and account for the most variance. In other words, given the outcomes of prior studies, it was expected that these predictor variables would account for the greatest amount of variance in descending order: current relationship quality, resentment, internal attributions, and premorbid relationship quality. Additionally, this study explored how current relationship quality was associated with premorbid relationship quality in order to try to understand if recall bias may be present.

After establishing that assumptions of hierarchical regression were met, these hypotheses were tested via hierarchical regression analysis with IBM SPSS Statistics 22. The criterion variable was caregiver depression (i.e., CESD-R scores). Step or block one consisted of entering the two significant covariates (i.e., caregiver gender and days of care provided). These dichotomous variables were dummy coded (male = 0, female = 1; 3 to 4 days/wk = 0, 5 or more days/wk = 1). Then each predictor variable was entered in separately for the second, third, fourth, and fifth step in this order: premorbid relationship quality (as measured by premorbid GFS), internal attributions (as measured by the Steinmetz Control Scale), resentment (as measured by the CRS), and current relationship quality (as measured by GFS).
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In Step 1 of the model (see Table 7), covariates of caregiver gender and days of care provided (i.e., contact) were statistically significant, $F(2,76) = 4.90, p < .05$; these covariates explained 9.1% of the unique variance (Adjusted $R^2 = 0.091$). In Step 2 and 3, premorbid relationship quality and internal attributions were added, the model remained significant. However, the addition of premorbid relationship quality in Step 2 resulted no significant increase of $R^2$ ($F(1, 75) = 0.12, p = .66$), and Step 3 the addition of internal attributions resulted in no significant increase of $R^2$ ($F(1, 74) = 0.15, p = .09$), indicating these two predictor values did not significantly add to the prediction of caregiver depression. The addition of resentment to the prediction of caregiver depression (Step 4) was significant ($F(5, 73) = 5.68, p < .001$) and $R^2$ significantly increased by .13 ($F(1, 73) = 0.28, p < .05$). The model remained significant at Step 4 with the inclusion of current relationship quality ($F(6, 72) = 4.73, p < .001$) but increase of $R^2$ by .04 was insignificant ($F(1, 72) = 0.28, p = .61$). After examining the regression coefficients, $t$ values, effect size, and part and partial correlation coefficients in Table 7, it was determined that Step 4 accounted for the most unique variance and had the lowest standard error, most predictive power, and $t$ values for gender, contact, and resentment were significantly different from zero. Therefore, results indicated that resentment best fits the model and was the only significant predictor of caregiver depression after covariates were included, yielding the following regression equation:

$$\hat{Y} = 11.55 + 0.24_{\text{Gender}} - 0.24_{\text{Contact}} + 0.42_{\text{Resentment}}$$

In summary, gender, days of contact, and higher resentment scores for caregivers were most predictive of caregiver depression.
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### Table 7

*Results of Predictors at Each Step of Hierarchical Regression Analysis*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.23</td>
</tr>
<tr>
<td>Contact</td>
<td>-0.25</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.24</td>
</tr>
<tr>
<td>Contact</td>
<td>-0.25</td>
</tr>
<tr>
<td>Premorbid Relationship Quality</td>
<td>-0.05</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.27</td>
</tr>
<tr>
<td>Contact</td>
<td>-0.28</td>
</tr>
<tr>
<td>Premorbid Relationship Quality</td>
<td>-0.12</td>
</tr>
<tr>
<td>Internal Attributions</td>
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<tr>
<td><strong>Step 4</strong></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.24</td>
</tr>
<tr>
<td>Contact</td>
<td>-0.24</td>
</tr>
<tr>
<td>Premorbid Relationship Quality</td>
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</tr>
<tr>
<td>Internal Attributions</td>
<td>-0.02</td>
</tr>
<tr>
<td>Resentment</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.23</td>
</tr>
<tr>
<td>Contact</td>
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<tr>
<td>Premorbid Relationship Quality</td>
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<tr>
<td>Internal Attributions</td>
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<tr>
<td>Resentment</td>
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</tr>
<tr>
<td>Current Relationship Quality</td>
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</tbody>
</table>

*Note: CI = confidence interval. * p < .05

### Discussion

This study explored how some potential covariates and predictor variables (i.e., internal attributions, premorbid and current relationship quality, and resentment) predict depression levels in caregivers of those with AD. Contrary to Hypothesis 1, premorbid relationship quality and internal attributions did not significantly predict caregiver depression, nor did internal...
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attributions account for more variance than relationship quality. However, current relationship quality was significantly correlated with depression, whereas premorbid relationship quality was not. This outcome is consistent with the existing literature, suggesting that recall bias is likely present when caregivers report on premorbid relationship retrospectively (Hassan, 2006; Mahoney et al., 2005; Morris et al., 1988; Quinn et al., 2009; & Wright, 1998). However, it also is possible that premorbid relationship quality is not associated with levels of depression. In any case, in a therapeutic setting, mental health clinicians often do not have the opportunity to work with caregivers before the onset of caregiving. In terms of the implications of internal attributions not significantly correlating with or predicting depression, there are potential reasons for this outcome. It may be that this study did not capture the full spectrum of caregivers; the caregivers on average were younger and may have been comprised of family caregivers other than spouses. In addition, this study did capture a more diverse range of participants than some previous studies.

Consistent with Hypothesis 2, resentment accounted for a significant amount of the variance for depression. Martin-Cook et al. (2003) and Morris et al. (1988) found resentment to be most associated with depression, and the results of this study support that finding. Further, this study adds to the literature in that resentment level was found to not only be positively associated with depression, but it also accounted for a significant amount of the unique variance. Interestingly, internal attributions and resentment have been significantly correlated in prior studies as well as the current study; however, in this study resentment was predictive of depression but internal attributions were not. This outcome suggests that, although resentment and internal attributions are both associated with depression, resentment as measured in this
study accounts for a unique aspect of depression. This may be due in part to the fact that resentment, as measured by the Caregiver Resentment Scale, is comprised of both a burden and a resentment scale. A portion of this resentment scale therefore may capture a caregiver’s struggle to cope and frustration about circumstances with respect to AD and the caregiving role. This may account more for depression levels rather than resentment focused toward the care recipient per se.

Contrary to Hypothesis 3, although current relationship quality has a significant positive correlation with depression, it does not account for the most variance of depression. After resentment was entered into the regression model, current relationship quality did not provide a significant contribution to the unique variance of depression. This indicates that resentment level is more of an important factor when examining caregiver depression, and caregivers seeking services due to depression may benefit from therapy focusing more on their feelings toward caregiving rather than on the caregiver-care recipient relationship quality itself. Again, it is important to note that the composition of the caregivers in this study was unique. It may be that for family caregivers in general, resentment is associated with depression and that for subsets of family caregivers, such as spousal caregivers, relationship quality is a more important factor.

Of all covariates, caregiver gender and days of care provided to loved ones were the most predictive of depression, suggesting that female caregivers and fewer days of care provided are most likely to predict depression. This finding is consistent with many prior studies, (Covinsky et al., 2003; Mahoney et al., 2005; Romero-Moreno, Marquez-Gonzalez, Mausbach, & Losada, 2012; & Valimaki et al., 2009), although Gallagher et al. (2011) and O’Rourke et al. (2010) both found no differences in depression between male and female caregivers.
As for the negative association between days of care provided and depression, the literature is again mixed; most studies have found that hours of care provided positively correlate with depression, but there are a few studies that have found the opposite (Pinquart & Sorenson, 2003). Given that this study falls into the latter category, there are several potential explanations: (1) This difference may be due in part to this study excluding caregivers providing the least days of care each week (i.e., zero to two days) and therefore not capturing the full range of caregivers; (2) Several studies examine only spousal caregivers, whereas this study included all family caregivers; (3) Although not significant, there was a weak negative association between both premorbid and current relationship quality and days of care provided (both $p = .06$), suggesting that less contact may be related to lower relationship quality; (4) Caregivers whose loved ones enter a care facility may be experiencing more depression because of grief and because their sense of purpose and meaning decreased when their loved one entered a facility; (5) Caregivers may have experienced so much depression that this ultimately resulted in transferring their loved one to a care facility where days of care they provided themselves were less; and (6) There may be cultural factors influencing the expectations of caregivers, resulting in varying levels of depression. To follow up on this, the association between days of contact and duration in the caregiver role was examined. Given that assumptions of a chi-square test were not met because half of the expected frequencies in each cell were lower than five, Fisher’s exact test was conducted and found to be significant ($p < .05$). This analysis found a trend for caregivers who identified as providing care for three to four days per week as having served in the caregiver role for a shorter period of time (i.e., three years or less); whereas, caregivers who had cared for their loved ones longer tended to provide care more days per week (five or more). Although duration
as a caregiver was not found to be significantly associated with depression, the trend between days of contact with loved one and duration as a caregiver would support the adaptation hypothesis, which posits that caregivers learn to adapt to stressors more effectively the longer they serve in this role (Pinquart & Sorenson, 2003).

Conclusion

Based on the findings of this study, mental health providers providing treatment for AD caregivers who present with elevated depression levels might consider focusing more closely on possible resentment toward the caregiving experience itself rather than on caregivers’ perceptions of current or premorbid relationship quality. In this regard, it may be helpful to administer the Caregiver Resentment Scale; this scale is comprised of items from the Zarit Burden Scale (Zarit et al., 1980) and a resentment scale by Thompson et al. (1995). It is in the public domain and is included in Appendix G. Female caregivers may be at higher risk of depression and may need formalized support. Clinicians should also consider following up with additional questions about possible resentment for caregivers who provide fewer days of care.

Strengths and Limitations

There were both strengths of and limitations to this study. Since caregivers self-selected to participate, there is potential that the sample was restricted in that it may have excluded participants who were too depressed to find or complete the survey. When comparing this study to others similar in design and topic, the sample size is relatively large. However, given that the power analysis recommended a sample size of 98 participants, this study (with 79 participants) was subject to Type II error. Therefore, some of the null hypotheses may have been falsely accepted; with more participants, some of the alternative hypotheses in this study may have been
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accepted, such as current relationship quality being a significant predictor of depression for AD caregivers. Increasing the sample size may also increase the likelihood that additional covariates will be found to be significantly associated with depression and therefore be entered into the regression model, in turn affecting which predictor variables account for the most unique variance and impacting study outcome.

Another strength of this study is roughly 30% of both caregivers and loved ones were ethnic minorities, since minorities are often not represented sufficiently in caregiver studies (Janevic & Connell, 2001). In this study, ethnic minority inclusion was attempted as per Ejiogu et al. (2011) by the principle researcher, not only seeking out diverse geographical areas to recruit but also developing relationships with Alzheimer’s Association chapters, community residents, and support group facilitators to decrease the likelihood of common concerns arising for potential minority participants, such as concern about being harmed or used, and to ensure that participants understood how this may benefit them and future caregivers. Nonetheless, not enough ethnic diversity was attained for this study and as such the ethnic categories were collapsed and comparison between ethnic minorities was not possible.

Although this study asked several demographic questions, it did not include information about caregivers’ relationships to their loved ones; this is an aspect that could have been very helpful to include as past research has found significantly different levels of depression across groups such as spousal and child caregivers. Further, although care recipient AD stage was requested, this information was reported by caregivers, and there is no way to verify this information. Also, information about premorbid caregiver-care recipient relationship quality was obtained retroactively and therefore may be subject to recall bias, and days of care provided to
loved one could be further examined as no questions were asked regarding loved one’s current location (e.g., nursing home, assisted living). Finally, this study was conducted online; this can be seen as a way to increase ease of access to the study, as participants do not have to factor in travel costs (Eijogu et al., 2011) but internet surveys can also exclude individuals who are not technologically inclined or do not have easy access to the internet. In summary, this study certainly has a good baseline sample size and ethnic minority inclusion, but these are several factors that could be improved for future studies.

**Future Studies**

Given that the sample size could be larger, it is the intention of this researcher to continue collecting data to increase the statistical power of the study and to examine some additional variables. For instance, as mentioned earlier, the Caregiver Resentment Scale included in this study is a combination of both a resentment and burden scale, and exploring how each item is related to level of depression could point to why a potential factor such as internal attributions did not account for a significant amount of unique variance in this study. This researcher hopes to explore whether there are particular types of resentment (e.g., resentment about how much life has changed vs. resentment toward loved one) that best account for level of depression. An extension of this study may also include examining how internal attributions and level of depression may differ between males and females, since research on how each gender tends to cope suggests that male caregivers tend to utilize more of a task-focused strategy than females (Navaie-Waliser, Spriggs, & Feldman, 2002).

This researcher is also interested in conducting subsequent studies to examine similar factors while also inquiring about the caregiver’s relationship to loved ones in addition to history
of care provided (e.g., have days of care provided lessened or increased over time?) and whether or not the caregiver is currently utilizing any outside help, formal or informal, as this could have a significant impact on level of caregiver depression, burden, and resentment. It is also this researcher’s intention to conduct this study in a manner that is more inclusive of various demographic groups and to obtain more reliable demographic and descriptive information; for example, recruiting from hospitals, where AD stage can be confirmed and a wider variety of caregivers might complete the study. In addition, this researcher found that collapsing some continuous data in questions resulted in loss of information; as such, this researcher would, for instance, list out number of days of care provided (i.e., 3, 4, 5, 6, or 7 days per week instead of 3-4 and 5 or more). Further, this study found a large percentage (17.7%) of loved ones who identified as having at least one other major medical condition for which care was being provided. Caregivers providing care for multiple conditions may have been in a caregiving role longer than their counterparts or provide very different types of care and could be experiencing different levels of depression; therefore, future studies should give consideration to examining how these two groups may differ.

Future studies also may consider exploring the comorbidity between depression and anxiety among caregivers. For instance, the results of a study by Mahoney et al. (2005) suggested that caregiver anxiety is associated with poor relationship quality; researching how the predictor variables in this current study impact anxiety rather than depression level might help explain why current relationship quality was not a significant predictor of caregiver depression. Finally, future studies may also focus on psychotherapy and solution finding for AD caregivers in order to identify specific factors to counter depression in this population.
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References


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Williamson, G. M., Shaffer, D. R., & The Family Relationships in Late Life Project. (2001). Relationship quality and potentially harmful behaviors by spousal caregivers: How we were then, how we are now. Psychology and Aging, 16, 217-226. doi:10.1037//0882-7974.16.2.217


Appendix A

Caregiver Depression

Caregiver depression and burden are quite prevalent amongst AD family caregivers; Mahoney et al. (2005) reported 10% of family caregivers are clinically depressed, whereas Cuijpers et al. (2005) found that nearly 22% of dementia caregivers met criteria for major depressive disorder. Covinsky et al. (2003) found 32% of 5,627 dementia caregivers scored high on the Geriatric Depression Scale. Several factors have been shown by the literature to contribute to or prevent its presence in caregivers. Mahoney et al. (2005) identified several factors indicative of caregiver depression, including living with loved one, identifying as female, loved one’s irritability level, poor caregiver health, and poor relationship quality. Valimaki et al. (2009) also found that, of the 170 spousal AD caregivers, female caregivers were found to experience significantly higher depressive levels than their male counterparts and that health-related quality of life and a low sense of coherence were significantly associated with depression. Similarly, Gallagher et al. (2011) identified self-efficacy as a mediating factor in decreasing caregiver depression. O’Rourke et al.’s (2010) one-year longitudinal study on self-efficacy of 105 cohabitating spousal AD caregivers found that level of caregiver perceived control and enjoyment of challenges in life were predictive of depression level. Just as caregivers’ behaviors, personality, and life views impact caregiver depression, these same attributes in care recipients appear to affect caregiver depression as well. Ornstein et al. (2013) explored how personality changes and behaviors related to AD impact caregiver depression; the researchers found that, for the 160 participant dyads, care recipient depression was most associated with caregiver
depression. Given the multitude of factors associated with caregiver depression, many of these factors were considered in developing this current study.

**Appendix B**

**Attribution Theory**

Attribution theory describes how individuals explain outcomes involving other humans. Specifically, causes can be attributed to internal or external forces (i.e., the locus of causality) (Weiner, 1985). Specific factors contribute to whether an internal or external reason is chosen, including perceptions of stability and control. Stability is defined as a factor that is interpreted to be consistent (Weiner). An example of such is an individual who performs poorly on tests throughout a semester; the unchanging test outcome can contribute to attributing poor class performance to an internal reason such as the student’s lack of ability. The other factor, control, is essential because the cause of an outcome will be attributed to that which has the greatest power. Expanding on the student example, a teacher is associated with having more power than a student; therefore, it is possible that a student’s class performance could be attributed to an external force, such as the instructor’s teaching or testing style.

Attribution theory becomes more complex when social factors are applied. Interpretation of causal factors is affected by how intent and outcome are perceived. In the teacher-student example, if others perceive the teacher to have ill intentions involving failing half of the class, the teacher is likely to be deemed the causal factor of poor class performance. However, if the class performed well, regardless of the teacher’s intentions, the teacher may still be identified as the primary factor contributing to the outcome. In other words, perceived intent is often bound to whether or not viewers see the outcome as good or bad (Heider, 1958). Further, when the
outcome is negative, the person involved in the situation is more likely to be identified as the cause (Sebald, 2010).

**Attribution theory in AD.** If negative outcomes are more readily identified as the fault of the person involved, then those with AD who exhibit aggressive and confused behaviors are at risk of being deemed responsible for their actions, rather than the disease itself being the cause. Once caregivers attribute a behavior to the care recipient, they are more likely to do so again in the future (Ross, Leppner, & Hubbard, 1975). Such a pattern inevitably results in decreased quality of relationship (e.g., trust) and care (Tomlinson & Mayer, 2009).

Cook, Ahrens, and Pearson (1995) explored depression and attributions in 93 family caregivers of AD. Using multiple regression, they found that particular attributions accounted for 5% of the variance in depression. The authors determined that higher levels of depression were associated with caregivers’ perceptions of care recipients’ behavior as unchanging (i.e., stable). Tarrier et al. (2002) found that among the 100 AD caregivers they interviewed, those who expressed the most emotion made more internal attributions regarding their loved ones’ negative events (e.g., hoarding or leaving the stove on).

A majority of the studies that examined resentment, burden, and attributions for AD family caregivers determined that those who internally attributed problematic behaviors to their care recipients experienced more resentment and guilt than those who did not (Cook, Ahrens, & Pearson, 2005; Levy, Hillygus, Lui, & Levkoff, 2000; Williamson et al., 2005).
Appendix C

Family Caregiving and Current and Premorbid Relationship Quality

Mahoney et al. (2005) found that poor relationship quality was a significant predictor of caregiver depression in a study of 153 AD caregivers. Harris, Adams, Zubatsky, and White (2011) qualitatively explored premorbid and current relationship quality in 10 spousal caregivers of AD or a related disorder. Premorbid relationship quality and problematic behaviors were shown to affect current relationship quality.

Shim, Landerman, and Davis (2011) explored relationship mutuality, positive feelings and alliance in 91 family caregivers of those with AD or Parkinson’s disease. Lower mutuality was associated with higher levels of depression, less experienced caregiving, and lower functioning care recipients. After looking at 15 studies regarding caregiving, dementia, and relationship quality, Quinn et al. (2009) found that many researchers had concluded care recipient problematic behaviors changed the caregivers’ perceptions of their relationship.

In addition, care recipients with AD who had a greater quality of relationship with their spousal caregivers were found to have a slower cognitive decline (Norton et al., 2009). This may be because relationship quality results in better care and more cognitive stimulation. Another study demonstrated that relationship closeness and healthy relationship history can contribute to greater caregiver health, including such things as decreased heart rate and blood pressure (Uchino, Kiecolt-Glaser, and Cacioppo, 1994). Another study (Williamson et al., 2001) that examined 142 spousal caregivers of loved ones with various diseases, half of whom had dementia, found that relationships lacking love and support (i.e., less communal) resulted in greater caregiver neglect and frustration.
Appendix D

Demographic Survey Information

1. Your age _______________

2. Age of loved one with Alzheimer’s disease _______________

3. Gender
   a. Male    b. Female    c. Other (please specify: __________)

4. Gender of loved one with Alzheimer’s disease
   a. Male    b. Female    c. Other (please specify: __________)

5. Race/ethnicity (please choose all that apply)
   a. Asian/East Indian
   b. Black/African-American
   c. Hispanic/Latino
   d. Middle Eastern
   e. Native American (continental U.S.)
   f. Native Alaskan/Aleutian
   g. Native Hawaiian/Pacific Islander
   h. White/Caucasian
   i. Other (please specify: _______________)

6. Race/ethnicity of loved one with Alzheimer’s disease (please choose all that apply)
   a. Asian/East Indian
   b. Black/African-American
   c. Hispanic/Latino
d. Middle Eastern

e. Native American (continental U.S.)

f. Native Alaskan/Aleutian

g. Native Hawaiian/Pacific Islander

h. White/Caucasian

Other (please specify)____________

7. What is your yearly household income?

a. 0 to $25,000

b. $25,000 to $50,000

c. $50,000 to $75,000

d. $75,000 to $100,000

e. $100,000 and up

8. Number of years of education completed:

a. Years:

9. Do you live with the care recipient?

a. No    b. Yes

10. Are you being paid to provide assistance to the care recipient?

a. No    b. Yes

11. Amount of contact with care recipient:

a. 2 days/week or less b. 3-4 days/week    c. 5 or more days/week
12. Do you provide and engage in ongoing and regular responsibilities for multiple aspects of care (such as managing medications, taking care of personal business, bathing, using toilet, and so forth)?
   a. No   b. Yes

13. Duration of time spent as caregiver:
   a. Less than 3 months
   b. 3 months to one year
   c. One to 3 years
   d. 3 to 5 years
   e. 5 years or more

14. Does your loved one have another major medical condition?

15. What is the primary medical condition in which you provide care for your loved one?

16. Approximate date the care recipient received diagnosis of Alzheimer’s disease:
   Month:
   Year:

17. What stage of Alzheimer’s disease does the care recipient currently have?

Stage 1 (No impairment)
   [In this stage, no presence of memory problems exists.]

Stage 2: Very mild decline
   [Individuals start reporting memory lapses, such as forgetting familiar names or the location of their keys or eyeglasses]

Stage 3: Mild decline
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[This is where early-stage Alzheimer’s disease can start to be detected. Family members and close acquaintances start to notice changes in their loved one’s memory. This might take the form of decreased ability to remember words and names, to plan, and/or decipher a passage just read.]

Stage 4: Moderate decline (mild or early stage)

[A medical interview has detected apparent changes: decreased ability to perform arithmetic or to pay bills; decreased knowledge about self and recent events.]

Stage 5: Moderately severe decline (moderate or mid-stage)

[Larger gaps in memory and a greater need for daily assistance for tasks is present. An individual in this stage might need assistance in choosing clothing or remembering the current date.]

Stage 6: Severe decline (moderately severe or mid-stage)

[At this stage, personality changes might occur and greater assistance is needed for daily tasks. The individual might not remember his/her caregiver or spouse’s name but recognizes his/her face. S/he might not remember personal life events accurately. Mistakes in appropriate dress or wearing the wrong shoes might occur. Someone at this stage might start to wander and will need assistance during activities such as toileting.]

Stage 7: Very severe decline (severe or late stage)

[This stage involves losing the ability to speak and control movement. Individuals need a great deal of care and assistance at this stage.]
Appendix E

Steinmetz Control Scale

Please see publishers for copy of measure.
Appendix F

CERAD Behavior Rating Scale for Dementia

Please see publishers for copy of measure.
Appendix G

Caregiver Resentment Scale

The following statements describe situations that people sometimes resent when caring for someone who is ill. After you read each statement, please report how often you feel resentful of these situations.

Not having enough time for yourself
___Never ___Rarely ___Sometimes ___Often ___Almost always

Feeling unappreciated
___Never ___Rarely ___Sometimes ___Often ___Almost always

Having your needs come second
___Never ___Rarely ___Sometimes ___Often ___Almost always

Not having the same social life as before
___Never ___Rarely ___Sometimes ___Often ___Almost always

Having to give up plans for the future
___Never ___Rarely ___Sometimes ___Often ___Almost always

How much longer things take to do
___Never ___Rarely ___Sometimes ___Often ___Almost always

Any change in (care recipient’s) personality
___Never ___Rarely ___Sometimes ___Often ___Almost always

How difficult it is to go anyplace
___Never ___Rarely ___Sometimes ___Often ___Almost always

Having to care for someone who has health problems
___Never ___Rarely ___Sometimes ___Often ___Almost always

Feeling responsible for (care recipient’s) well being
___Never ___Rarely ___Sometimes ___Often ___Almost always

Using the same responses, tell how often you have the following feelings.

(Care recipient) is overly dependent.
___Never ___Rarely ___Sometimes ___Often ___Almost always
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(Care recipient) makes requests of me that are over and above what he/she needs.
___Never ___Rarely ___Sometimes ___Often ___Almost always

(Care recipient) expects me to take care of him/her as if I were the only person he/she could depend on.
___Never ___Rarely ___Sometimes ___Often ___Almost always

I resent the time and effort I spend taking care of him/her.
___Never ___Rarely ___Sometimes ___Often ___Almost always

(Care recipient) doesn’t appreciate what I do for him/her as much as he/she should.
___Never ___Rarely ___Sometimes ___Often ___Almost always

I feel trapped by my caregiving responsibilities.
___Never ___Rarely ___Sometimes ___Often ___Almost always

I resent having to take on (care recipient’s) responsibilities in addition to my own.
___Never ___Rarely ___Sometimes ___Often ___Almost always
Appendix H
McMaster Family Assessment Device – General Functioning Scale

[This scale was administered twice. Two sets of directions were provided each time.]

Please see publishers for copy of measure.
Appendix I
Center for Epidemiologic Studies Depression Scale – Revised (CESD-R)

Below is a list of the ways you might have felt or behaved. Please check the boxes to tell how often you have felt this way in the past week or so.

0 = Not at all or Less than 1 day
1 = 1-2 days
2 = 3-4 days
3 = 5-7 days
4 = Nearly every day for 2 weeks

My appetite was poor.
___0___1___2___3___4
I could not shake off the blues.
___0___1___2___3___4
I had trouble keeping my mind on what I was doing.
___0___1___2___3___4
I felt depressed.
___0___1___2___3___4
My sleep was restless.
___0___1___2___3___4
I felt sad.
___0___1___2___3___4
I could not get going.
___0___1___2___3___4
Nothing made me happy.
___0___1___2___3___4
I felt like a bad person.
___0___1___2___3___4
I lost interest in my usual activities.
___0___1___2___3___4
I slept much more than usual.
___0___1___2___3___4
I felt like I was moving too slowly.
___0___1___2___3___4
I felt fidgety.
___0___1___2___3___4
I wished I were dead.
___0___1___2___3___4
I wanted to hurt myself.
___0___1___2___3___4
I was tired all the time.
___0___1___2___3___4
I did not feel like myself.
___0___1___2___3___4
I lost a lot of weight without trying to.
___0___1___2___3___4
I had a lot of trouble getting to sleep.
___0___1___2___3___4
I could not focus on the important things.
___0___1___2___3___4