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Dementia Caregiver Personality Traits and Coping Strategies: Association with Care Recipient Outcomes

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DEMENTIA CAREGIVER PERSONALITY TRAITS AND COPING STRATEGIES:

ASSOCIATION WITH CARE RECIPIENT OUTCOMES

by

Christine M. Snyder

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Psychology

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2015

ABSTRACT

Dementia Caregiver Personality Traits and Coping Strategies:
Association with Care Recipient Outcomes

by

Christine M. Snyder, Doctor of Philosophy

Utah State University, 2015

Major Professor: Dr. JoAnn T. Tschanz
Department: Psychology

Using extant data from the Cache County Dementia Progression Study, this study examined the association of dementia caregivers' personality traits (as assessed by the NEO Personality Inventory/Five Factor Inventory) and use of coping strategies (as reported on the Ways of Coping Checklist) with their care recipients' outcomes including time to developing severe dementia, being institutionalized, and mortality. Up to 244 dyads of individuals with dementia and a primary caregiver were followed for a maximum of fifteen semi-annual visits, during which time information was collected on other potential caregiver and care recipient factors. The caregiver covariates analyzed in models included caregiver age, gender, kin relation to the care recipient, relationship closeness, and co-residency with care recipient. Potential care recipient covariates analyzed included gender, estimated onset age of dementia, completed education, and neuropsychiatric symptoms.

Individual caregiver personality traits were not predictive of the examined care recipient outcomes. Among the caregivers' coping strategies, more frequent caregiver use of Avoidance predicted care recipient time to severe dementia (hazard ratio (HR) = 1.065, $p = .034$). More frequent use of Counting Blessings predicted 36% lower hazard of care recipient mortality (HR = 0.648, $p = .017$) when also accounting for the increased risk of mortality with older care recipient age at dementia onset (HR = 1.052, $p = .004$).

Analyses revealed only low to moderate associations between some caregiver personality traits and coping strategies, with Neuroticism having the greatest number of significant associations with five emotion-focused coping strategies. Personality traits did not modify the associations between caregiver coping strategies (Avoidance and Counting Blessings) reported above.

Generally, the examined caregiver characteristics often assumed to be more stable (i.e. personality traits) were not predictive of care recipient outcomes, while caregivers' use of some coping strategies was predictive of development of severe dementia and mortality in care recipients. This allows for the possibility that interventions aimed at encouraging dementia caregivers to use effective coping strategies may promote better outcomes for care recipients.

(158 pages)

PUBLIC ABSTRACT

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This study examined the potential impact of dementia caregivers' personality traits and utilization of coping strategies on care recipients' development of severe dementia, institutionalization, and mortality. Generally, the personality traits and coping strategies were not predictive of care recipient outcomes, especially related to the institutionalization of care recipients. However, increased caregiver use of Avoidance predicted time to care recipient development of severe dementia, while increased use of Counting Blessings reduced risk of mortality.

This research was conducted using extant data from a community-wide study examining factors that affect dementia progression. All data were collected by a research nurse and a neuropsychological technician with the caregiver/care recipient dyad at the residence of care recipients and/or caregivers. Visits typically lasted two to three hours, during which the participants completed interviews, questionnaires, and assessment measures. Care recipients and their caregivers were each compensated $25 for their

participation per study visit, each of which was scheduled approximately six months apart. The study was funded by grant R01AG21136 from the National Institute on Aging.

No costs to the participants were anticipated beyond the time spent participating. Benefits for the study included adding to the existing knowledge base regarding caregiver factors that predict significant clinical milestones of the course of dementia.

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Christine M. Snyder

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CHAPTER I

INTRODUCTION

The first baby boomers turned 65 in 2011, and by 2030, 20% of the total U.S. population will be over the age of 65 (Alzheimer's Association, 2014). As the population ages, diseases of late life, such as dementia, are becoming more common. Dementias, differentiated as major or mild neurocognitive disorders in the Diagnostic and Statistical Manual, Fifth Edition (DSM-5), are syndromes that includes cognitive decline from previous functioning in one or more domains that hinder daily activities and represent a decline from prior levels of functioning (American Psychiatric Association, 2013). These domains include learning and memory, complex attention, executive functioning, language, or social cognition. Estimates of new cases of Alzheimer's disease, the most common form of dementia in late life, increased by 10% from 2000 to 2010. It was estimated by the Alzheimer's Association that one in nine older Americans, or approximately 5.2 million Americans, had Alzheimer's disease in 2014. The National Institute of Health's National Institute on Aging estimates that the number of people with Alzheimer's disease doubles for each five-year interval above age 65 (Alzheimer's Disease Education and Referral Center, 2012). The Aging, Demographics, and Memory Study (ADAMS) estimated that 13.9% of individuals aged 71 years or older meet criteria for dementia in the U.S. (Alzheimer's Association, 2014).

The consequences of a dementia diagnosis for these individuals and society are vast and long-lasting due to the unstoppable and irreversible death and malfunction of neurons in the brain that ultimately cause progressively worsening symptoms. There are currently no medications that have been proven to slow or stop this progression of impairment; there are only medications to address symptoms or temporarily improve functioning (Alzheimer's Association, 2014).

Along with the increasing number of individuals with dementia, the number of family caregivers for these individuals is also on the rise. The Alzheimer's Association (2014) estimated that over 15.5 million Americans provide approximately 17.7 billion hours of unpaid care for individuals with dementia in 2013. These caregivers are often family members such as the spouse or adult children of individuals with dementia. The task of providing care for loved ones has costs for the caregiver with the experience of grief at the loss of their loved one's cognitive and functional abilities, as well as the personal sacrifices made in order to support their loved one. Caregiving has been found to have effects on the caregivers' physical and mental health. Vitaliano, Zhang, and Scanlan (2003) found that, compared to non-caregivers, caregivers for individuals with dementia presented with a greater risk for health problems, including poorer general health and greater physical symptoms, medication use, and higher levels of antibodies and stress hormones in the blood. Additionally, increased caregiver distress or burden has also been found to be associated with worse outcomes for caregivers and their care recipients (Vitaliano, Russo, Young, Teri, & Maiuro, 1991). Specifically, caregivers who report more burden also reported a less positive life outlook, more anger, and poorer health. Additionally, caregiver burden was also associated with significantly lower care recipient scores on a brief cognitive screening test at follow-up, but not at baseline (r =

-.25, $p < .01$; $r = -.15$, $p > .05$, respectively). Caregiver burden and health concerns conceivably may affect caregivers' ability to provide care to the care recipient, so it is important to identify whether any factors influence caregivers' ability to fulfill the responsibilities of this role.

Due to the current lack of effective treatments for dementia, it is imperative that we seek to better understand the factors that affect dementia outcomes for the sake of general public health as well as to aid and inform caregivers and individuals with dementia now and in the future. In doing this, we may be able to facilitate interactions that will help promote higher levels of functioning and reduce the rate of cognitive and functional decline in individuals with dementia. This, in turn, may delay significant negative clinical outcomes for the individual with dementia, such as severe disability and institutionalization. Despite the clear potential for education and interventions aimed at the care giving relationship, there is limited research regarding the importance of the care environment, including characteristics of caregivers that may be associated with care recipient outcomes.

While some studies have examined the impact of caregiver personality characteristics on caregiver outcomes, there is limited research on the effects of caregivers' personality traits for the care recipient. Personality traits have been shown to be related to outcomes for the caregiver (e.g. see Löckenhoff, Duberstein, Friedman, & Costa, 2011), and it would not be surprising to see that these mental and physical health changes in the caregiver may also affect the caregiver's care management activities. For instance, caregivers whose personality traits lead them to engage in behaviors associated with better health behaviors may experience better physical health, allowing them to engage in caregiving activities, which may improve care recipient outcomes (Cheng et al., 2014).

Another factor that may affect outcomes for the caregiver and the care recipient is the utilization of certain coping strategies by the caregiver to manage the responsibilities of providing care. Coping strategies are often classified by the focus of the strategy. For instance, many researchers delineate coping strategies into problem-focused coping and emotion-focused coping strategies (Lazarus & Folkman, 1984). Problem-focused coping is defined as the style of coping that occurs when the individual makes a change with his/her relationship with the perceived stressor, such as working to fix a discrepancy between one's current situation and what one wants. An example is going to the doctor to get medication when one is sick. Many studies have found positive outcomes, including less caregiver burden and greater ease of adjustment, associated with caregivers' use of problem-focused coping methods (see Kneebone & Martin, 2003; Kramer, 1993). Emotion-focused coping is often defined as coping that is utilized to reduce distress and may be more commonly used in situations in which an individual does not perceive there to be any productive options available to affect the stressor (Carver, Scheier, & Weintraub, 1989). An example of emotion-focused coping is wishing for the best outcome out of a situation. Coping can be broken down into more categories, which may help to give a better idea of the focus and intent of individuals' coping efforts (Folkman & Lazarus, 1980).

Coping strategies may not be universal across situations, and individuals may use a variety of coping strategies in the same situation. For example, Siegler and George (1983) found that the type of coping technique and the effectiveness of the coping techniques utilized by individuals were dependent on the type of stressors experienced. For instance, men were more likely to use active techniques when coping with negative events, such as a death. Additionally, 62% of individuals rated instrumental strategies as more effective than palliative coping strategies when the stressor event was a personal event, while the opposite was found in the case of non-personal stressors. Individuals rated coping effectiveness highest when both strategies were utilized.

It is important to examine how caregivers cope with stressors, as their coping strategies may affect outcomes for the person with dementia. For example, Tschanz et al. (2013) found that slower care recipient decline on cognitive functioning (measured by the Mini Mental State Exam) was associated with caregivers' use of Problem Focused and Counting Blessing (emotion-focused) coping strategies. Additionally, they found an association between caregivers' use of Problem Focused coping, Seeking Social Support, and Wishful Thinking with slower decline on Clinical Dementia Rating (CDR) Scale sum of boxes scores, which is a rating scale of memory and functional abilities. However, when multivariate models were run incorporating these coping strategies, only Problem Focused coping was found to be a significant predictor of cognitive and functional outcomes.

There may be several mechanisms through which caregiver coping affects care recipient outcomes. For instance, caregivers who are unable to cope effectively with the stressors associated with providing care may report more perceived burden or distress and poorer mental or physical health. Caregiver burden is associated with poorer psychological well-being and physical health, which may affect the caregivers' ability to engage in beneficial caregiving behaviors with the care recipient (George & Gwyther, 1986). Each of these outcomes for the caregiver can conceivably affect how they interact with and care for the person with dementia. This effect could happen either directly, such as by prohibiting the person from being able to engage in physical activities necessary to assist the care recipients in their activities of daily living, or indirectly, such as by promoting negative caregiver mood or limiting emotional availability towards the person with dementia.

Caregivers' personality and coping strategies may be related, although the exact nature of that association is not well-defined. In a review of the literature, Connor-Smith and Flachsbart (2007) found a weak association between personality and broad coping styles and individuals' "engagement," which involves approach and active situation-management strategies, ranging from a magnitude of r = .10-.15. There was also an association with "disengagement," which involves avoidant strategies to distance oneself from the stressor, ranging from a magnitude of r = .13-.27. However, they found that each personality trait predicted specific coping strategies. For example, they found that the Extraversion and Conscientiousness among the "Big Five" scales were associated with more problem-solving coping, which is an engagement coping strategy, while Neuroticism was associated with less use of problem-solving coping. They did not examine how caregiver personality traits and coping strategies might interact and affect care recipient outcomes in the context of other care environment factors.

The importance of the caregivers' personality traits and coping styles becomes apparent when one examines the possible influence of these factors on the outcomes for the care recipient. The care environment has the potential to affect the care recipient in beneficial or harmful ways. As the aforementioned caregiver factors affect the physical and mental state of the caregiver, these effects, especially when they are negative for the caregiver, may also be evident when examining the caregivers' ability to engage in the caregiving role. Caregivers' interactions with others, and specifically the care recipients, are naturally influenced by the personal qualities they bring into those interactions. This process may be especially evident as the caregivers are faced with adapting to the new role of addressing the care recipients' changing state and needs. When a caregiver co-resides with the care recipient, or has formed a long-standing pattern of engagement, either as a spouse or child of the care recipient, the time and energy commitment to the caregiving role may also interact with these caregiver qualities as they adjust to the role requirements of this new life stressor.

There is a paucity of research examining the factors that affect the influence of caregivers' coping strategies and personality traits on the caregiving relationship and care recipient outcomes. The purpose of this study was to examine the relationship between caregivers' coping strategies and personality traits and their impact on care recipient outcomes, including time to severe dementia, institutionalization, or death of the care recipient. In addition, statistical control of caregiver- and care recipient-related variables was included in the examination of caregiver personality traits and coping strategies predicting care recipient outcomes. These included caregiver age and gender, relationship-related variables, namely kin relation between caregiver and care recipient, relationship closeness, and co-residency, and care recipient dementia onset age, education, and neuropsychiatric symptoms.

CHAPTER II

LITERATURE REVIEW

As medical advances in society allow people to survive to older ages, diseases associated with older age are becoming more salient in the public health arena. Dementia is a syndrome most commonly associated with neurodegenerative diseases marked by memory and other cognitive losses that become more prevalent with older age (American Medical Association, 2013). Individuals with dementia also experience declines in cognitive and functional abilities as the underlying disease progresses. Symptoms of dementia may be observed in an individual’s language, emotional experience or expression, personality, executive functioning, abstract thinking, judgment, and behavior (National Institute of Health (NIH), 2011). The loss of functional abilities involves the inability to independently carry out activities of daily living. Additionally, individuals with dementia are at a greater risk than similar-aged peers for earlier death (Tschanz et al., 2004).

According to the Alzheimer’s Association (2014) estimates, Alzheimer’s Disease (AD) accounts for approximately 60-80% of dementia cases in late-life. The second most common type of dementia is vascular dementia, which accounts for approximately 10% of cases (Walker et al., 2000). However, not all cases of dementia are “purely” one classification. One study found that 42.8% of cases were “pure AD,” while 10.8% of cases had AD with associated Lewy body pathology and 22.6% had AD with cerebrovascular pathology (Jellinger, 2006). Due to the co-morbid forms of dementia and the fact that the exact etiology of dementia awaits neuropathological examination after autopsy, this study will examine outcomes for individuals from all causes of dementia.

The progression of symptoms of dementia is variable. Some individuals may experience a rapid loss of cognitive and functional abilities, while others may experience a slower course of symptom progression even for those with the same underlying cause of dementia (Tschanz et al., 2011). However, the pattern of loss of abilities for individuals with Alzheimer's type dementia proceeds with loss of instrumental activities of daily living often occurring earlier in the course of the disease and the loss of basic activities of daily living occurring further into the disease course (NIH, 2011; Spector, Katz, Murphy, & Fulton, 1987). In a longitudinal study of persons with dementia, Haley and Pardo (1989) found that cognitive impairment steadily increases while functional behavior loss varies in quality of behaviors, as individuals lose the ability to engage in instrumental self-care behaviors earlier in dementia and basic self-care behaviors later in the course of the dementia. Additionally, they found that the problematic behavioral symptoms exhibited by the individuals in this study decreased in late stage, terminal dementia. These findings may not be consistent for individuals also experiencing physical deficits that may be related to the etiology of their cognitive impairments.

Alzheimer's disease is currently the sixth leading cause of death in the U.S., and is the fifth leading cause of death for individuals over 65 years of age (Alzheimer's Association, 2014). There are presently no treatments available to stop the death or malfunction of neurons in the brain or to stop the progression of dementia (Alzheimer's Association, 2014). Thus, while deaths attributable to other major public health concerns are generally declining, the percentage of deaths due to dementia continues to rise. Specifically, the percentage of deaths attributable to dementia increased by 68% from 2000 to 2010, while deaths caused by heart disease decreased by 16% over the same time period (Alzheimer's Association, 2014). The course of dementia, even within the same classification, may vary greatly between individuals, with individuals experiencing different symptoms and outcomes, such as the severity of impairments and occurrence of institutionalization.

Few studies have examined the caregiving environment, especially as it relates to the outcomes for the individual with dementia. However, some studies that have been conducted in this area report an association between caregiving factors and care recipient outcomes. For instance, higher care recipient quality of life ratings with regard to psychological well-being were found with more positive relationships with the caregiver ($r = -.51$, $p < .001$; higher numbers on relationship scale represent negative relationships) and greater participation in pleasant activities over time ($r = .34$, $p < .01$; Burgener & Twigg, 2002). These researchers found that care recipient functional ability was also related to participation in pleasant activities ($r = .61$, $p < .001$) and by caregiver distress ($r = -.30$, $p < .05$) and domestic upset ($r = -.40$, $p < .01$). Other studies have identified additional care environment factors that are associated with differences in the progression of dementia.

In the following sections, I discuss care environment factors that may affect outcomes for care recipients with dementia. First, I discuss the outcomes related to greatest emotional and financial costs for dementia patients and their families, followed by risk factors for these outcomes, emphasizing the role of the care environment. Where research is lacking, I discuss the available literature of caregiver factors on the rate of dementia progression.

Outcomes for Care Recipients

Severe Dementia or Disability

Severe dementia is a classification of the severity of dementia symptoms that signifies great impairment or cognitive and/or functional disability for the individual with dementia. Severe dementia may be defined as the stage at which extensive cognitive decline has occurred, language and communication is impaired, memory systems have been affected, and executive functioning is impaired (Boller, Verny, Hugonot-Diener, & Saxton, 2002) to a much greater extent than milder stages of dementia. Individuals with severe dementia may exhibit: loss of remote memory, unintelligible verbal output, inability to copy or write, inability to independently groom or dress, incontinence, and motor or verbal agitation. Additionally, individuals with severe dementia may exhibit problematic behavioral symptoms, like delusions, psychosis, anxiety, agitation, pacing, and incontinence (Boller et al., 2002). These symptoms may also decline in the later stages of dementia as intellectual and physical deterioration makes individuals “incapable” of displaying these problem behaviors (Haley & Pardo, 1989). Due to the worsening symptoms, individuals who reach severe dementia status often require more resources for their care. Unfortunately, some researchers estimate that individuals spend more time experiencing severe dementia (40% overall) compared to the time spent in any other stage of the disease (Arrighi, Neumann, Lieberburg, & Townsend, 2010). The increase in demand for resources required to care for individuals in this stage of dementia is associated with greater financial and emotional costs for the dementia caregivers as well as society at large, so it is important to examine the factors associated with severe-stage dementia.

There is minimal research on severe dementia, but some researchers estimate that one-third of individuals with dementia exhibit severe dementia symptoms (Pivi, Bertolucci, & Schultz, 2012). The American Geriatric Society (AGS) criteria for classifying severe dementia includes an estimation of time since onset, scores on cognitive and functional assessments, and symptom criteria. For example, early mild impairment is associated with Mini Mental State Exam (MMSE) scores of 21 to 25, CDR of one, and Reisberg Functional Assessment Staging Test (FAST) of 4 (Reisberg, 1988). Common symptoms in early mild impairment include disorientation to date, naming difficulties, decreased insight, and recent recall problems. The AGS classifies severe impairment as often occurring between years six and twelve and as corresponding with MMSE of 0 to 10, CDR of three, and FAST of seven. Other approaches involve applying cutoffs on cognitive or functional measures that signify varying degrees of the severity of impairment. Some studies use specific cutoffs for commonly used measures of cognitive and functional impairment, such as scores on the MMSE of less than or equal to 10 points, or a CDR scale score of three (Rabins et al., 2012). Other cutoffs include categories 6a to 7f on the FAST or scores of six or seven on the Global Deterioration Scale (Pivi et al., 2012). The FAST classifies individuals' activity limitations into seven stages of decreasing ability, with stage six consisting of decreased ability to perform activities of daily living and stage seven consisting of loss of speech, locomotion, and consciousness.

Institutionalization

Institutionalization is an outcome in dementia associated with high cost and increased caregiver distress. Individuals with dementia who are unable to live on their own, have complex health concerns, or whose caregivers may not be able to provide the degree of care needed may be faced with institutionalization. The decision to institutionalize a care recipient with dementia has implications for both the caregiver and care recipient. For instance, while 66% of caregivers in one study expressed the opinion that it was neither a “right nor wrong” decision to institutionalize their care recipients, many caregivers experienced guilt, emotional upheaval, and difficulties adapting to this new arrangement (Alzheimer’s Association, 2014). Additionally, institutionalization usually involves more than a dramatic change in the living situation for the person with dementia; it also involves a loss of independence and removal from the comforts of their previously known life. Thus, it can be assumed that the decision to institutionalize a loved one with dementia likely is not made flippantly but is necessitated due to an inability to continue providing adequate care in a less restrictive environment. In this review, institutionalization was defined as the placement of an individual in an assisted living or structured nursing facility as the individual’s primary residence. Excluded are temporary placements due to a need for rehabilitation following a health crisis.

Individuals with dementia have a much greater risk of being institutionalized than other individuals. One study found that 75% of individuals with a dementia diagnosis were admitted to a nursing home by the age of 80 years old relative to 4% of the general population (Arrighi et al., 2010). Another study found cognitive impairment and dementia was the largest risk factor for institutionalization for older adults, with three-year risk percentages of institutionalization for those with dementia at 61% in a sample of community-based individuals in Stockholm, Sweden (Agüero-Torres, von Strauss, Viitanen, Winblad, & Fratiglioni, 2001). In a study of 435 patients (207 cognitively normal, 48 mild cognitive impairment, and 180 with dementia) through the University Hospitals of Geneva, Switzerland, Zekry et al. (2009) found that dementia was the best predictor of institutionalization, with individuals whose dementia was rated in the severe range on the CDR scale having four times greater chance of being institutionalized than similarly aged peers. Individuals with moderate to severe dementia on the CDR also had longer hospital stays and had greater home care needs. In a review of medical records of individuals discharged from a skilled nursing facility, Sabbagh et al. (2003) found that the length of stay in a skilled nursing facility was longer for individuals with dementia compared to their non-demented peers, with 59% of individuals with dementia staying longer than 10 days and only 38% of individuals without dementia staying that length of time. For individuals who stayed until their death, those with dementia had significantly longer stays (mean [*M*] = 202.9 days, standard deviation [*SD*] = 528.6) than those without dementia (*M* [*SD*] = 91.8 [300.5], $p < .001$). They posited that individuals with dementia are institutionalized earlier due to cognitive rather than physical impairments, and that the behavioral rather than medical reasons for admission into nursing facilities may be associated with earlier and longer institutionalization.

Institutionalization of individuals with dementia may also be related to prior hospital stays. In a review of hospital records, Draper, Karmel, Gibson, Peut, and Anderson (2011) found that institutionalization following hospitalization was more common for those with dementia (ages 50-64 years: odds ratio (*OR*) = 0.07, 95% confidence interval (CI) [0.06-0.08]; ages 65-74 years: *OR* = 0.08, 95% CI [0.07-0.08]). Additionally, the average hospitalization stay for individuals with dementia in this study was 16.4 days, compared to 8.9 days for individuals without dementia, and individuals with dementia are more likely to be readmitted within 3 months (40% versus 32%, $p < .001$). Thus, the amount of care required for someone with dementia is likely to be higher than for individuals without dementia, which is supported by their longer stays in settings in which health care is provided.

Caregiver factors may affect the timing of institutionalization. For instance, Hooker et al. (2002) found that the mental and physical health of the caregivers are associated with the residence of the care recipient at home or in a “long-term care facility.” For instance, residence in a long-term facility was correlated with higher depression ($r = .50$, $p < .01$), greater perceived stress ($r = .43$, $p < .01$), and poorer perception of health ($r = .41$, $p < .01$) among caregivers. Of note, this study provided only a dichotomous residential status classification so the nature of that facility for each individual is unknown. Chenoweth and Spencer (1986) found that 72% of caregivers reported feeling too overwhelmed or felt the 24-hour care was too difficult, which precipitated their decision to institutionalize. There may be an interaction between caregiver and care recipient effects, as studies have found that caregivers who report distress due to care recipients' behavioral symptoms were more likely to institutionalize their care recipient (Gaugler, Yu, Krichbaum, & Wyman, 2009). Additionally, 21% of caregivers in the same study blamed their own illness, including physical injuries, heart attacks, "nervous breakdowns," and ulcers, as a precipitating factor for institutionalization. Gaugler, Kane, Kane, and Newcomer (2005b) found that care recipients were 1.77 times more likely to be institutionalized in a nursing home ($p < .001$) and were 1.37 as more likely to die earlier ($p < .01$) when caregivers reported that the care recipient did not receive enough help completing ADLs. If caregivers are unable or unwilling to meet the growing demands of the care recipient as dementia severity progresses, this likely means the person with dementia will require institutionalization.

Other studies have identified caregiver factors associated with lower risk of or delay in institutionalization. Caregivers who utilize community-based services, such as adult day care or in-home assistance earlier in the dementia course for their care recipient are more likely to delay institutionalization (adult day care: $\beta = -0.32$, $p < .05$; in home help: $\beta = -0.18$, $p < .05$; Gaugler, Kane, Kane, & Newcomer, 2005a). These services may provide respite for caregivers and allow them to acclimate to the caregiving role before they experience distress that begins to take a negative toll on the caregivers and care recipient. According to a study conducted in the United Kingdom, caregivers who report their motivation for engaging with the caregiver role as relating to "positive" (e.g. having a positive, trusting, close relationship with the care recipient) versus "negative" (e.g.

others are unwilling to provide care or there is no one else) were less likely to institutionalize the care recipient within a year (Camden, Livingston, & Cooper, 2011).

Care recipient characteristics have also been found to affect institutionalization of individuals with dementia. For instance, an increase in the behavioral problems exhibited by the care recipient is associated with higher rates of institutionalization. It is important to examine the effects of problem behaviors on institutionalization, as it is estimated that 63% of caregivers of individuals with dementia have reported these symptoms (Cohen-Mansfield, Marx, & Rosenthal, 1989), and have identified them as being "as problematic as the impairment itself" (Chenoweth & Spencer, 1986). Chenoweth and Spencer identified problem behaviors, such as leaving the oven on, not sleeping, and being unable to perform basic activities of daily living, such as feeding and dressing oneself, as a reason for institutionalization cited by 18% of caregivers. Combativeness and angry outbursts, which are symptoms often classified as problematic behavioral symptoms, were cited as factors influencing the decision to institutionalize by 15% of caregivers in the same study, and wandering was cited as a factor by 11% of caregivers. Phillips and Diwan (2003) found that individuals who exhibited a dementia-related problem behavior, including verbal and physical behaviors like repetitive questioning and wandering, were institutionalized two years prior to their peers who did not display these behavioral problems. Kopetz et al. (2000) identified specific problematic behavioral problems associated with institutionalization, including wandering, delusions, and aggression. Cohen et al. (1993) also found that problematic behaviors, as well as incontinence, were linked to institutionalization. The population-based, Canadian Study of Health and

Aging found that higher rates of behavioral disturbance and lower scores of functional ability for activities of daily living were associated with institutionalization (Canadian Study of Health and Aging Working Group, 2002). Another study similarly found that individuals with dementia whose scores on a measure of activities of daily living were lowest were twice as likely to need institutionalization (Zekry et al., 2009). Older age and more severe cognitive impairment are also associated with institutionalization, as are greater medical comorbidities and greater dependence on caregivers (Kopetz et al., 2000).

Studies have found that institutionalization is often strongly associated with other negative outcomes for the person with dementia that will also be examined in this study. Specifically, institutionalization has been found to be associated with shorter survival times (McClendon, Smyth, & Neundorfer, 2006). However, the survival time of those individuals placed in a long-term care facility is less affected when individuals are institutionalized later in the course of the dementia, perhaps suggesting that the individual's dementia severity has the greater effect on survival rather than the event of the person being institutionalized.

Mortality

The course of dementia varies greatly between individuals, but often, severe dementia is associated with premature death following rapid progression of dementia symptoms. The average length of survival from diagnosis of Alzheimer's disease is estimated to be between 4 and 6 years, although some individuals may live much longer (see Ganguli, Dodge, Shen, Pandav, & DeKosky, 2005; Xie, Brayne, & Matthews, 2008). The risk of death related to Alzheimer's disease increases dramatically with age. The time to mortality in individuals with dementia thus may be related to dementia severity (Tschanz et al., 2004). In the United States, most dementia-related deaths in 2001 occurred in nursing homes (66.9%, *N* = 59,197; Mitchell, Teno, Miller, & Mor, 2005).

As with the decision to institutionalize care recipients, studies have found caregiver-related variables are associated with time to care recipient deaths. In a longitudinal study of 258 caregiver and care recipient dyads associated with the Alzheimer's Disease Research Center, McClendon et al. (2006) found care recipients are more likely to die sooner when caregivers utilized "wishfulness-intrapsychic" coping strategies. One may speculate that this association reflects a lack of appropriate problem-solving behaviors on the part of the caregiver to address issues that are remediable.

Care recipient factors related to institutionalization have also been found to be related to mortality. For instance, Butler, Orrell, Ukoumunne, and Bebbington (2004) found that individuals who were male, older, had poorer physical health, later onset of dementia, and poorer functioning were more likely to have shorter survival times. Other studies also found that survival times of persons with dementia were shortened when the person displayed impairments in performing activities of daily living, exhibited cognitive impairments (as measured by scores on the MMSE), or displayed a greater frequency of problematic behaviors, such as depressive symptoms, inertia, vegetative symptoms, behavioral dysfunction, irritability, and psychotic symptoms (McClendon, Smyth, & Neundorfer, 2004). Schäufele, Bickel, and Weyerer (1999) found significant effects for dementia severity, age, and motor disability on risk of mortality, but they did not find significant effects for gender. However, Meng et al. (2011) found that being male, having later onset age, and having a lower income were statistically significant in predicting shorter survival times. Additionally, in a study of individuals who were hospitalized, mortality rates for individuals with dementia were twice the rate for those without dementia (*OR* = 1.93; 95% CI [1.55-2.41]; Draper et al., 2011).

Individuals who have comorbid dementia and psychiatric disorders and who had greater chronic disease scores had significantly shorter survival times (for chronic disease scores above zero (1-24, hazard ratio (HR) = 1.038-1.387; all *p* < .001; Meng et al., 2011). The chronic disease score used in the analyses was calculated on the basis of the individual's previous year's prescriptions and was associated with physicians' ratings and patients' ratings of their own health status. Butler et al. (2004) found that individuals with depression and dementia had poorer survival times. Additionally, these researchers found that having two or more stressful life events also reduced survival time. Lack of social support may be related to reduced survival times, as higher dependency and receiving home delivered meals were both associated with reduced survival in individuals with dementia (*p* = .004 and *p* = .001, respectively; Orrell, Butler, & Bebbington, 2000).

Care Environment Factors and Dementia Progression

The majority of care provided to persons with dementia is delivered by informal caregivers, usually relatives (Alzheimer's Association and National Alliance for Caregiving, 2004). While some factors associated with care recipient outcomes have been examined, limited attention has been given to caregiver factors, including caregiver personality traits and coping styles, especially as they might affect caregivers' ability to provide care and a positive care environment. Very few studies have examined caregiver factors as they affect the three previously mentioned care recipient outcomes. The next section provides a rationale for how caregiver factors might affect care recipient outcomes related to severe dementia, institutionalization, and death. First, I discuss the literature on factors in the care environment that are associated with care recipient outcomes. Next, I discuss the literature on caregiver personality and coping strategies which may impact caregiver outcomes such as perceived burden, distress, and health. These in turn may affect the care provided and affect the course of dementia in the care recipient. While it is important to understand the potential mechanisms of how caregiver factors affect care recipient outcomes, this review is focused on examining the supporting research of this project, which examined caregiver personality and coping strategies in predicting dementia outcomes relevant to the care recipient.

Caregivers may have an impact on the cognitive and functional outcomes of their care recipient through the environment in which the care is provided and their interactions with the care recipient over time. Slower cognitive decline in persons with dementia has been associated with engagement in cognitive activities that involve novel information processing (as reported on the Lifestyles Activity Questionnaire), at least early in the course of dementia (Treiber et al., 2011), as well as stimulating games and physical exercise (Cheng et al., 2014). In fact, in the latter study, individuals with at least mild dementia, defined as CDR of greater than or equal to 0.5, who were living in nursing homes were randomly assigned to one of three conditions: involvement in cognitively stimulating activities (mahjong), physically stimulating activities (tai chi), or a control group who worked on simple handicrafts. After nine months, individuals engaged in the cognitively and physically stimulating activities on average earned MMSE scores 4.5 (95% CI [2.0, 6.9]; *d* = 0.48) and 3.7 (95% CI [1.4, 6.0]; *d* = 0.40) points higher, respectively, than those who did not engage in these activities. Over that time, the control group MMSE scores dropped by 2.9 points (95% CI [-4.2, -1.7]) while the game group gained 1.5 points (95% CI [0.0, 3.0]) and the physical exercise group gained 1.3 points (95% CI [0.0, 2.5]). It has also been found that care recipients whose caregivers encourage physical activity, even at moderate and severe stages of dementia, have slower declines in their ability to perform activities of daily living (Burge, Kuhne, Berchtold, Maupetit, & von Gunten, 2012).

Of course, several care recipient factors are associated with worse outcomes. Lopez et al. (2010) cited studies that identified factors associated with more rapid cognitive decline. This included more cognitive and functional impairment at baseline, language impairment, impairments in executive functioning, the presence of disruptive behavioral problems or psychotic symptoms, and problematic motor symptoms. Rabins et al. (2012) found that individuals with behavioral disturbance (as measured by at least one clinically significant Neuropsychiatric Inventory [NPI] domain score) and those with worse physical health were more likely to develop severe dementia. There have been many studies examining physical health and its effect on cognitive outcomes for individuals with dementia, but these are not always consistent. For example, Musicco et al. (2009) found that individuals with diabetes had a slower rate of cognitive decline than individuals without diabetes, but they found no effect for hypertension or hypercholesterolemia. Additionally, they found that younger individuals and those with more education had faster rates of cognitive decline. These results are consistent with other studies (see Jacobs et al., 1994; Rasmusson, Carson, Brookmeyer, Kawas, & Brandt, 1996). Some medications have also been linked to slower decline of cognitive abilities in dementia. Specifically, Lopez et al. (2010) found that treatment with donepezil (trade name: Aricept) was related to a 39-63% reduction in risk of rapid decline in cognitive functioning.

Caregiver Factors Related to Care Recipient Outcomes

The literature that examines caregivers' impact on care recipient outcomes suggests that several potential caregiver factors may play a role in this association. Specifically, these factors include caregivers' perceived burden, distress, and poorer mental or physical health. Caregivers may have different vulnerabilities to negative outcomes from the caregiving role. In fact, Vitaliano et al. (1991) found that caregivers who have health problems, anger, and anxiety, as well as those caring for individuals with more functional impairment in performing activities of daily living, are at a higher risk of experiencing and reporting burden as a result of the caregiving role. Additionally, caregivers who report spending more time with the care recipient also report more perceived burden and stress (Bell, Araki, & Neumann, 2001). This may contribute to the findings that spouse caregivers have worse negative outcomes compared to adult child caregivers (George & Gwyther, 1986; Schulz, O'Brien, Bookwala, & Fleissner, 1995). Tremont, Davis, and Bishop (2006) found that poor familial relationships, poor communication between family members, and dysfunctional family roles are associated with higher perceived levels of burden for caregivers. The burden reported by caregivers may affect their ability to promote experiences for their care recipients that are associated with slower rates of cognitive and functional decline.

According to a survey comparing caregivers for individuals with AD (*n* = 227) with caregivers for physically ill individuals (*n* = 749), caregivers for those with AD show higher levels of stress and burden (Alzheimer's Association & National Alliance for Caregiving, 2004). A study of nearly 1,400 caregivers of individuals with and without dementia found that caregivers of individuals with dementia report more difficulties managing personal time, time with other family members, family conflict, and mental and physical problems, which are often associated with increased perceptions of burden (Ory, Hoffmann, Yee, Tennstedt, & Schulz, 1999). Likewise, caregiver burden can affect many facets of caregivers' lives, including psychological well-being, social interactions, and physical health (George & Gwyther, 1986). This may be particularly relevant to caregivers who reported having a closer relationship with the care recipient or spending more time with the care recipient, as they also reported greater strain (Cantor, 1983; Fauth et al., 2012).

The increased burden reported by caregivers is important, and may impact the caregivers' behavior towards the person with dementia. For instance, Camden et al. (2011) found that caregivers' reports of burden were positively related to the caregivers' reports of more abusive behavior directed towards the care recipient over a year of caregiving.

Caregivers' reports of increased stress and psychological morbidity have been found to be associated with increases in care recipients' behavioral symptoms and impairment in their ability to independently carry out activities of daily living (González-Salvador, Arango, Lyketsos, & Barba, 1999). However, caregiver behaviors have been found to affect care recipient behaviors, which may in turn lessen the burden experienced by the caregiver. Specifically, de Vugt et al. (2004) found that caregiver management strategies that include adaptive and accepting behaviors defined as nurturing or supporting are associated with fewer care recipient neuropsychiatric symptoms, and less caregiver reported burden.

Additionally, for care recipients who lose the ability to carry out their own activities of daily living, caregivers are often required to perform more physically intensive tasks, which may contribute to perceptions of burden (Burge et al., 2012). In turn, burden may be more intensely experienced by caregivers of care recipients with poorer health, or for caregivers who have their own medical or physical ailments that make physical activities difficult or painful.

In light of the above, the importance of caregivers' ability to manage their perceptions of and response to stress becomes apparent. Two factors relevant to this process are the caregivers' personality and their coping strategies. Caregiver personality traits and their potential relation to the caregiving relationship are examined in the next section followed by a section that examines caregiver coping strategies, which are important in assessing how individuals respond to situations that have the potential to cause distress.

Caregiver Personality Traits

According to the premises of personality trait theory, personality is presumed to be the pattern of thoughts, feelings, and behaviors that differentiate individuals and is relatively stable throughout one’s life, especially into adulthood (Eysenck & Eysenck, 1985; McCrae & Costa, 1994). There is a broad array of personality theories examined in research. It is outside of the scope of this project to examine all of these theories. However, as reported by Ozer and Benet-Martínez (2006), the Five Factor Model (FFM) of personality is widely used in personality research, especially that which predicts mental and physical outcomes. This model of personality provides the framework for the current study. The FFM conceptualizes personality traits in five domains: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, each of which is examined briefly in this section.

Neuroticism is defined by McCrae and John (1992) as a tendency to experience distress, nervous tension, depression, frustration, guilt, and self-consciousness. High Neuroticism is often associated with higher ratings of anxiety, depression, and emotional lability (Eysenck & Eysenck, 1985). Additionally, higher Neuroticism scores are associated with greater reports of distress related to major life events and daily stressors (Larsen & Ketelaar, 1991; Ormel & Wohlfarth, 1991). The six facets of Neuroticism as identified by the NEO are anxiety, depression, hostility, impulsiveness, self-consciousness, and vulnerability (Costa & McCrae, 1992).

McCrae and John (1992) reported that the definition of Extraversion is less agreed upon than that of Neuroticism, but Extraversion is often defined as sociability.

Extraversion is associated with higher ratings of sociability, liveliness, and more activity (Eysenck & Eysenck, 1985). The six facets of Extraversion are warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions (Costa & McCrae, 1992). Individuals who are high in Extraversion often have more social support (Bolger & Eckenrode, 1991), which has been found to be associated with lower reports of stress (Cohen, 1988).

Openness is associated with a willingness to experience new things. The facets of Openness are openness to fantasy, aesthetics, feelings, actions, ideas, and values (Costa & McCrae, 1992). The facets of the personality trait called Agreeableness are altruism, compliance, modesty, straightforwardness, tender-mindedness, and trust. Finally, the facets of the fifth personality trait, Conscientiousness, are achievement striving, competence, deliberation, dutifulness, order, and self-discipline.

While caregivers may be thrust into their roles out of necessity, a sense of familial obligation, or a desire to help, it may be that certain family members whose personality traits are more amenable to the tasks of care giving are better able to adjust and adapt to the new role. Even at less extreme positions on the continuum of personality traits, the five personality domains may have an impact on how an individual engages in relationships and responds to situations in their lives. As such, it is important to understand how caregivers' personality traits affect their engagement in the caregiving relationship and their reaction to the stressors of providing care for a loved one with a degenerative disease.

Some studies have examined the impact of caregiver personality characteristics on caregiver outcomes. For instance, physical and mental health are positively associated with Extraversion and Conscientiousness and negatively associated with Neuroticism, while subjective mental health is positively associated with Agreeableness and subjective physical health is associated with Openness (Löckenhoff et al., 2011). As suggested earlier, caregivers' mental and physical health also affect the caregiver's care management activities.

A relatively small number of studies have also examined the effects of caregivers' personality on care recipient outcomes. For instance, using the same longitudinal, population-based study of dyads of dementia caregivers and their care recipients, Norton et al. (2013) found that care recipients have significantly faster cognitive decline when they have caregivers, especially adult child caregivers, who score high on Neuroticism.

Caregiver Coping Strategies

In the caregiving role, caregivers may be faced with numerous, often unpredictable, stressors associated with their responsibilities. They must make difficult decisions regarding the present and future care of a formerly independent family member. Common themes in studies examining the caregivers' experience of providing care to a family member with dementia include feelings of grief, guilt and burden associated with decision-making and increased depression even several years following the death of the person with dementia (Peacock, 2012). According to survey data from the Alzheimer's Association (2014), the majority of caregivers (59%) rated the emotional stress of caregiving as high or very high. In various circumstances, the caregiver must appraise emotionally charged situations and respond in a way that considers the needs and desires of the care recipient as well as the caregiver and other parties involved. In this way it is foreseeable that caregivers' successful (or unsuccessful) use of coping strategies may conceivably affect treatment of the person with dementia.

Broadly speaking, coping has been defined by Lazarus and Folkman (1984) as an individual's response to a situation, based on his or her appraisals of that situation. They reported that coping is a process that involves "constantly changing cognitive and behavioral efforts in order to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141).

According to the transactional model of stress, coping involves two stages of appraisal processes (Vollrath, 2001). The primary appraisal process requires the individual to assess whether the situation involves a threat, loss, or challenge, and may take into account the novelty, predictability, uncertainty, and ambiguity of the situation. The secondary process of appraisal involves determining the controllability of the stressor or situation and the assessment of coping resources. It is during this secondary stage that caregivers implement coping strategies, which may affect the situation's outcome and their reaction to the situation.

Problem Versus Emotion Focused Coping Strategies

Often, coping strategies are classified into one of two categories based on the function of the strategy. Problem-focused coping strategies are intended to change one's interaction with the situation. These may include, “defining the problem, generating alternative solutions, weighing the alternatives in terms of their costs and benefits, choosing among them, and acting” (Lazarus & Folkman, 1984, p.152). Problem-focused coping is used when the individual makes a change with his/her relationship with the perceived stressor, such as working to fix a discrepancy between one’s current situation and what one wants. An example is going to the doctor to get medication when one is sick. Caregivers’ increased use of Problem Focused coping methods has been found to be associated with less caregiver burden and greater ease of adjustment (see Kneebone & Martin, 2003; Kramer, 1993).

Alternatively, emotion-focused strategies are intended to alleviate one’s emotional response related to the situation. These coping strategies include avoidance, minimization, selective attention, distancing, and finding positive value in negative events (Lazarus & Folkman, 1984). Emotion-focused coping strategies are intended to reduce distress and may be more common if the individual does not perceive there to be any productive options available to affect the stressor (Carver et al., 1989). An example of emotion-focused coping is wishing for the best outcome from a situation.

Coping and Outcomes

Coping strategies may not be universal across situations, and individuals may use a variety of coping strategies in the same situation. Studies have examined the efficacy of the use of these coping strategies in various situations. For instance, problem-focused coping strategies are often used in situations in which the individual has some potential effect on the possible outcomes through their behaviors (Folkman & Lazarus, 1980).

Additionally, Siegler and George (1983) found that the type of coping technique and its effectiveness were dependent on the type of stressors experienced. For instance, men were more likely to use “active” techniques, as defined by Lazarus and Launier (1978), and to identify having more of an internal locus of control when coping with negative events, such as a death. Additionally, 62% of individuals rated instrumental strategies as more effective than palliative coping strategies when the stressor event was a personal event, while the opposite was found in the case of non-personal stressors. Individuals rated coping effectiveness highest when both strategies were utilized.

Other studies have examined coping strategies and their effect on caregiver outcomes. For instance, caregiver distress has been found to increase with the use of emotion-focused coping strategies (Sanders-Dewey, Mullins, & Chaney, 2001). Additionally, caregivers who reported less use of problem-focused coping and greater use of emotion-focused coping also reported experiencing more burnout (Almberg, Grafstrom, & Winblad, 1997). Dementia caregivers’ use of Wishful Thinking and Blaming Self coping strategies were found to be associated with greater anxiety, while use of Blaming Others coping strategy among male caregivers and Wishful Thinking among younger caregivers was associated with a greater number of health concerns (Snyder et al., 2014). There is evidence that older persons rely more on emotion-focused coping strategies and less on problem-focused strategies than do younger persons (Blanchard-Fields, Jahnke, & Camp, 1995; Folkman, Lazarus, Pimley, & Novacek, 1987). Whether this represents cohort differences or a change in coping style longitudinally is not clear. In light of the finding that emotion-focused coping strategies are associated with outcomes that are more negative, this finding may suggest that spouse caregivers, who are typically older than their adult child counterparts, may be at greater risk for caregiver distress and negative outcomes from the caregiving relationship.

Positive effects of coping have also been found for caregivers. Specifically, the use of approach coping strategies, Seeking Social Support, and caregivers' benign appraisal of stressors have been found to be related to more positive caregiver health outcomes. This is important because caregivers with more health concerns are more vulnerable to negative outcomes as a result of the caregiving role, which may interfere with their ability to engage in positive caregiving activities (Goode, Haley, Roth, & Ford, 1998). Piercy et al. (2012) found that dementia caregivers who utilized more Problem Focused coping strategies and less Wishful Thinking reported fewer depressive symptoms.

Gender Differences in Coping

Caregivers for individuals with dementia are typically female, but it may be important to understand gender differences in coping strategies. Overall, male and female caregivers did not differ on self-reported measures of burden, depression, coping, or life satisfaction in one study (McConaghy & Caltabiano, 2005).

Devries, Hamilton, Lovett, and Gallagher-Thompson (1997) found that female caregivers used a wider range of coping strategies, but did not differ in their frequency of use of Avoidance coping nor in their helpfulness ratings of coping strategies. This finding was thought to refute the hypothesis that women's higher report of distress leads to more emotion-focused coping like Avoidance.

Association of Personality Traits and Coping Strategies

Both personality traits and coping strategies are present from an early age. Although not necessarily stable over time and situations, these factors may be related. Personality has been argued to have direct effects on the development of coping styles in early childhood, which may affect lifelong coping (Derryberry, Reed, & Pilkenton-Taylor, 2003). It has been argued that biological appetitive, defensive, and attention systems that facilitate approach to rewards and avoidance of threats are defined by personality styles and affect how the individual engages with their environment. For instance, the authors argued that individuals high in Extraversion have an underlying tendency to be social and active, which may encourage them to engage in support-seeking coping behaviors. Additionally, the increased awareness of threats associated with higher Neuroticism may be associated with Avoidance coping styles.

Studies have examined the direct association between personality traits and coping strategies. For instance, in a review of the literature examining the association between personality and coping, Connor-Smith and Flachsbart (2007) found that Problem Focused coping was associated with higher levels of Extraversion and Conscientiousness and lower levels of Neuroticism. This may be because individuals high in Extraversion and Conscientiousness see problems as challenges to solve, while those high in Neuroticism may see problems as threats. High levels of Neuroticism have been associated with more emotion-focused coping like Wishful Thinking and withdrawal (McCrae & Costa, 1986). Another study, which utilized a sample of college students, found an association of Extraversion and Seeking Social Support, which is typically defined as an emotion-focused coping strategy ($F = 5.21$, $p < .03$; Amirkhan, Risinger, & Swickert, 1995). Watson and Hubbard (1996) found a positive association with Extraversion and emotion-focused coping strategies such as Seeking Social Support and positive reappraisal, but they also found a positive correlation between Extraversion and Problem Focused coping, again using a college student sample. These findings associating Neuroticism and Extraversion with coping styles have been replicated by many studies.

Less studied are associations between Openness, Agreeableness, or Conscientiousness with coping strategies (David & Sulls, 1999). However, McCrae and Costa (1986) found that lower scores on Openness were associated with greater use of Religious coping strategies in community-dwelling adults. Similar to the findings regarding Extraversion, high Agreeableness has been associated with greater use of Seeking Social Support as a coping strategy in undergraduate student samples (O'Brien & DeLongis, 1996; Watson & Hubbard, 1996). Higher Conscientiousness was associated with more problem solving and less emotion-focused coping strategies (Hooker, Frazier & Monahan, 1994). Geisler, Wiedig-Allison, and Weber (2009) found a positive association between Problem Focused coping and Extraversion, Openness, Agreeableness, and Conscientiousness, respectively, using a college student sample. Hooker et al. (1994) studied a sample of spouses of persons with dementia and found a negative association of Problem Focused coping with Neuroticism ($r = -.59$, $p < .001$) and positive associations with Extraversion ($r = .34$, $p < .01$) and Conscientiousness ($r = .35$, $p < .01$). They also found a positive association of emotion focused coping with

Neuroticism ($r = .67$, $p < .001$) and a negative association with Extraversion ($r = -.63$, $p < .001$), Agreeableness ($r = -.32$, $p < .05$), and Conscientiousness ($r = -.48$, $p < .001$). Carver and Connor-Smith (2009) found an association between Extraversion, Conscientiousness, and Openness to coping styles that required engagement, including optimism and engagement. These researchers differentiated between engagement coping strategies, which others may call problem-solving strategies, emphasizing dealing with the problem, versus disengagement, or avoidance strategies, which relate to emotion-focused strategies discussed by other researchers. Neuroticism, on the other hand, was associated with more disengagement type of coping.

There have also been studies to examine the indirect link between personality and coping. Personality characteristics may affect how individuals perceive stressors, which may then affect the coping strategy with which they respond to the stressor. In a study of non-psychology major university students participating in a staged interpersonal stress situation study, Geisler et al. (2009) found that individuals high in Neuroticism were more likely to withdraw and display passivity. Neuroticism has also been linked to higher rates of stress exposure and reactivity to stress in undergraduate student samples (Gunthert, Cohen, & Armeli, 1999). Agreeableness has been found to be associated with infrequent interpersonal conflict, although, in a review of the literature as well as in an original study utilizing university psychology students, Watson and Hubbard (1996) argue that the research shows only modest associations between this personality trait and coping styles. Conscientiousness is associated with lower stress exposure, which has been argued to be related to the preventative behaviors and reduced risk behaviors associated with this personality trait (Vollrath, 2001). In a review of the literature, high Extraversion has been found to be associated with lower stress reactivity (Penley, Tomaka, & Wiebe, 2002), although one study using a sample of college students found that high Extraversion is associated with higher levels of self-reported stress due to life experiences (Swickert, Rosentreter, Hittner, & Mushrush, 2002).

The association between personality and coping may be somewhat situation specific. For instance, a review of the literature revealed that personality was more strongly associated with coping styles for younger individuals and among individuals experiencing stress (Connor-Smith & Flachsbart, 2007). Extrapolating to caregivers, this may suggest that adult child caregivers' personality traits will be more strongly linked to their coping strategies. Another study found that age, stress severity, and temporal proximity between coping and the report of coping also have been found to moderate the association between personality and coping responses (Carver & Connor-Smith, 2009). Additionally, there may be other caregiver factors that affect both personality and coping characteristics, such as the higher propensity for women to seek social support (Tamres, Janicki, & Helgeson, 2002) and to score higher on some facets of Extraversion (Costa, Terracciano, & McCrae, 2001). Alternatively, some researchers have proposed that coping is a personality process, and that personality traits may emerge in coping patterns over time in the face of stressful events (Bolger, 1990). For instance, Bolger (1990) found that Neuroticism affected coping strategies, especially emotion-focused coping, and increased Wishful Thinking and Blaming Self in individuals in longer-term, stressful situations.

As the previous section addressed, many studies have attempted to elucidate the link between personality factors and coping strategies. However, the majority of these studies utilized a university student convenience sample, which may not generalize to a potentially more heterogeneous population of dementia caregivers. Additionally, although several studies have examined the role of caregiver personality and caregiver coping strategies on caregiver outcomes, there is limited research examining the role of these two factors on outcomes for the person with dementia. As was previously stated, many studies have attempted to identify and examine factors associated with differing courses of dementia symptom progression. This study seeks to add to the literature by examining the role of caregiver personality traits and coping strategies on care recipient outcomes.

Research Questions

This study used extant data from a population-based sample to examine caregiver factors, specifically caregiver personality traits and coping strategies as individual factors as well as their interactions, and their possible association with the care recipients' progression to clinically relevant endpoints, including severe dementia, institutionalization, and mortality. This study addressed several significant research questions that had not been thoroughly addressed by previous research.

1. Are specific caregiver personality trait scores (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness [N-E-O-A-C]) associated

with dementia care recipient outcomes, including time to severe dementia, institutionalization, and death?

> Controlling for caregiver factors including age, gender, kin relation to the care recipient, co-residing with care recipient, and caregiver-rated relationship closeness, as well as care recipient factors including gender, estimated dementia onset age, education, and neuropsychiatric symptoms, are specific personality traits (N-E-O-A-C) identified on the NEO Personality Inventory, Revised (NEO-PI-R) or NEO Five Factor Inventory (NEO-FFI) associated with whether care recipients develop severe dementia, become institutionalized, or die?

2. Are caregiver coping strategies associated with dementia care recipient outcomes, including time to severe dementia, institutionalization, and death?

> Controlling for caregiver factors including age, gender, kin relation to the care recipient, co-residing with care recipient, and caregiver-rated relationship closeness, as well as care recipient factors including gender, estimated dementia onset age, education, and neuropsychiatric symptoms, are specific coping strategies identified on the Ways of Coping Checklist – Revised (WCCL-R) associated with whether care recipients develop severe dementia, become institutionalized, or die?

3. Are caregiver personality trait scores (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) associated with caregivers’ specific coping strategies?

4. Does the interaction of caregiver personality traits and caregiver coping styles predict outcomes for the care recipient, including progression to severe dementia, institutionalization, or death?

    The selection of factors to examine for interactions was informed by identification of the significant associations between the personality traits and coping styles as well as their associations with the three outcomes. These potential predictors were included in models examining the interaction terms with one personality trait and one coping strategy to assess for moderating effects.

CHAPTER III

METHOD

Participants

This project used extant data collected from the population-based study, the Cache County Dementia Progression Study (DPS). The DPS was an offshoot of the Cache County Study on Memory in Aging (CCSMA). The CCSMA examined a community-based sample of persons aged 65 years or older and completed four waves of dementia ascertainment through a multi-staged screening and assessment protocol (see Breitner et al., 1999; Miech et al., 2002). The primary purpose of DPS was to examine factors that are related to the course of dementia progression. DPS participants were dyads of caregivers of individuals with dementia and their care recipients. Persons with dementia were identified in four waves of the CCSMA based on a dementia screening protocol described in the next section.

Dementia Screening and Assessment

The CCSMA began in 1995, at which time 5,657 individuals over the age of 64 years were identified as meeting the permanent Cache County residency inclusion criteria (Breitner et al., 1999). Approximately 90% (5,092) participated in the first wave of the study protocol. Breitner and colleagues described the protocol for dementia identification in the CCSMA, which included a cognitive screening using an altered version of the Modified Mini-Mental State Exam (3MS; Tschanz et al., 2004), or cognitive and functional ratings from a proxy informant for individuals scoring poorly on the 3MS ($\leq$ 60) or who were deemed to be unreliable according to an interviewer. Informants of participants who screened positive on the cognitive measure or who were over the age of 90, as well as a subsample of participants who were previously selected to complete all screening stages, completed a semi-structured interview utilizing the Dementia Questionnaire (DQ) to identify cognitive impairment. For those screening positive ("questionable dementia" or "probable dementia" on the DQ) and the subsample were invited to participate in a clinical assessment. This assessment, performed by a research nurse and neuropsychological technician, involved neuropsychological testing, physical exam and a clinical interview with an informant. Following the assessment, the data were reviewed for determination of dementia status by a neuropsychologist, board-certified geriatric psychiatrist, and the nurse and neuropsychological technician. Dementia was diagnosed using the DSM-III-R (American Psychiatric Association [APA], 1987) criteria. Additionally, individuals were given a CDR scale score as a rating of functional abilities. The estimated age of dementia onset was noted as the age at which the individual first met DSM-III-R criteria for dementia. Additionally, laboratory tests were conducted for persons with suspected dementia, including complete blood counts, routine chemistries (CHEM-20), serum B-12, folate, thyroid function tests and urinalysis, and Magnetic Resonance Imaging (MRI) brain scans or Computed Tomography (CT) scans. A geropsychiatric examination was offered to those individuals as well.

A panel of experts was convened to make a final decision regarding dementia status designation. Alzheimer's Disease diagnoses were made using criteria from the

National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA). Vascular Dementia diagnoses used criteria from the National Institute of Neurological Disorders and Stroke and Association – Internationale pour la Recherché et l'Enseignement en Neurosciences (NINCDS-AIREN). An 18-month clinical assessment was offered for individuals with possible or probable dementia to elucidate the dementia diagnosis. Waves two through four were conducted in a similar manner except for a few variations in procedures to increase the sensitivity of dementia ascertainment.

Throughout the four waves of CCSMA, 575 incident (new-onset) cases of dementia were identified. Beginning in 2002, the individuals identified as having a new-onset case of dementia were asked to participate in the DPS.

Procedures of the DPS

Individuals identified as having dementia, as well as a caregiver, were asked to participate in semi-annual home visits, during which a trained research nurse and neuropsychological technician conducted assessments and interviews with participants. During the visit, the care recipient participated in neuropsychological testing and a brief neurological and physical examination. The caregivers completed an interview during which they answered questions regarding the care recipients' cognitive and functional abilities, health status, and psychiatric conditions. The caregivers also reported information regarding their own physical and mental health status. The DPS and the current project were both reviewed and approved by the Utah State University Institutional Review Board.

Caregiver Measures

Assessing Personality

The DPS used the NEO-PI-R or the shortened Five Factor Inventory, the latter for caregivers missing NEO-PI-R questionnaires. The NEO-PI-R is a 240-item personality inventory, with 48 items for each of the five domains. The NEO-FFI is a 60-item personality inventory that uses a subset of 12 items from the original 48 for each domain. The NEO Personality Inventory (NEO-PI) and its revision (NEO-PI-R) are commonly used personality assessments. Costa and McCrae first developed the NEO-PI in 1985. The purpose of this inventory was to measure an "individual's characteristic and enduring emotional, interpersonal, experiential, attitudinal, and motivational styles" (p. 189), which they labeled personality traits (Costa & McCrae, 2008). The revised version of the scale (NEO-PI-R) was published 1992, adding facet scales for Agreeableness and Conscientiousness as well as making changes to 10 of 144 items loading onto Neuroticism, Extraversion, and Openness to improve internal consistency (Costa & McCrae, 2008). This measure was developed based on the personality FFM, which includes five broad domains of personality named Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness (Costa & McCrae, 1992). In addition to the five broad domains, each domain is comprised of six facet scales (Costa & McCrae, 1995). The purpose of linking this personality measure with the FFM was to maintain the clinical utility for counseling, abnormal psychology, and clinical psychology. Costa and McCrae (1992) argued that their personality inventory measures “enduring dispositions emotional, interpersonal, experiential, attitudinal, and motivational styles” (p. 11) of individuals.

Caregivers who were identified to be the primary provider of support for the person with dementia were asked to complete a personality questionnaire either at the time of a home visit or via a follow-up telephone call. The questionnaires were not completed at the same visit for all of the caregivers. The caregivers were given instructions to rate each item on either the NEO-PI-R or NEO-FFI on a 5-point Likert scale of how appropriately they think the item describes them, from strongly agree to strongly disagree. Items include things like, “I am not a worrier” and “When a project gets too difficult, I decline and start a new one.” In order to allow for the use of the NEO-FFI questionnaires in this study, all of the personality inventories were scored using the NEO-FFI algorithm, as has been done in previous research (see Norton et al., 2013). If individuals were missing less than 10% of the items for each facet score, the average score across the facet was imputed for the missing scores. Scores were converted to *t*-scores and were treated as continuous variables.

Psychometric properties of the NEO-PI-R have been documented in a number of studies. Trull, Useda, Costa, and McCrae (1995) found statistically significant correlations between the scales of the NEO-PI-R and the corresponding scales on the Psychopathology Five, another measure of personality constructs. Specifically, NEO Neuroticism had a significant counterpart of Negative Emotionality ($r = .60$, $p < .001$), while NEO Extraversion had a significant counterpart of Positive Emotionality ($r = .59$, $p < .001$). In a study of 1,944 participants ranging in age from 20 to 96, with a majority over the age of 60, Terracciano, McCrae, Brant, and Costa (2005) found high internal consistencies for each of the five domains (N = .91, E = .87, O = .87, A = .88, and C = .92). Caruso (2000) found differences in reliability among the scales. For example, there was lower reliability for Agreeableness for self-report (.74 across 45 studies), report using English scales (.73 across 41 studies), student samples (.74 across 17 studies), and clinical samples (.62 across seven studies). Test-retest reliabilities for Agreeableness were found to be low (.58 across four studies). In interpreting the findings of this review, Caruso argues that the scores on the NEO may better represent “state” rather than “trait” characteristics. Vassend and Skrondal (2011) found support through confirmatory factor analysis for most of the facets and domains of the NEO-PI-R, but found a lack of fit for Extraversion and Agreeableness. However, other studies cited by these researchers found support for the factors using exploratory factor analysis (e.g. McCrae, Zonderman, Costa, Bond, & Paunonen, 1996).

The NEO has been found to be correlated with the Myers Briggs Type Indicator (MBTI; Furnham, Moutafi, & Crump, 2003). The MBTI measures four personality traits based on Jung’s psychological types theory. Specifically, Extraversion on the NEO-PI-R was highly correlated with Extraversion-Introversion on the MBTI ($r = .71$, $p < .001$; $r = -.72$, $p < .001$, respectively). The Neuroticism domain was also correlated with Extraversion-Introversion ($r = -.30$, $p = .001$; $r = -.31$, $p < .001$). The Openness domain was correlated with Sensing-Intuition ($r = -.66$, $p < .001$; $r = .64$, $p < .001$, respectively).

The Agreeableness domain was associated with Thinking-Feeling ($r = -.41$, $p < .001$; $r = .28$, $p < .001$, respectively). The Conscientiousness domain was associated with Judging-Perceiving ($r = .46$, $p < .001$; $r = -.46$, $p < .001$, respectively). These findings replicated the findings of prior studies (McCrae & Costa, 1992; MacDonald, Anderson, Tsagarakis, & Holland, 1994). Costa and McCrae (1992) report moderate to high internal consistency for each domain of the NEO-FFI (Neuroticism = .79, Extraversion = .79, Openness = .80, Agreeableness = .75, Conscientiousness = .83).

Assessing Ways of Coping

Caregivers were asked to complete the Ways of Coping Checklist-Revised (WCCL-R; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985) annually in order to assess their means for coping with life stressors. The Ways of Coping Checklist (WCCL) measure was originally developed by Folkman and Lazarus (1980) to assess coping strategies from Lazarus’ transactional model of stress (Vitaliano et al., 1985). It contained 68 coping items and identified seven coping strategies. Vitaliano et al. (1985) analyzed this version of the questionnaire for reliability and found that across the four common scales, the mean alpha values ranged were .81 for the original scales and .82 for the revised scales for a sample of medical students. Vitaliano has since revised the measure, creating the WCCL-R, which now produces eight coping strategies. The coping strategies assessed through this measure are Problem Focused, Seeking Social Support, Blaming Self, Wishful Thinking, Avoidance, Blaming Others, Counting Blessings, and Religious coping.

Caregivers were asked to complete this questionnaire as part of the self-administered booklet during each of the odd-numbered visits. They were asked to disclose an issue or problem in their life with which they were currently dealing and to keep it in mind as they completed the questionnaire, rating how often they used each of 57 strategies on a 4-point scale (0 = never, 1 = rarely, 2 = sometimes, 3 = regularly). These included strategies such as “avoided my problem” and “made a plan of action and followed it.” Although the focus of this analysis is to study caregivers’ coping strategies in their caregiving role, caregivers were not prompted to think solely about the problem of providing care for the person with dementia. The WCCL-R was scored by summing scores in each of the eight scales separately and calculating the average rating across items within each scale. Each of the scale scores was then treated as interval variables in the models.

Due to the nature of examining coping across situations, internal consistency was not expected to be high for this measure, especially across different stressors (Billings & Moos, 1981). However, some researchers have found estimates of coefficient alphas in the moderate to moderate/high ranges, such as those found in a study of 168 working adults (.50 to .75; Scherer & Brodzinski, 1990).

Demographics

Caregivers’ demographic information, including gender, age, and highest level of education was collected at the time of the first visit. Additionally, caregivers were asked to report the nature of the relationship between the caregiver and care recipient, such as adult child or spouse.

Relationship Closeness

In addition to the nature of the relationship between the caregiver and care recipient, caregivers were asked to complete the Whitlatch Relationship Closeness Scale (RCS) in order to assess the quality of the bond between the caregiver and care recipient. The Whitlatch RCS has been used previously in studies addressing whether caregiver closeness affected caregiver adjustment for caregivers of older individuals with dementia (Whitlatch, Schur, Noelker, Ejaz, & Looman, 2001). This scale is a six-item measure that asks caregivers and care recipients to separately rate their agreement, on a 4-point Likert scale, with statements concerning the quality of their relationship currently and prior to the onset of the care recipient’s dementia symptom onset. The statements on the RCS include, “(Care recipient) always understands what I value in life,” “My relationship with (Care recipient) is close,” “(Care recipient) makes me feel like a special person,” and “(Care recipient) and I can always discuss things together.” Higher scores on this measure indicate greater closeness, as negatively worded items were reverse scored. The scores from each of the items were summed, and the maximum possible total score is 24 points. Due to time limitations, this scale was only administered annually during odd-numbered visits. Although this scale was completed by both the caregiver and the care recipient when possible, we used the caregiver report due to questions of the accuracy with which care recipients could report due to the cognitive impairments of dementia. Whitlatch et al. (2001) found an α reliability of .90, while Fauth et al. (2012) found a reliability of Cronbach α = .859 in the DPS.

Care Recipient Outcome Measures

Severe Dementia

Severe dementia was defined following criteria reported in Rabins et al. (2012) using two measures, one a global cognitive test and the second, a rating of dementia severity. Each is discussed below. The MMSE is a commonly used, 30-point screening measure of global cognitive abilities (Folstein, Folstein, & McHugh, 1975; Norton et al., 2009). The MMSE assesses five domains of cognitive functioning, including orientation, registration, attention, recall, and language (Crum, Anthony, Bassett, & Folstein, 1993). Total scores were obtained by summing the correct points across all items. Folstein et al. (1975) found good test-retest reliability in the MMSE (r = .83-.99), as well as moderate correlation with the Wechsler Adult Intelligence Scale Verbal and Performance Indices (r = .78, p < .001, and r = .66, p < .001, respectively). The MMSE produces scores ranging from 0-30, with lower scores representing greater cognitive impairment. As discussed earlier, a common cutoff for designating severe dementia is an MMSE score less than or equal to 10 (American Geriatric Society, n.d.), which is the cutoff that will be used for this study.

The CDR scale is an observer rating of the severity of dementia symptoms across several functional domains. This measure was developed as part of the Memory and Aging Project at the Washington University School of Medicine as a way to stage dementia severity, originally intended for Alzheimer’s disease patients. It is a rating scale of six areas of cognitive and functional performance, including memory, orientation, judgment and problem solving, community affairs, home and hobbies, and personal care. Each performance area is rated on a 5-point scale ranging in severity of symptoms within each domain (0 = none; 0.5 = very mild; 1 = mild; 2 = moderate; 3 = severe). A global score can be calculated given a formula that takes into account the most common rating, with a greater weight for the memory domain. Morris et al. (1997) found an overall agreement between raters of 83% using the CDR, and no significant difference between MD raters and non-MD raters ($\chi^2 = 0.36$, $p = .55$).

If an individual did not meet severe dementia criteria for both the MMSE and CDR scores independently, the individual was still classified as meeting criteria with an MMSE score of 16 or less or a CDR score of 2 or greater (Rabins et al., 2012).

Institutionalization

The place of residence of the care recipient was reported at every visit. This included any hospital stays and dates of moving into an assisted living or structured nursing facility. Each of these facilities represents a clear difference from living independently at home. This study examined any admittance into an assisted living or structured nursing facility as evidence of institutionalization.

Mortality

Death occurrence and death dates were identified through newspaper obituaries or notification from caregivers.

Covariates

In order to examine the association between caregiver personality, caregiver coping strategies, and outcomes for the person with dementia, additional factors were controlled as the concepts they represent are associated with the above constructs. For example, the age and gender of the person with dementia was controlled for in the proposed analyses, as studies have shown that older individuals and males are at risk of worse outcomes. Additionally, the care recipient's level of education was controlled, as prior studies have found that greater cognitive reserves associated with more years of formal education may slow the rate of progression of cognitive decline, especially early in the disease course. Neuropsychiatric symptoms were also controlled, as they have been shown to be related both to caregiver coping strategies as well as the care recipient's stage of dementia progression (Peters et al., 2012). Due to the nature of data collection, this study was able to incorporate time-varying ratings of the presence of neuropsychiatric symptoms on the NPI. Finally, the duration of dementia was controlled in all analyses, as this has been found to be associated with dementia progression. As individuals did not complete visits at the same time point in their dementia progression, this was a necessary control. Variables associated with the caregivers, including age, gender, and kin relationship, and perceived relationship closeness were also tested as covariates in the analyses. Other than the major personality trait and coping strategy variables, non-significant covariates were removed from all models.

Study Design

In order to collect as accurate information as possible regarding dementia outcomes, all attempts were made to collect data from the person with dementia as well as a primary caregiver, usually either a spouse or adult child who had regular contact with the care recipient. The study sought to interview the same caregiver over time to maintain consistency in subjective report measures, but this was not always possible. This study identified a key caregiver, who was the person who provided information regarding the care recipient most often, or who served first in the case of multiple caregivers completing an equal number of visits. Only information from identified key caregivers was used in the caregiver-specific analyses. Information regarding the person with dementia, including scores on objective measures of cognitive abilities conducted by the neuropsychology technician as well as reports of behavioral symptoms, was used for each visit conducted as long as the caregiver providing information was rated as reliable or probably reliable.

To minimize the burden to caregivers and care recipients, not all of the measures utilized in these analyses were administered at every visit, but rather some were only collected on alternate visits. For instance, the WCCL-R measure was only completed by caregivers during every odd-numbered visit. A complete list of the assessment schedule can be found in Table 1. Additionally, information regarding care recipients' dates of death was collected throughout the DPS from caregivers' reports and newspaper obituaries.

The data were compiled from the most recent DPS data release from Fall 2012. Caregiver data was included only for those caregivers identified as "key caregivers," and the starting date in the study for the person with dementia was adjusted to coincide with the first visit during which this key caregiver provided data. Due to the nature of data collection, caregivers' coping strategies were only assessed at odd-numbered visits.

Table 1

Assessment Schedule

Domain	Odd Visits	Even Visits
Care Recipient Outcome Measures		
Severe Dementia		
MMSE	X	X
CDR	X	X
Institutionalization	X	X
Death[a]	When occurred	
Caregiver factors		
Personality Traits (NEO Personality Inventory; NEO Five Factor Personality Inventory)[b]	Once, at earliest availability	
Ways of Coping Checklist[b]	X	X
Moderating variables—Caregiver factors		
Caregiver Demographics[b]	X	X
Whitlatch Relationship Closeness Scale (RCS)[b]	X	
Moderating variables—Care Recipient factors		
Care Recipient Demographics	X	X
Neuropsychiatric Inventory (NPI)	X	X
Onset age	Estimated at start of study	

[a] Information gathered between visits.
[b] Only information collected from designated Key Caregivers used in analyses

Data Exploration

Prior to answering the proposed research questions, descriptive statistics were conducted on each of the covariates and outcome variables. Additionally, the demographics of the individuals to be included in the study were examined. Finally, the associations between each of the outcomes were examined for possible correlations indicative of potential confounding factors that may need to be addressed in the final analyses.

Statistical Analyses

The discussion of analysis and the results of the study are organized by research question. Within each question, the results are organized first by outcome variable and subsequently by the major facets of the primary predictor or independent variables, namely the five personality traits and eight coping strategies. All statistical analyses were conducted using IBM Statistical Package for the Social Sciences (SPSS) Version 22.

In order to address the first two proposed research questions, this study utilized survival analysis and Cox regression to assess the time to, and the hazard of, each of the three proposed care recipient outcomes with regard to caregiver personality traits (NEO-PI-R/NEO-FFI) and coping strategies (WCCL-R). In survival analysis, the beginning of time was indicated by the first visit conducted through the DPS in which the key caregiver completed the measure of interest. The outcome states, which meet the criteria of being both exclusive and exhaustive, were identified for each of the three outcomes. For the severe dementia outcome, the states were whether the care recipient met criteria for severe dementia on the MMSE and the CDR or not. If an individual met criteria for severe dementia on only one measure, cutoffs were applied when examining the other measure prior to including cases for analyses (MMSE < 16; CDR ≥ 2). For the institutionalization outcome, the states were institutionalized versus not institutionalized. For the mortality outcome, the states were alive or deceased. These were consistent across both predictor variables of caregiver personality traits and caregiver coping strategies. Event occurrence was marked if the care recipient experienced the state change during the time that the key caregiver provided care for the severe dementia and institutionalization outcomes. Event occurrence was marked for the mortality outcome if the care recipient died within 1.8 years (which excluded outliers following examination of the data distribution) after the key caregiver last participated in the study.

The survival analyses were conducted using Kaplan-Meier statistics (Singer & Willett, 2003). Survival analysis is meant to assess the rate of occurrence of specific events as a function of time. The Kaplan-Meier method of survival analysis recalculates the survival function each time an event occurs. This method also automatically accounts for censored subjects, as the fraction reflects the number of individuals who have not experienced the event at the end of the time period divided by the number who had not experienced the event at the beginning of that time period, which is why this method is called the product-limit method. Kaplan-Meier analyses have several assumptions: the event status is two mutually exclusive and exhaustive states, time to event is precisely measured, censoring should be minimized where possible, censored cases would have behaved in the same way as the non-censored cases, and there are no changes in time of recruitment. However, the Kaplan-Meier method does not allow for the examination of the impact of covariates, so additional analyses were required, such as to account for recruitment timing differences through use of dementia duration as a proposed covariate. The Kaplan-Meier method also requires use of categorical predictor variables, which was accomplished by creating quartiles for each of the predictor variable scales, and this study sought to examine the role of the continuous variables measuring personality traits and coping strategies.

Cox regression models, also called proportional hazard models, were used to examine whether there are variations in the risk of outcomes occurring that differ systematically with the predictors. The use of Cox regression allowed for tests of interactions between the variables as well as control of possible covariates (Hosmer & Lemeshow, 1999). In this way, the use of Cox regression models permitted the testing of effects of the variables identified by previous researchers as possible covariates, such as dementia duration. The assumptions of Cox regression include non-informative censoring and proportional hazards. Non-informative censoring means there is not a significant difference in individuals who do not experience the event of interest in the observation period. Proportional hazard is the assumption that the risk of experiencing the event is the same regardless of the time of observation. The log minus log plot for each personality trait (divided into quartiles) was examined with each respective care recipient outcome to examine for diversion of outcomes between groups over time. Due to the examination of incident dementia cases and differences in start time in the study relative to the onset of dementia symptoms, dementia duration was controlled for in all analyses. The possible covariates related to care recipients, including age, gender, education, and neuropsychiatric symptoms (varying across visits), as well as those related to the caregivers, including age, gender, kin relationship, and relationship closeness (varying across key caregiver-completed visits), were controlled in these analyses.

To address the third research question regarding whether the caregivers' personality traits were associated with caregivers' coping strategies, correlational analyses were conducted. The personality trait scores (*t*-score) and the coping strategies (mean scores) were analyzed as continuous variables. Using the mean scores for coping strategies allowed for easier interpretation of caregivers' use of coping strategies through interpretation of the scale noting the frequency with which the coping strategy was used.

The fourth research question regarding the interaction of caregiver personality traits and caregiver coping strategies and its impact on care recipient outcomes was addressed using Cox regression models. The caregiver personality traits and coping strategies were examined to identify any statistically significant associations between pairings, as well as associations with the respective outcomes. This was done to identify which variables were included as interaction terms in models to address this final research question. Additionally, the previous analyses identified the personality traits and coping strategies that were statistically significant predictors in individual models, and these were also analyzed as interaction terms to examine moderation effects.

CHAPTER IV

RESULTS

Research Question 1: Personality Trait Participants

There were 233 dyads whose caregivers completed the NEO and who met criteria for analysis. Dyads included in the analyses were comprised of individuals who had a shorter dementia duration, who experienced a longer time to severe dementia following their inclusion in the study, and who had a longer time to mortality relative to those dyads whose caregiver did not have a completed NEO profile. Table 2 shows a comparison of the dyads whose key caregiver completed the NEO (included in analyses) with those whose caregiver did not complete the NEO (excluded from analyses).

In exploratory analyses, the caregiver and care recipient covariates examined in these analyses were examined for significant associations. Older caregivers were more likely to co-reside with their care recipient at baseline ($r = .627$, $p < .001$). Female care recipients were more likely to be older ($r = .159$, $p = .015$), have longer dementia duration ($r = .280$, $p < .001$), and have completed fewer years of formal education ($r = -.202$, $p = .002$). Care recipients of dyads who did not co-reside at baseline were more likely to be older ($r = .291$, $p < .001$), female ($\phi = .492$, $p < .001$), completed fewer years of education ($r = -.153$, $p = .25$), have older onset age ($r = .217$, $p = .001$) and dementia duration ($r = .225$, $p = .001$) at the time of the first visit. Female care recipients were more likely to have younger ($r = -.387$, $p < .001$) and male ($\phi = -.246$, $p < .001$) caregivers. All of the correlations between caregiver and care recipient variables can be found in Tables 3 through 7.

Table 2

NEO: Complete NEO Versus Incomplete NEO

	NEO *M* (*SD*) or *n* (%)	No NEO *M* (*SD*) or *n* (%)	χ^2 or *t*	*p*	Effect size
n	233	95			
Care Recipient variables					
Gender (female)	132 (56.7%)	58 (61.1%)	0.536	.464	
Education	13.43 (2.97)	13.07 (2.85)	-1.001	.317	
Age	86.08 (5.83)	85.92 (5.49)	-0.228	.820	
Ethnicity (Caucasian)	229 (98.3%)	95 (100%)	1.651	.438	
Age of onset	82.59 (6.04)	81.88 (5.88)	-0.997	.329	
Dementia duration	3.49 (1.80)	4.04 (2.17)	2.199*	.029	0.276
Caregiver variables					
Gender (female)	183 (78.5%)	65 (71.4%)	1.844	.175	
Education	14.34 (2.34)	14.12 (2.59)	-0.733	.464	
Age	66.27 (13.21)	69.43 (16.05)	1.605	.111	
Ethnicity (Caucasian)	230 (98.7%)	91 (100%)	1.183	.554	
Co-resident (yes)	106 (45.5%)	50 (52.6%)	1.379	.240	
Relationship Closeness	18.47 (4.07)	18.16 (3.74)	-0.538	.591	
Care recipient outcomes					
Severe Dementia (e)	61 (26.2%)	25 (26.3%)	0.001	.980	
Time to Severe Dementia	1.77 (2.16)	0.75 (1.27)	-2.700**	.009	0.576
Institutionalization (e)	113 (48.5%)	41 (43.2%)	0.773	.379	
Time to Institutionalization	0.81 (1.54)	0.48 (1.05)	-1.482	.141	
Mortality (e)	164 (70.4%)	72 (79.1%)	2.524	.112	
Time to Mortality	2.61 (1.91)	1.80 (1.61)	-3.153**	.002	0.459

Note. (e): signifies event occurrence
*$p < .05$; **$p < .01$

Descriptive statistics were conducted for NEO *t*-scores. Neuroticism *t*-scores ranged from 33.52 to 88.71, with an average of 50.81 (*SD* = 9.41). Extraversion *t*-scores ranged from 22.23 to 76.97, with an average of 48.99 (*SD* = 9.96). Openness *t*-scores ranged from 27.51 to 85.81 with an average score of 46.37 (*SD* = 8.94). Agreeableness *t*-scores ranged from 6.40 to 75.82 with an average score of 52.96 (*SD* = 9.59).

Table 3

NEO: Caregiver Variable Associations

	CG Age	CG Gender	Co-residency	Relationship Closeness
Caregiver Age				
Correlation	1			
p				
n	220			
Caregiver Gender				
Correlation	-.107	1		
p	.113			
n	220	233		
Non-co-residency				
Correlation	-.627***	-.028	1	
p	<.001	.680		
n	203	213	213	
Relationship Closeness				
Correlation	.109	-.058	.160	1
p	.119	.392	.820	
n	208	221	202	221

Note. CG: Caregiver
***$p < .001$ (all 2-tailed)

Table 4

NEO: Caregiver Variable Associations Continued

	Kin Relationship				Co-Residency		
	Spouse	Adult Child	Other	Total	Co-reside	Non-co-reside	Total
Caregiver Gender							
Male CG	19	30	1	50	21	25	46
Female CG	68	95	20	183	82	85	167
Total	87	125	21	233	103	110	213
Co-Residency							
Co-Reside	81	20	2	103			
Non-Co-Reside	4	89	17	110			
Total	85	109	19	213			

Note. CG: Caregiver; CG Gender and Kin Relationship Phi = 0.130, $p = .138$; Co-residency and CG Gender Phi = 0.028, $p = .678$; Co-residency and Kin Relationship Phi = 0.543***, $p < .001$

Table 5

NEO: Care Recipient Variable Associations

	CR Age	CR Gender	CR Educ	Onset Age	Dementia Duration
CR Age					
Correlation	1				
p					
n	233				
CR Gender					
Correlation	.159*	1			
p	.015				
n	233	233			
CR Education					
Correlation	-.124	-.202**	1		
p	.059	.002			
n	233	233	233		
Onset Age					
Correlation	.955***	.070	-.106	1	
p	<.001	.286	.107		
n	233	233	233	233	
Dementia Duration					
Correlation	.037	.280***	-.046	-.262***	1
p	.570	<.001	.480	<.001	
n	233	233	233	233	233

Note. CR: Care Recipient; Educ: Education
**p* < .05; ***p* < .01; ****p* < .001 (all 2-tailed)

Conscientiousness *t*-scores ranged from 8.41 to 89.72 with an average of 46.74 (*SD* = 10.28). While normality of variable distribution is not assumed in regression analyses, it is assumed in correlation analyses. As such, the skewness was assessed for each of these distributions. As expected given the nature of *t*-scores, all of the NEO trait distributions had a skewness statistic of less than the recommended cutoff of 5.5 (Morgan & Griego, 1997), so *t*-scores were retained for analyses.

Table 6

NEO: Caregiver and Care Recipient Variable Associations

	CR Age	CR Gender	CR Educ	Onset Age	Dementia Duration
CG Age					
Correlation	-.010	-.387***	.159*	-.048	-.161*
p	.136	.001	.018	.483	.017
n	220	220	220	220	220
CG Gender					
Correlation	.011	-.246***	.094	-.002	.043
p	.869	<.001	.152	.971	.511
n	233	233	233	233	233
Non-co-residency					
Correlation	.291***	.492***	-.153*	.217*	.225*
p	<.001	<.001	.025	.001	.001
n	213	213	213	213	213
Relationship Closeness					
Correlation	-.014	-.119	.192**	-.024	.033
p	.831	.078	.004	.727	.630
n	221	221	221	221	221

Note. CR: Care Recipient; Educ: Education
**p* < .05; ***p* < .01; ****p* < .001 (all 2-tailed)

The correlations between the outcome variables were assessed. As predicted, the three care recipient time to event outcomes for individuals who experienced the event were significantly correlated. See Table 8 for the correlations of caregiver personality covariates and care recipient time to event outcomes for those who met inclusion criteria pairwise. The correlation between the personality traits was assessed. Many of the personality trait factors were significantly correlated with other traits. For instance, Extraversion was significantly correlated with all four other traits. Alternatively, Openness was only significantly correlated with Extraversion and Conscientiousness.

Table 7

NEO: Caregiver and Care Recipient Variable Associations Continued

	Care Recipient Gender		
	Male CR	Female CR	Total
Caregiver Gender			
Male CG	10	40	50
Female CG	91	92	183
Total	101	132	233
Co-residency			
Co-reside	73	30	103
Non-co-reside	24	86	110
Total	97	116	213
Kin Relationship			
Spouse	68	19	87
Adult Child	29	96	125
Other	4	17	21
Total	101	132	233

Note. CR: Care Recipient; CG: Caregiver; CG Gender and CR Gender Phi = .246***, $p < .001$; Co-Residency and CR Gender Phi = .492***, $p < .001$; Kin Relationship and CR Gender Phi = .543***, $p < .001$

Additionally, tests of correlations between the care recipient time to event outcomes and the proposed caregiver personality covariates were conducted, although none of these correlations were statistically significant. All of these correlations can be found in Table 9. Table 10 shows the occurrence of each care recipient outcome relative to the other outcomes.

Table 8

NEO: Association of Caregiver Personality Traits

	NEO N	NEO E	NEO O	NEO A	NEO C
Neuroticism					
r	1				
p					
n	233				
Extraversion					
r	-.372***	1			
p	.001				
n	213	233			
Openness					
r	.030	.242***	1		
p	.646	<.001			
n	213	213	233		
Agreeableness					
r	-.367***	.234***	.003	1	
p	<.001	<.001	.960		
n	213	213	213	233	
Conscientiousness					
r	-.289***	.370***	.143*	.246	1
p	<.001	<.001	.029	<.001	
n	213	213	213	213	233

**p* < .05; ***p* < .01; ****p* < .001 (all 2-tailed)

Table 9

NEO: Association of Caregiver Personality Traits and Care Recipient Outcomes

	Instit.	Mortality	NEO N	NEO E	NEO O	NEO A	NEO C
Sev Dem							
r	.784***	.484***	-.004	-.027	-.074	-.093	-.067
p	<.001	<.001	.973	.835	.570	.475	.609
N	62	61	61	61	61	61	61
Instit.							
r		.466***	.102	.104	.014	-.137	.022
p		<.001	.282	.274	.880	.147	.816
N		110	113	113	113	113	113
Mortality							
r			.045	-.083	.002	.021	.058
p			.568	.290	.290	.785	.459
N			164	164	164	164	164

Note. Sev Dem: Severe Dementia; Instit.: Institutionalization; All outcomes above are time to event
N: Neuroticism; E: Extraversion; O: Openness; A: Agreeableness; C: Conscientiousness

Table 10

NEO: Care Recipient Outcome Event Occurrence

	Institutionalization			Mortality		
	No Instit.	Instit.	Total	No Mortality	Mortality	Total
Severe Dementia						
No Sev Dem	106	66	172	54	118	172
Sev Dem	14	47	61	15	46	61
Total	120	113	233	69	164	233
Mortality						
No Mortality	43	26	69			
Mortality	77	87	164			
Total	120	113	233			

Note. Sev Dem: Severe Dementia; Instit.: Institutionalization; Sev Dem and Instit. Phi = .340***, *p* < .001; Care Recipient Sev Dem and Mortality Phi = .066, *p* = .317; Care Recipient Mortality and Instit. Phi = .140*, *p* = .032

Research Question 1: Personality Trait Analyses

Research Question 1 sought to examine the association between NEO factors and care recipient outcomes. Exploratory analysis with Kaplan Meier plots did not reveal statistically significant effects when examining the personality traits, divided into quartiles, and predicting each of the three outcomes. However, to incorporate the potential effects of covariates, Cox regression analyses were pursued. First, log minus log plots were examined to test the proportional hazards assumption by assessing for divergence in the hazard of each outcome for levels of each personality trait. These plots can be found in the Appendix. Gross inspection of the plots suggested the lines were parallel, thus meeting the assumption of proportional hazards. Cox regression models were run first with only the primary variable of the NEO factor and the primary outcome of severe dementia, institutionalization, and death, respectively. Included in every model was a term for the care recipients' dementia duration to account for differences in the visit timing over the course of each individual's dementia progression. These models included the individuals who had valid scores for each factor separately. For the severe dementia outcome, 229 dyads were included in this analysis, 55 (24.0%) of whom met criteria for severe dementia while the key caregiver was serving, and 174 were censored. For the institutionalization outcome, 217 dyads were included in analysis, 95 (43.8%) of whom were institutionalized while the key caregiver served, and 122 of whom were censored. For the mortality outcome, 233 dyads were included in the analyses, 164 (70.4%) of whom experienced death during the key caregiver window and 69 who were censored. After this baseline Cox model was run for each NEO factor, it was found that none of the five NEO factors predicted any of the three care recipient outcomes. The variable statistics for the base models predicting time to severe dementia can be found in Table 11. The models predicting institutionalization and mortality were not statistically significant and thus will not be discussed further.

To further examine the possible association between caregiver personality characteristics and the three outcomes for the person with dementia, models were re-run incorporating hypothesized covariates that might affect this association. These models were run separately with proposed key caregiver variables followed by care recipient variables and then a combination of both. The significant variables were identified and included in final models for caregiver variables and care recipient variables. Although these overall models were statistically significant, none of the NEO factors became

Table 11

Personality Traits Predicting Time to Severe Dementia Models

	Event	Censored	HR	*p*	CI (95%)
Neuroticism	55	172			
Neuroticism			1.017	.232	0.989-1.045
Dementia Duration			1.197**	.005	1.055-1.358
Extraversion	55	172			
Extraversion			1.000	.985	0.970-1.030
Dementia Duration			1.197**	.006	1.053-1.361
Openness	55	172			
Openness			0.999	.964	0.970-1.029
Dementia Duration			1.198**	.006	1.053-1.362
Agreeableness	55	172			
Agreeableness			0.991	.551	0.964-1.020
Dementia Duration			1.205**	.005	1.059-1.373
Conscientiousness	55	172			
Conscientiousness			0.989	.402	0.964-1.015
Dementia Duration			1.220**	.004	1.065-1.397

**$p < .01$

significant predictors for the severe dementia, institutionalization, or mortality outcomes. In the statistically significant final overall models, only co-residing at baseline and closer relationship within the dyad over time were associated with less risk of care recipients meeting severe dementia criteria. The severe dementia, institutionalization, and mortality models can be found in Tables 12, 13, and 14, respectively.

In each model of the role of personality factors on time to severe dementia, the time-varying covariate of care-recipient neuropsychiatric symptoms was statistically significant at the $p < .01$ level, and co-residency was also statistically significant at the $p < .05$ level. This can be interpreted to mean that, with all else held constant, individuals with dementia who exhibited more psychiatric symptoms were more likely to develop severe dementia. Also, individuals who co-resided with their caregivers at the first DPS

Table 12

Personality Traits with Covariates Predicting Severe Dementia Final Models

	Event	Censored	HR	*p*	CI (95%)
Neuroticism	32	101			
Neuroticism			1.026	.101	0.995-1.059
Dementia Duration			1.072	.476	0.885-1.298
Relationship Closeness (t.v.)			0.894*	.018	0.815-0.981
Non-co-residency			3.354**	.002	1.539-7.309
Extraversion	32	101			
Extraversion			0.991	.647	0.952-1.031
Dementia Duration			1.071	.479	0.886-1.295
Relationship Closeness (t.v.)			0.897*	.022	0.818-0.984
Non-co-residency			3.156**	.003	1.470-6.775
Openness	32	101			
Openness			0.983	.449	0.941-1.027
Dementia Duration			1.069	.496	0.882-1.295
Relationship Closeness (t.v.)			0.903*	.030	0.823-0.990
Non-co-residency			3.240**	.003	1.506-6.970
Agreeableness	32	101			
Agreeableness			0.993	.715	0.955-1.032
Dementia Duration			1.074	.464	0.887-1.299
Relationship Closeness (t.v.)			0.898*	.022	0.819-0.985
Non-co-residency			3.156**	.003	1.471-6.770
Conscientiousness	32	101			
Conscientiousness			0.989	.533	0.956-1.023
Dementia Duration			1.073	.468	0.887-1.299
Relationship Closeness (t.v.)			0.900*	.025	0.822-0.987
Non-co-residency			3.409**	.003	1.510-7.697

Note. t.v.: time varying
*$p < .05$; **$p < .01$

visit were less likely to develop severe dementia relative to those individuals with dementia who did not live with their key caregiver.

Included in these models were 70 dyads whose care recipient was institutionalized while the key caregiver served, and 76 who were censored. Statistically significant predictors in individual models with each of the five NEO factors in predicting time to institutionalization included co-residing at baseline as well as care recipient gender, onset age, and reported neuropsychiatric symptoms over time. However, when included in

Table 13

Personality Traits with Covariates Predicting Institutionalization Final Models

	Event	Censored	HR	*p*	CI (95%)
Neuroticism	70	76			
Neuroticism			1.018	.071	0.998-1.037
Dementia Duration			1.044	.096	0.992-1.099
Non-co-residency			0.293***	<.001	0.165-0.522
Extraversion	70	76			
Extraversion			0.990	.421	0.965-1.015
Dementia Duration			1.021	.756	0.894-1.166
Non-co-residency			0.230***	<.001	0.135-0.393
Openness	70	76			
Openness			1.000	.977	0.973-1.027
Dementia Duration			1.022	.748	0.895-1.167
Non-co-residency			0.230***	<.001	0.135-0.393
Agreeableness	70	76			
Agreeableness			0.990	.352	0.968-1.012
Dementia Duration			1.019	.778	0.892-1.164
Non-co-residency			0.232***	<.001	0.136-0.396
Conscientiousness	70	76			
Conscientiousness			0.986	.218	0.964-1.008
Dementia Duration			1.030	.664	0.901-1.178
Non-co-residency			0.217***	<.001	0.125-0.374

***$p < .001$

final overall models, only co-residing remained a statistically significant predictor. In all models, care recipients who co-resided with their key caregivers at their first DPS visit were less likely to be institutionalized relative to those who did not co-reside at the baseline visit.

When examining covariates in the separate models predicting time to mortality with each of the five NEO factors and dementia duration, caregivers age, co-residency at baseline, and care-recipient dementia onset age were statistically significant predictors. However, the personality traits did not become statistically significant predictors in these

Table 14

Personality Traits with Covariates Predicting Mortality Final Models

	Event	Censored	HR	*p*	CI (95%)
Neuroticism	142	63			
Neuroticism			1.003	.714	0.988-1.018
Dementia Duration			1.070	.155	0.975-1.174
Onset Age			1.064***	<.001	1.033-1.096
Extraversion	142	63			
Extraversion			1.000	.975	0.984-1.017
Dementia Duration			1.069	.160	0.974-1.174
Onset Age			1.063***	<.001	1.032-1.094
Openness	142	63			
Openness			1.008	.368	0.990-1.027
Dementia Duration			1.031	.535	0.936-1.137
Onset Age			1.435*	.046	1.007-2.045
Non-co-residency			1.056***	<.001	1.025-1.089
Agreeableness	142	63			
Agreeableness			0.996	.601	0.982-1.011
Dementia Duration			1.069	.158	0.974-1.174
Onset Age			1.063***	<.001	1.032-1.095
Conscientiousness	142	63			
Conscientiousness			0.998	.757	0.985-1.011
Dementia Duration			1.070	.153	0.975-1.175
Onset Age			1.068***	<.001	1.032-1.095

*$p < .05$; ***$p < .001$

models. Included in the analyses were 142 dyads whose care recipient died within a specified amount of time following the last key caregiver visit and 63 whose did not. The Openness model included 150 dyads whose care-recipient had died and 65 censored cases. When included in models with other statistically significant predictors, only care recipient age at dementia onset was a significant predictor in the models for Neuroticism, Extraversion, Agreeableness, and Conscientiousness. In the final model with Openness as a predictor, co-residing and care recipient age at dementia onset were both statistically significant predictors. The personality traits were not statistically significant predictors in any of the models. Later dementia onset was associated with greater likelihood of mortality.

Research Question 2: Coping Strategy Participants

The analyses examining caregivers' utilization of coping strategies and the effects on care recipient outcomes required similar inclusion criteria as that of the NEO analyses, except these analyses required the completion of the Ways of Coping scale. This scale was only administered on odd visits, so, for example, key caregivers who began serving on the care recipient's second or third visit had a baseline score at the care recipient's visit 3. Due to the nature of repeated collection of coping data, these scales were analyzed as time-varying scores. However, in those analyses, only individuals who completed at least two odd visits were included. Exploratory descriptive statistics were conducted for the dyads who completed at least the baseline visit and are presented here.

The number of caregivers' who completed at least 90% of the items for each of the coping strategy scales differed between the strategies. For instance, the smallest number of caregivers (*n* = 266) provided complete scores for Problem Focused coping, while the largest number of caregivers (*n* = 279) provided complete scores on Wishful Thinking. An overview of caregivers' coping strategy utilization at the first visit completed by the key caregiver can be seen in Table 15.

Only 244 (74.4%) of the 328 caregivers completed enough of the items for all of the eight ways of coping scales. These individuals were compared to the caregivers who were missing at least one coping scale, although caregivers in the latter group may have

Table 15

Coping Strategy Use at Baseline

	n	*M*	*SD*
Problem Focused	266	1.77	0.63
Seeking Social Support	274	1.59	0.72
Blaming Self	267	1.09	0.87
Wishful Thinking	279	1.34	0.67
Avoidance	273	1.09	0.57
Blaming Others	272	0.73	0.68
Counting Blessings	273	2.18	0.60
Religiosity	270	1.73	0.72

Note. Use coded: 0: Never; 1: Rarely; 2: Sometimes; 3: Regularly

been included in analyses for individual coping strategies. Table 16 shows a comparison of the dyads whose key caregiver completed the WCCL-R with those whose caregiver did not complete the WCCL-R.

The caregiver and care recipient covariates examined in these analyses were examined for significant associations. These can be found in Tables 17, 18, and 19. Younger caregiver age was moderately associated with not co-residing with the care recipient at baseline ($r = -.610$, $p < .001$). Older care recipient onset age was strongly associated with older care recipient age at baseline ($r = .943$, $p < .001$) and moderately correlated with shorter dementia duration ($r = -.316$, $p < .001$). Other significant associations were of smaller magnitudes.

There were several patterns of association between the caregiver and care recipient variables. For instance, there were moderately strong associations with female care recipients having younger caregivers who were more likely male and who did not co-reside at baseline. Caregivers who did not co-reside had older care recipients with

Table 16

Coping: Complete Coping Strategy Profile Versus Incomplete Coping

	Full Coping *M* (*SD*) or *n* (%)	Incomplete Coping	χ^2 or *t*	*p*	Effect size (*d*)
n	244 (74.4%)	84 (25.6%)			
Care recipient variables					
Gender (female)	142 (58.2%)	48 (57.1%)	0.028	.866	
Education	13.46 (2.86)	12.95 (3.14)	-1.362	.174	
Age	86.07 (5.58)	86.22 (6.23)	0.196	.845	
Ethnicity (Caucasian)	242 (99.2)	82 (97.6)	3.014	.222	
Age of onset	82.45 (5.85)	82.20 (6.43)	-0.335	.738	
Dementia duration	3.62 (1.97)	3.84 (1.86)	0.856	.392	
Caregiver variables					
Gender (female)	191 (78.3%)	57 (71.3%)	1.658	.198	
Education	14.47 (2.41)	13.73 (2.32)	-2.411*	.016	0.313
Age	65.86 (14.39)	71.04 (12.21)	3.022**	.003	-0.388
Ethnicity (Caucasian)	243 (99.6%)	78 (97.5)	3.766	.152	
Co-resident (yes)	129 (52.9%)	43 (51.2%)	0.071	.790	
Relationship Closeness	18.49 (3.91)	17.54 (4.33)	-1.406	.161	
Care recipient outcomes					
Severe Dementia (e)	64 (26.2%)	22 (26.2%)	0.000	.994	
Time to Severe Dementia	1.41 (2.13)	1.48 (1.59)	0.137	.891	
Institutionalization (e)	113 (46.3%)	40 (47.6%)	0.043	.836	
Time to Institutionalization	0.59 (1.31)	0.80 (1.19)	0.891	.371	
Mortality (e)	176 (72.1%)	60 (75.0%)	0.251	.617	
Time to Mortality	2.35 (1.91)	2.32 (1.69)	-0.106	.915	

Note. (e): signifies event occurrence
**p* < .05; ***p* < .01

older dementia onset age and duration of dementia at baseline. Tables 20 and 21 show the associations between the caregiver and care recipient variables.

Caregivers' age and co-residency with the care recipient at baseline were significantly associated with caregivers' use of many of the coping strategies. Specifically, younger caregivers and those who did not co-reside with the care recipient

Table 17

Coping: Caregiver Variable Associations

	CG Age	CG Gender	Non-co-residency	Relationship Closeness
CG Age				
Correlation	1			
p				
n	267			
CG Gender				
Correlation	-.203**	1		
p	.001			
n	267	282		
Non-co-residency				
Correlation	-.610***	.010	1	
p	<.001	.873		
n	267	282	282	
Relationship Closeness				
Correlation	.167**	-.060	-.041	1
p	.008	.330	.503	
n	248	263	263	263

Note. CG: Caregiver
**$p < .01$; ***$p < .001$ (all 2-tailed)

Table 18

Coping: Caregiver Variable Associations Continued

	Kin Relationship				Co-Residency		
	Spouse	Adult Child	Other	Total	Co-reside	Non-co-reside	Total
Caregiver Gender							
Male CG	29	28	2	59	29	30	59
Female CG	86	112	25	223	107	116	223
Total	115	140	27	282	136	146	282
Co-Residency							
Co-Reside	108	25	3	136			
Non-Co-Reside	7	115	24	146			
Total	115	140	27	282			

Note. CG: Caregiver; CG Gender and Kin Relationship Phi = .124, $p = .114$; Co-residency and CG Gender Phi = .010, $p = .873$; Co-residency and Kin Relationship Phi = .760***, $p < .001$

Table 19

Coping: Care Recipient Variable Associations

	CR Age	CR Gender	CR Educ	Onset Age	Dementia Duration
CR Age					
Correlation	1				
p					
n	282				
CR Gender					
Correlation	.163**	1			
p	.006				
n	282	282			
CR Education					
Correlation	-.083	-.184**	1		
p	.165	.002			
n	282	282	282		
Onset Age					
Correlation	.943***	.062	-.078	1	
p	<.001	.296	.191		
n	282	282	282	282	
Dementia Duration					
Correlation	.017	.278***	-.002	-.316***	1
p	.776	<.001	.975	<.001	
n	282	282	282	282	282

Note. CR: Care Recipient; Educ: Education
*p < .05; **p < .01; ***p < .001 (all 2-tailed)

were more likely to utilize Problem Focused, Seeking Social Support, Blaming Self, Wishful Thinking, Avoidance, and Blaming Others strategies. Interestingly, care recipients who were female had caregivers with increased utilization of the same coping strategies. However, none of these associations exceeded a correlation coefficient of .330, and most were in the weak range. The caregiver variable correlations can be found in Table 22, and the care recipient variable correlations can be found in Table 23.

Table 20

Coping: Caregiver and Care Recipient Variable Associations

	CR Age	CR Gender	CR Educ	Onset Age	Dementia Duration
CG Age					
Correlation	-.084	-.359***	.082	-.025	-.162
p	.174	<.001	.180	.684	.008
n	267	267	267	267	267
CG Gender					
Correlation	-.016	-.302***	.100	-.006	-.027
p	.787	<.001	.095	.915	.653
n	282	282	282	282	282
Non-co-residency					
Correlation	.296***	.461***	-.102	.222***	.178**
p	<.001	<.001	.087	<.001	.003
n	282	282	282	282	282
Relationship Closeness					
Correlation	.072	-.140*	.126*	.070	-.005
p	.246	.023	.042	.256	.935
n	263	263	263	263	263

Note. CG: Caregiver; CR: Care Recipient; Educ: Education
**p* < .05; ***p* < .01; ****p* < .001 (all 2-tailed)

The association between the care recipient outcomes was examined, selecting for those who met criteria for each of the outcomes. Event occurrence can be seen in Table 24. The association between individuals who developed severe dementia and who were institutionalized was strong, while the associations with time to mortality and time to both severe dementia and institutionalization were in the moderate ranges. None of the coping strategies was statistically significantly related to the care recipient outcomes. However, there were statistically significant associations between the coping strategies themselves. Table 25 shows the associations among coping strategies, while Table 26 shows the associations with care recipient outcomes.

Table 21

Coping: Caregiver and Care Recipient Variable Associations Continued

	Care Recipient Gender		
	Male CR	Female CR	Total
Caregiver Gender			
Male CG	8	51	59
Female CG	112	111	223
Total	120	162	282
Co-Residency			
Co-Reside	90	46	136
Non-Co-Reside	30	116	146
Total	120	162	282
Kin Relationship			
Spouse	86	29	115
Adult Child	29	111	140
Other	5	22	27
Total	120	162	282

Note. CR: Care Recipient; CG: Caregiver; CG Gender and CR Gender Phi = -.302***, *p* < .001; Co-Residency and CR Gender Phi = .461***, *p* < .001; Kin Relationship and CR Gender Phi = .541***, *p* < .001

Table 22

Coping: Association of Caregiver Variables with Coping Strategies

	PF	SS	BS	WT	AV	BO	CB	RG
CG Age								
Correlation	-.330***	-.303***	-.188**	-.290***	-.291***	-.318***	-.093	-.128*
p	<.001	<.001	.003	<.001	<.001	<.001	.137	.041
n	254	261	254	265	260	258	260	257
CG Gender								
Correlation	.098	.037	-.009	.127*	.097	-.006	.181**	.215***
p	.112	.542	.881	.035	.109	.923	.003	<.001
n	266	274	267	279	273	272	273	270
Non-co-residency								
Correlation	.283***	.291***	.128*	.167**	.207**	.258***	.106	.111
p	<.001	<.001	.036	.005	.001	<.001	.081	.068
n	266	274	267	279	273	272	273	270
Relationship Closeness								
Correlation	.044	.050	-.112	-.187**	-.153*	-.091	.062	.143*
p	.494	.422	.079	.002	.015	.150	.327	.023
n	247	255	248	260	255	254	254	252

Note. CG: Caregiver; PF: Problem Focused; SS: Seeking Social Support; BS: Blaming Self; WT: Wishful Thinking; AV: Avoidance; BO: Blaming Others; CB: Counting Blessings; RG: Religiosity

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

Table 23

Coping: Association of Care Recipient Variables with Coping Strategies

	PF	SS	BS	WT	AV	BO	CB	RG
CR Age								
Correlation	.132*	.134*	.042	-.001	.049	.090	.049	-.011
p	.032	.027	.489	.992	.421	.140	.425	.856
n	266	274	267	279	273	272	273	270
CR Gender								
Correlation	.209**	.175**	.130*	.134*	.168**	.196**	-.015	-.091
p	.001	.004	.034	.025	.005	.001	.806	.137
n	266	274	267	279	273	272	273	270
CR Education								
Correlation	.028	-.012	.012	-.038	.012	-.076	.008	.070
p	.652	.839	.851	.523	.839	.210	.897	.250
n	266	274	267	279	273	272	273	270
Onset age								
Correlation	.109	.115	.033	-.022	.010	.052	.029	.004
p	.076	.057	.596	.715	.875	.393	.636	.953
n	266	274	267	279	273	272	273	270
Dementia duration								
Correlation	.049	.038	.024	.064	.110	.100	.052	-.042
p	.424	.534	.700	.285	.069	.101	.390	.489
n	266	274	267	279	273	272	273	270

Note. CR: Care Recipient; PF: Problem Focused; SS: Seeking Social Support; BS: Blaming Self; WT: Wishful Thinking; AV: Avoidance; BO: Blaming Others; CB: Counting Blessings; RG: Religiosity
**p* < .05; ***p* < .01; ****p* < .001

Table 24

Coping: Care Recipient Outcome Event Occurrence

	Institutionalization			Mortality		
	No Instit.	Instit.	Total	No Mortality	Mortality	Total
Severe Dementia						
No Sev Dem	134	74	208	65	143	208
Sev Dem	19	55	74	14	60	74
Total	153	129	282	79	203	282
Mortality						
No Mortality	51	28	79			
Mortality	102	101	203			
Total	153	129	282			

Note. Sev Dem: Severe Dementia; Instit.: Institutionalization; Sev Dem and Instit. Phi = .342***, *p* < .001; Care Recipient Sev Dem and Mortality Phi = .121*, *p* = .042; Care Recipient Mortality and Instit. Phi = .129*, *p* = .030

Table 25

Coping: Associations of Coping Strategies

		PF	SS	BS	WT	AV	BO	CB	RG
PF	*r*	1							
	p								
	n	266							
SS	*r*	$.580^{***}$	1						
	p	<.001							
	n	262	274						
BS	*r*	$.398^{***}$	$.132^{*}$	1					
	p	<.001	.031						
	n	257	265	267					
WT	*r*	$.411^{***}$	$.255^{***}$	$.529^{***}$	1				
	p	<.001	<.001	<.001					
	n	265	273	267	279				
AV	*r*	$.507^{***}$	$.243^{***}$	$.622^{***}$	$.699^{***}$	1			
	p	<.001	<.001	<.001	<.001				
	n	262	270	265	272	273			
BO	*r*	$.519^{***}$	$.300^{***}$	$.526^{***}$	$.549^{***}$	$.583^{***}$	1		
	p	<.001	<.001	<.001	<.001	<.001			
	n	262	269	264	271	271	272		
CB	*r*	$.570^{***}$	$.365^{***}$	$.171^{***}$	$.254^{***}$	$.283^{***}$	$.195^{**}$	1	
	p	<.001	<.001	.006	<.001	<.001	.001		
	n	262	269	262	271	269	267	273	
RG	*r*	$.449^{***}$	$.380^{***}$	.107	$.137^{*}$	.105	$.180^{**}$	$.477^{***}$	1
	p	<.001	<.001	.086	.025	.089	.004	<.001	
	n	257	264	259	269	262	261	263	270

Note. PF: Problem Focused; SS: Seeking Social Support; BS: Blaming Self; WT: Wishful Thinking; AV: Avoidance; BO: Blaming Others; CB: Counting Blessings; RG: Religiosity
**p* < .05; ***p* < .01; ****p* < .001

Table 26

Coping: Associations of Coping Strategies and Care Recipient Outcomes

		Instit.	Mort.	PF	SS	BS	WT	AV	BO	CB	RG
Sev Dem^	*r*	.755	.555	.004	-.154	.092	-.019	-.066	-.013	-.053	-.048
	p	<.001	<.001	.977	.245	.491	.885	.624	.922	.688	.722
	n	33	56	57	59	58	61	58	58	59	58
Instit.^	*r*		.602	-.175	-.167	-.104	.018	-.118	-.178	-.088	-.076
	p		<.001	.144	.154	.380	.875	.318	.132	.459	.525
	n		71	71	74	73	76	74	73	73	72
Mortality^	*r*			-.105	$-.162^{*}$	.020	.067	.042	-.104	-.002	-.033
	p			.147	.022	.786	.344	.557	.146	.974	.649
	n			192	200	194	202	197	197	196	195

Note. Sev Dem: Severe Dementia; Instit.: Institutionalization; Mort.: Mortality; PF: Problem Focused; SS: Seeking Social Support; BS: Blaming Self; WT: Wishful Thinking; AV: Avoidance; BO: Blaming Others; CB: Counting Blessings; RG: Religiosity; ^selected for care recipients who experienced respective outcomes
**p* < .05; ***p* < .01; ****p* < .001

Research Question 2: Coping Strategies Analyses

In addressing Research Question 2, examining the association between the eight coping strategies and care recipient outcomes, Cox regression models were run first with only the primary covariate of the coping strategy and the primary outcome of severe dementia, institutionalization, and death, respectively. Included in every model was a term for the care recipients' dementia duration to account for differences in the visit timing over the course of each individual's dementia progression.

Ratings on utilization of different coping strategies were collected from caregivers at every other visit. In order to utilize the longitudinal data available, coping strategies were examined as time-varying variables for the final models. The number of cases available for analysis was reduced in these analyses due to the necessity of having at least two time points, which required that the key caregiver completed two odd visits. Scores for caregivers who missed a visit in between completing other visits were imputed forward to allow for inclusion in the analyses.

In the time-varying analyses, caregiver use of Avoidance coping was a statistically significant predictor of severe dementia. This means that greater frequency of a caregiver's use of avoidance as a coping strategy over time was associated with a greater likelihood of their care recipient meeting criteria for severe dementia. None of the other coping strategies were statistically significant in these base models. The model variables are presented in Table 27.

Table 27

Time-Varying Coping Strategies Predicting Time to Severe Dementia Models

	Event	Censored	HR	*p*	CI (95%)
Problem Focused	42	122			
Problem Focused			1.285	.396	0.721-2.290
Dementia Duration			1.209**	.009	1.049-1.394
Seeking Social Support	44	125			
Seeking Social Support			1.332	.249	0.818-2.170
Dementia Duration			1.210*	.011	1.046-1.400
Blaming Self	43	118			
Blaming Self			1.028	.886	0.708-1.491
Dementia Duration			1.215**	.009	1.050-1.407
Wishful Thinking	46	126			
Wishful Thinking			1.573	.070	0.963-2.568
Dementia Duration			1.186*	.013	1.037-1.356
Avoidance	43	124			
Avoidance			1.881*	.034	1.048-3.376
Dementia Duration			1.179*	.019	1.027-1.353
Blaming Others	43	122			
Blaming Others			0.868	.592	0.517-1.457
Dementia Duration			1.185*	.020	1.027-1.368
Counting Blessings	44	124			
Counting Blessings			0.719	.271	0.399-1.295
Dementia Duration			1.211**	.009	1.050-1.398
Religiosity	43	123			
Religiosity			0.751	.274	0.449-1.255
Dementia Duration			1.206*	.013	1.041-1.397

$^*p < .05$; $^{**}p < .01$

None of the models predicting time to institutionalization or death were statistically significant, nor were any of the coping strategies in the model statistically significant.

To further examine the possible association between caregiver coping strategies and the three outcomes for the person with dementia, the time-varying models were re-run incorporating hypothesized covariates that might affect this association. These models were run separately with proposed key caregiver variables, followed by care recipient variables. The significant variables were identified and included in final models for caregiver variables and care recipient variables. These final models are presented below by care recipient outcome.

All of the final models examining each coping strategy on predicting severe dementia and including proposed covariates were statistically significant at the $p < .001$ level. In each model examining the role of time-varying coping strategies on occurrence of severe dementia, the time-varying covariate of care-recipient neuropsychiatric symptoms and co-residency were statistically significant. This can be interpreted to mean that, with all else held constant, individuals with dementia who exhibited more psychiatric symptoms were more likely to develop severe dementia. Also, individuals who co-resided with their caregivers at the first DPS visit were less likely to develop severe dementia relative to those individuals with dementia who did not live with their key caregiver. The variables included in the final models can be found in Table 28.

None of the time-varying coping strategies was statistically significant in predicting institutionalization the final models. However, in each of the combined final models, the presence of more neuropsychiatric symptoms was associated with a greater risk of institutionalization. Additionally, individuals who lived with their caregiver at baseline were less likely to be institutionalized. Key caregivers' gender was a significant predictor in the models for Problem Focused, Seeking Social Support, Wishful Thinking, Blaming Others and Religiosity at the $p < .05$ level. That is, care recipients whose caregivers were male were more likely to be institutionalized. Care recipients' age at

Table 28

Time-Varying Coping Strategies with Covariates Predicting Time to Severe Dementia Final Models

	Event	Censored	HR	*p*	CI (95%)
Problem Focused	39	120			
Problem Focused			1.037	.917	0.523-2.055
Dementia Duration			1.142	.117	0.967-1.347
Neuropsych sxs (t.v.)			2.180*	.039	1.040-4.568
Non-co-residency			1.052***	<.001	1.023-1.081
Seek Social Support	41	123			
Seek Social Support			1.011	.971	0.561-1.821
Dementia Duration			1.102	.247	0.935-1.299
Neuropsych sxs (t.v.)			2.172*	.034	1.059-4.456
Non-co-residency			1.047**	.001	1.018-1.076
Blaming Self	40	116			
Blaming Self			1.014	.940	0.699-1.472
Dementia Duration			1.117	.192	0.946-1.320
Neuropsych sxs (t.v.)			2.136*	.030	1.078-4.233
Non-co-residency			1.046**	.002	1.017-1.076
Wishful Thinking	43	124			
Wishful Thinking			1.604	.065	0.970-2.652
Dementia Duration			1.152	.054	0.997-1.330
Neuropsych sxs (t.v.)			1.051***	<.001	1.023-1.079
Avoidance	40	122			
Avoidance			2.311*	.010	1.227-4.352
Dementia Duration			1.158	.051	0.999-1.342
Neuropsych sxs (t.v.)			1.061***	<.001	1.032-1.091
Blaming Others	40	120			
Blaming Others			0.605	.100	0.333-1.101
Dementia Duration			1.064	.470	0.900-1.258
Neuropsych sxs (t.v.)			2.985**	.003	1.450-6.143
Non-co-residency			1.051***	<.001	1.022-1.080
Counting Blessings	42	123			
Counting Blessings			0.711	.297	0.375-1.349
Dementia Duration			1.106	.229	0.939-1.302
Neuropsych sxs (t.v.)			2.129*	.025	1.098-4.128
Non-co-residency			1.046**	.001	1.018-1.075
Religiosity	41	121			
Religiosity			0.704	.182	0.420-1.179
Dementia Duration			1.135	.136	0.961-1.340
Neuropsych sxs (t.v.)			2.141*	.027	1.090-4.207
Non-co-residency			1.048**	.001	1.019-1.078

Note. sxs: symptoms; t.v.: time varying
$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

dementia onset was a statistically significant predictor in the models for Blaming Self, Avoidance, and Counting Blessings. In all of these models, care recipients who were older were more likely to be institutionalized. The variables included in the final models can be found in Tables 29 and 30.

All of the final models examining each coping strategy on predicting mortality and including proposed covariates were statistically significant at least at the $p < .05$

Table 29

Time-Varying Coping Strategies with Covariates Predicting Time to Institutionalization Final Models Part 1

	Event	Censored	HR	*p*	CI (95%)
Problem Focused	49	87			
Problem Focused			0.875	.622	0.515-1.487
Dementia Duration			0.953	.581	0.804-1.130
Neuropsychiatric sxs (t.v.)			1.036**	.005	1.011-1.062
Non-co-residency			4.034***	<.001	2.132-7.632
KCG Gender			0.414*	.012	0.208-0.821
Seeking Social Support	51	89			
Seek Social Support			1.159	.546	0.718-1.870
Dementia Duration			0.957	.615	0.807-1.135
Neuropsychiatric sxs (t.v.)			1.035**	.005	1.011-1.061
Non-co-residency			3.559***	<.001	1.900-6.666
KCG Gender			0.441*	.017	0.225-0.866
Blaming Self	50	82			
Blaming Self			1.242	.199	0.892-1.730
Dementia Duration			0.955	.602	0.802-1.137
Neuropsychiatric sxs (t.v.)			1.034**	.006	1.010-1.060
Dementia Onset Age			1.086*	.011	1.019-1.157
Non-co-residency			2.565**	.003	1.376-4.782
Wishful Thinking	53	89			
Wishful Thinking			1.117	.632	0.709-1.761
Dementia Duration			0.964	.652	0.821-1.132
Neuropsychiatric sxs (t.v.)			1.035**	.005	1.011-1.060
Non-co-residency			3.402***	<.001	1.851-6.252
KCG Gender			0.440*	.014	0.228-0.847

Note. sxs: symptoms; t.v.: time varying
**p* < .05; ***p* < .01; ****p* < .001

Table 30

Time-Varying Coping Strategies with Covariates Predicting Time to Institutionalization Final Models Part 2

	Event	Censored	HR	*p*	CI (95%)
Avoidance	51	87			
Avoidance			1.647	.068	0.964-2.816
Dementia Duration			0.985	.856	0.833-1.164
Neuropsychiatric sxs (t.v.)			1.040**	.002	1.015-1.066
Dementia Onset Age			1.076*	.019	1.012-1.145
Non-co-residency			2.286**	.009	1.231-4.244
Blaming Others	50	86			
Blaming Others			0.884	.619	0.544-1.437
Dementia Duration			0.945	.513	0.797-1.120
Neuropsychiatric sxs (t.v.)			1.035**	.006	1.010-1.060
Non-co-residency			4.005***	<.001	2.082-7.705
KCG Gender			0.411*	.014	0.202-0.838
Counting Blessings	51	90			
Counting Blessings			0.855	.590	0.483-1.513
Dementia Duration			0.979	.814	0.823-1.165
Neuropsychiatric sxs (t.v.)			1.038**	.003	1.013-1.063
Dementia Onset Age			1.076*	.024	1.010-1.148
Non-co-residency			2.548**	.003	1.378-4.710
Religiosity	50	87			
Religiosity			1.034	.893	0.637-1.677
Dementia Duration			0.965	.683	0.814-1.144
Neuropsychiatric sxs (t.v.)			1.034**	.009	1.008-1.061
Non-co-residency			4.195***	<.001	2.295-7.671
KCG Gender			0.415*	.013	0.206-0.833

Note. sxs: symptoms; t.v.: time varying
$^*p < .05$; $^{**}p < .01$; $^{***}p < .001$

level. The only coping strategy that was a statistically significant predictor of mortality was Counting Blessings, in a model also including dementia onset age. In this model, increased use of Counting Blessings was associated with a decreased risk of care recipient mortality. In each of the combined final models examining caregiver and care recipient factors, the care recipients' age at dementia onset was the only significant predictor in all other caregiver coping models, and onset age was significant at least at the $p < .01$ level. The variables included in the final models can be found in Table 31.

Table 31

Time-Varying Coping Strategies with Covariates Predicting Time to Mortality Final Models

	Event	Censored	HR	*p*	CI (95%)
Problem Focused	115	54			
Problem Focused			0.803	.205	0.571-1.128
Dementia Duration			1.040	.452	0.939-1.151
Dementia Onset Age			1.065***	<.001	1.028-1.104
Seeking Social Support	120	54			
Seek Social Support			1.056	.717	0.787-1.416
Dementia Duration			1.032	.533	0.934-1.141
Dementia Onset Age			1.057**	.002	1.021-1.094
Blaming Self	114	52			
Blaming Self			0.967	.777	0.768-1.218
Dementia Duration			1.040	.464	0.937-1.154
Dementia Onset Age			1.058**	.002	1.021-1.096
Wishful Thinking	120	57			
Wishful Thinking			0.888	.400	0.673-1.171
Dementia Duration			1.037	.472	0.939-1.146
Dementia Onset Age			1.058**	.001	1.023-1.095
Avoidance	116	56			
Avoidance			1.021	.907	0.720-1.448
Dementia Duration			1.037	.484	0.937-1.148
Dementia Onset Age			1.061**	.001	1.025-1.099
Blaming Others	116	54			
Blaming Others			0.867	.377	0.632-1.190
Dementia Duration			1.040	.448	0.940-1.151
Dementia Onset Age			1.062**	.001	1.026-1.100
Counting Blessings	116	57			
Counting Blessings			0.648*	.017	0.454-0.926
Dementia Duration			1.037	.496	0.935-1.150
Dementia Onset Age			1.067***	<.001	1.030-1.105
Religiosity	117	55			
Religiosity			0.882	.341	0.682-1.142
Dementia Duration			1.052	.327	0.950-1.165
Dementia Onset Age			1.052**	.004	1.016-1.090

$^{**}p < .01$; $^{***}p < .001$

Research Question 3: Personality Trait and Coping Strategy Combined Participants

For the analyses incorporating both the caregivers' personality traits and utilization of coping strategies, only the dyads whose key caregiver completed both the NEO personality measure as well as the WCCL-R measure were included in the analyses. Of the 328 dyads initially included in the study, 206 dyads completed both the NEO and at least enough of the WCCL-R to derive at least a score on one strategy. Only 176 caregivers provided sufficient responses to allow for complete scores on all scales of both the NEO and WCCL-R. As with the previous analyses, caregivers were included in analyses for which they had the relevant scores regardless of the completeness of their profiles, so this is not entirely representative of the overall pool of individuals included in the combined analyses. However, this does allow for an understanding of the differences between individuals who completed the entire protocol at baseline and those who did not. Table 32 shows a comparison of the dyads whose caregivers provided complete personality trait and coping strategy profiles.

Research Question 3: Personality Trait and Coping Strategy Associations

In order to address the Research Question 3, the association between caregivers' personality traits and utilization of coping strategies was assessed using Pearson's correlation tests. Cases were included pairwise to allow for the largest possible sample pool. This includes the dyads whose key caregivers completed the NEO and who

Table 32

Complete versus Incomplete Personality and Coping

	Complete *M* (*SD*) or *n* (%)		Incomplete *M* (*SD*) or *n* (%)		χ^2 or *t*	*p*	Effect size (*d*)
n	176	(53.7%)	152	(46.3%)			
Care recipient variables							
Gender (female)	99	(56.3%)	91	(60.0%)	0.438	.508	
Education	13.50	(2.88)	13.13	(2.99)	-1.130	.259	
Age	86.09	(5.62)	86.13	(5.89)	0.070	.944	
Ethnicity (Caucasian)	174	(99.0%)	150	(99.0%)	1.362	.506	
Age of onset	82.62	(5.83)	82.12	(6.18)	-0.759	.448	
Dementia duration	3.47	(1.83)	3.92	(2.05)	2.089*	.037	-0.231
Caregiver variables							
Gender (female)	140	(79.5%)	108	(73.0%)	1.934	.164	
Education	14.50	(2.35)	14.02	(2.46)	-1.788	.075	
Age	65.49	(13.64)	69.08	(14.36)	2.239*	.026	
Ethnicity (Caucasian)	175	(99.4%)	146	(98.6%)	1.209	.546	
Co-resident (yes)	82	(46.6%)	74	(48.7%)	0.143	.705	-0.256
Relationship Closeness	18.37	(4.02)	18.37	(3.92)	0.009	.993	
Care recipient outcomes							
Severe Dementia (e)	46	(26.1%)	40	(26.3%)	0.001	.971	
Time to Severe Dementia	1.66	(2.35)	1.16	(1.48)	-1.152	.253	
Institutionalization (e)	82	(46.6%)	71	(46.7%)	<0.001	.983	
Time to Institutionalization	0.64	(1.40)	0.65	(1.13)	0.027	.979	
Mortality (e)	124	(70.5%)	112	(73.7%)	1.108	.293	
Time to Mortality	2.63	(2.02)	2.02	(1.63)	-2.559*	.011	0.332

Note. (e): signifies event occurrence
$*p < .05$

obtained a score on each coping strategy scale, respectively. Table 33 shows the maximum number of individuals who meet these criteria at the baseline first odd visit.

The personality trait scales and the coping strategy utilization scales were continuous. The NEO scales *t*-scores were used for these analyses as for the previous analyses. Although the caregivers in this study were slightly less open to new experiences and less conscientious and slightly more agreeable than average, none of the

Table 33

Personality Traits and Coping Strategy Use

	n	*M* (*SD*)	Range
NEO Neuroticism	206	50.74 (9.57)	33.52-88.71
NEO Extraversion	206	48.82 (10.02)	22.23-75.50
NEO Openness	206	46.45 (8.59)	27.51-85.81
NEO Agreeableness	206	53.36 (9.80)	6.40-75.82
NEO Conscientiousness	206	46.67 (10.29)	8.41-89.72
Problem Focused	196	1.82 (0.60)	0-3
Seeking Social Support	200	1.61 (0.71)	0-3
Blaming Self	195	1.10 (0.84)	0-3
Wishful Thinking	203	1.38 (0.65)	0-3
Avoidance	199	1.13 (0.56)	0-2.5
Blaming Others	198	0.76 (0.69)	0-2.67
Counting Blessings	200	2.22 (0.57)	0-3
Religiosity	195	1.77 (0.71)	0-3

NEO scales was significantly skewed, nor were seven of the eight coping scales. However, the Counting Blessings (skewness = -1.029, *SE* = .172; skewness/*SE* = 5.98) was significantly skewed. Log10, square root, and inverse transformations were attempted, but did not significantly improve the skewness value. As a result, the original variable was included in the correlation analyses.

First, the correlations between personality traits and coping strategy use at baseline were measured. It was found that Neuroticism was significantly associated with the greatest number of coping strategies and to the greatest extent, although all correlations were low in magnitude. Conscientiousness was not found to be significantly associated with any of the coping strategies at baseline. Table 34 shows all of the correlations between NEO personality traits and WCCL-R coping strategies. The limited strength and quantity of associations between the personality traits and coping strategies

Table 34

Association of Personality Traits and Coping Strategy Use

	NEO N	NEO E	NEO O	NEO A	NEO C
Problem Focused					
r	-.105	.122	.185**	-.077	.096
p	.142	.090	.009	.283	.180
N	196	196	196	196	196
Seeking Social Support					
r	-.036	.071	.100	-.145*	.075
p	.611	.315	.160	.041	.292
N	200	200	200	200	200
Blaming Self					
r	.277***	-.206**	-.123	-.050	-.131
p	.000	.004	.087	.491	.068
N	195	195	195	195	195
Wishful Thinking					
r	.368***	-.156*	.110	-.185**	-.104
p	.000	.026	.119	.008	.138
N	203	203	203	203	203
Avoidance					
r	.237**	-.126	.077	-.142*	-.074
p	.001	.077	.282	.046	.300
N	199	199	199	199	199
Blaming Others					
r	.241***	-.017	.125	-.191**	.087
p	.001	.811	.080	.007	.224
N	198	198	198	198	198
Counting Blessings					
r	-.232**	.227**	.059	.147	.099
p	.001	.001	.404	.038	.162
N	200	200	200	200	200
Religiosity					
r	-.027	.136	-.027	-.024	.023
p	.707	.058	.706	.735	.753
N	195	195	195	195	195

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

may signify that individuals’ personality traits do not necessarily predict their utilization of coping strategies, and vice versa.

Subsequently, correlations were examined for each of the personality traits with each coping strategies at each visit. Due to the limited sample size of individuals who completed to visit 15, analyses were only available through visit 13. As can be seen in the following tables, there were few consistent associations between personality traits and coping strategy utilization at each visit. The results are organized by coping strategy, with a table presenting coping strategy use presented first, followed by a table with the corresponding coping strategy correlated with the personality traits. These can be found in Tables 35 through 50.

Research Question 4: Personality Trait and Coping Strategy Combined Analyses

To address the Research Question 4, the associations between each personality trait and coping strategy were examined, respectively, as well as the associations with the care recipient outcomes, in order to identify variables that had strong correlations and thus would necessitate examination for moderation effects. Additionally, results from the previous research questions were examined to identify the statistically significant coping strategies and personality traits predicting each of the three care recipient outcomes. There were limited associations between pairs including a coping strategy and a personality trait, and correlations of these predictors with outcomes were also generally low. None of the personality traits predicted care recipient outcomes, but caregivers' use of Avoidance over time predicted severe dementia outcomes. Additionally, caregivers' use of Counting Blessings predicted mortality only when included in a model with care recipients' dementia onset age as a covariate. Only these models were tested for

Table 35

Problem Focused Use by Visit

	n	Min	Max	*M*	*SD*
PF Visit 1	196	0	3.00	1.82	0.60
PF Visit 3	146	0	3.00	1.83	0.59
PF Visit 5	86	0	2.80	1.73	0.61
PF Visit 7	57	0	2.60	1.74	0.57
PF Visit 9	24	0.73	2.87	1.95	0.42
PF Visit 11	13	0.20	2.47	1.53	0.69
PF Visit 13	4	0.67	2.40	1.45	0.88
PF Visit 15	2	1.13	2.27	1.70	0.80

Note. PF: Problem Focused

Table 36

Association of Personality Traits and Problem Focused Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
PF Visit 1	*r*	-.105	.122	.185**	-.077	.096
	p	.142	.090	.009	.283	.180
	n	196	196	196	196	196
PF Visit 3	*r*	-.058	.180*	.233**	-.055	.227
	p	.468	.023	.003	.485	.004
	n	161	161	161	161	161
PF Visit 5	*r*	.026	.209	.123	-.169	.151
	p	.803	.044	.238	.106	.149
	n	93	93	93	93	93
PF Visit 7	*r*	.034	-.007	.217	-.359**	.068
	p	.797	.955	.095	.005	.603
	n	60	60	60	60	60
PF Visit 9	*r*	-.215	.277	.109	-.006	.557
	p	.281	.162	.589	.977	.003
	n	27	27	27	27	27
PF Visit 11	*r*	-.268	-.045	.195	-.173	.398
	p	.377	.884	.523	.572	.178
	n	13	13	13	13	13
PF Visit 13	*r*	.495	-.850	.507	-.624	.456
	p	.505	.150	.493	.376	.544
	n	4	4	4	4	4

Note. PF: Problem Focused
*p < .05; **p < .01; ***p < .001; all 2-tailed

Table 37

Seeking Social Support Use by Visit

	n	Min	Max	*M*	*SD*
SS Visit 1	200	0	3.00	1.61	0.71
SS Visit 3	149	0	3.00	1.52	0.68
SS Visit 5	87	0	3.00	1.54	0.66
SS Visit 7	58	0	2.83	1.45	0.60
SS Visit 9	25	0.50	3.00	1.59	0.59
SS Visit 11	13	0	3.00	1.58	0.87
SS Visit 13	5	0.83	2.50	1.87	0.66
SS Visit 15	2	1.17	2.33	1.75	0.82

Note. SS: Seeking Social Support

Table 38

Association of Personality Traits and Seeking Social Support Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
SS Visit 1	*r*	-.036	.071	.100	-.145*	.075
	p	.611	.315	.160	.041	.292
	n	200	200	200	200	200
SS Visit 3	*r*	-.101	.176*	.221**	-.052	.154
	p	.202	.026	.005	.513	.051
	n	161	161	161	161	161
SS Visit 5	*r*	.202	-.057	.108	-.165	-.084
	p	.053	.588	.304	.114	.422
	n	93	93	93	93	93
SS Visit 7	*r*	-.098	.081	.082	-.049	-.040
	p	.456	.536	.534	.711	.764
	n	60	60	60	60	60
SS Visit 9	*r*	-.190	.169	.209	.039	-.080
	p	.343	.400	.295	.847	.692
	n	27	27	27	27	27
SS Visit 11	*r*	-.071	-.323	.315	.075	-.337
	p	.817	.282	.295	.807	.261
	n	13	13	13	13	13
SS Visit 13	*r*	.348	.003	.637	.366	.048
	p	.566	.997	.248	.544	.939
	n	5	5	5	5	5

Note. SS: Seeking Social Support
**p* < .05; ***p* < .01; ****p* < .001; all 2-tailed

Table 39

Blaming Self Use by Visit

	n	Min	Max	*M*	*SD*
BS Visit 1	195	0	3.00	1.10	0.84
BS Visit 3	144	0	3.00	1.06	0.90
BS Visit 5	82	0	3.00	1.01	0.83
BS Visit 7	56	0	3.00	1.22	0.79
BS Visit 9	25	0	3.00	1.29	0.90
BS Visit 11	13	0	2.00	0.92	0.68
BS Visit 13	4	0.67	2.00	1.33	0.61
BS Visit 15	2	0.67	0.67	0.67	0

Note. BS: Blaming Self

Table 40

Association of Personality Traits and Blaming Self Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
BS Visit 1	*r*	.277***	-.206**	-.123	-.050	-.131
	p	<.001	.004	.087	.491	.068
	n	195	195	195	195	195
BS Visit 3	*r*	.321***	-.084	.049	-.101	-.070
	p	<.001	.286	.535	.203	.378
	n	162	162	162	162	162
BS Visit 5	*r*	.349**	-.108	-.145	-.244*	-.212*
	p	.001	.308	.170	.020	.044
	n	91	91	91	91	91
BS Visit 7	*r*	.429**	-.219	.093	-.163	-.329*
	p	.001	.095	.486	.217	.011
	n	59	59	59	59	59
BS Visit 9	*r*	.371	-.164	-.016	-.020	-.119
	p	.056	.413	.936	.922	.553
	n	27	27	27	27	27
BS Visit 11	*r*	.409	-.155	.268	-.625*	.180
	p	.166	.614	.375	.022	.556
	n	13	13	13	13	13
BS Visit 13	*r*	.843	-.966*	.662	-.472	.000
	p	.157	.034	.338	.528	1.000
	n	4	4	4	4	4

Note. BS: Blaming Self

**p* < .05; ***p* < .01; ****p* < .001; all 2-tailed

Table 41

Wishful Thinking Use by Visit

	n	Min	Max	*M*	*SD*
WT Visit 1	203	0	3.00	1.38	0.65
WT Visit 3	151	0	3.00	1.37	0.59
WT Visit 5	89	0	2.75	1.31	0.68
WT Visit 7	59	0	2.50	1.35	0.67
WT Visit 9	25	0.13	2.63	1.51	0.74
WT Visit 11	13	0.25	2.50	1.39	0.77
WT Visit 13	5	1.13	2.25	1.63	0.46
WT Visit 15	2	1.25	2.38	1.81	0.80

Note. WT: Wishful Thinking

Table 42

Association of Personality Traits and Wishful Thinking Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
WT Visit 1	*r*	.368***	-.156*	.110	-.185**	-.104
	p	<.001	.026	.119	.008	.138
	n	203	203	203	203	203
WT Visit 3	*r*	.425***	-.218**	.105	-.274***	-.128
	p	<.001	.005	.183	<.001	.104
	n	162	162	162	162	162
WT Visit 5	*r*	.494***	-.203	.076	-.247*	-.193
	p	<.001	.051	.469	.017	.064
	n	93	93	93	93	93
WT Visit 7	*r*	.559***	-.309	.072	-.306*	-.302
	p	<.001	.016	.584	.018	.019
	n	60	60	60	60	60
WT Visit 9	*r*	.484*	-.302	.194	-.297	-.131
	p	.010	.126	.332	.132	.515
	n	27	27	27	27	27
WT Visit 11	*r*	.563*	-.159	.434	-.530	-.311
	p	.045	.604	.138	.063	.301
	n	13	13	13	13	13
WT Visit 13	*r*	.962**	-.760	.037	-.375	-.569
	p	.009	.136	.953	.534	.317
	n	5	5	5	5	5

Note. WT: Wishful Thinking
**p* < .05; ***p* < .01; ****p* < .001; all 2-tailed

Table 43

Avoidance Use by Visit

	n	Min	Max	*M*	*SD*
AV Visit 1	199	0	2.50	1.13	0.56
AV Visit 3	147	0	2.20	1.13	0.51
AV Visit 5	86	0	2.30	1.06	0.59
AV Visit 7	57	0	2.20	1.12	0.59
AV Visit 9	25	0.30	2.30	1.23	0.58
AV Visit 11	13	0.20	2.20	1.11	0.56
AV Visit 13	5	0.60	2.20	1.24	0.67
AV Visit 15	2	0.70	2.10	1.40	0.99

Note. AV: Avoidance

Table 44

Association of Personality Traits and Avoidance Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
AV Visit 1	*r*	.237**	-.126	.077	-.142*	-.074
	p	.001	.077	.282	.046	.300
	n	199	199	199	199	199
AV Visit 3	*r*	.321***	-.204**	.100	-.223**	-.073
	p	<.001	.009	.205	.004	.358
	n	162	162	162	162	162
AV Visit 5	*r*	.275**	-.219*	-.020	-.188	-.070
	p	.008	.035	.850	.071	.506
	n	93	93	93	93	93
AV Visit 7	*r*	.442***	-.378**	.059	-.169	-.217
	p	<.001	.003	.652	.198	.096
	n	60	60	60	60	60
AV Visit 9	*r*	.310	-.308	.099	-.061	-.180
	p	.115	.118	.623	.763	.369
	n	27	27	27	27	27
AV Visit 11	*r*	.404	-.361	.456	-.122	-.213
	p	.171	.225	.117	.692	.485
	n	13	13	13	13	13
AV Visit 13	*r*	.756	-.611	.358	-.183	.130
	p	.139	.273	.554	.768	.835
	n	5	5	5	5	5

Note. AV: Avoidance
*p < .05; **p < .01; ***p < .001; all 2-tailed

Table 45

Blaming Others Use by Visit

	n	Min	Max	*M*	*SD*
BO Visit 1	198	0	2.67	0.76	0.69
BO Visit 3	145	0	2.67	0.70	0.65
BO Visit 5	86	0	2.50	0.62	0.59
BO Visit 7	57	0	2.17	0.72	0.62
BO Visit 9	25	0	2.33	0.90	0.64
BO Visit 11	13	0	1.50	0.56	0.45
BO Visit 13	5	0	1.17	0.60	0.43
BO Visit 15	2	0.17	0.50	0.33	0.24

Note. BO: Blaming Others

Table 46

Association of Personality Traits and Blaming Others Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
BO Visit 1	*r*	.241**	-.017	.125	-.191**	.087
	p	.001	.811	.080	.007	.224
	n	198	198	198	198	198
BO Visit 3	*r*	.235**	.091	.138	-.234**	.054
	p	.003	.249	.081	.003	.494
	n	161	161	161	161	161
BO Visit 5	*r*	.279**	.167	.201	-.111	.144
	p	.007	.110	.053	.291	.169
	n	93	93	93	93	93
BO Visit 7	*r*	.376**	-.048	.338**	-.279*	.011
	p	.003	.714	.008	.031	.931
	n	60	60	60	60	60
BO Visit 9	*r*	.269	-.031	.275	-.179	.148
	p	.175	.877	.166	.372	.460
	n	27	27	27	27	27
BO Visit 11	*r*	-.155	.370	-.173	-.060	.596*
	p	.614	.213	.572	.846	.031
	n	13	13	13	13	13
BO Visit 13	*r*	.209	-.595	-.023	-.499	.036
	p	.736	.290	.970	.392	.954
	n	5	5	5	5	5

Note. BO: Blaming Others
**p* < .05; ***p* < .01; ****p* < .001; all 2-tailed

Table 47

Counting Blessings Use by Visit

	n	Min	Max	*M*	*SD*
CB Visit 1	200	0	3.00	2.22	0.57
CB Visit 3	149	0	3.00	2.27	0.52
CB Visit 5	86	0	3.00	2.21	0.60
CB Visit 7	58	0	3.00	2.27	0.59
CB Visit 9	25	1.33	3.00	2.45	0.48
CB Visit 11	13	0.83	3.00	2.18	0.60
CB Visit 13	5	1.67	3.00	2.43	0.52
CB Visit 15	2	2.50	2.67	2.58	0.12

Note. CB: Counting Blessings

Table 48

Association of Personality Traits and Counting Blessings Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
CB Visit 1	*r*	-.232**	.227**	.059	.147*	.099
	p	.001	.001	.404	.038	.162
	n	200	200	200	200	200
CB Visit 3	*r*	-.216**	.175*	.093	.089	.120
	p	.006	.026	.240	.261	.129
	n	162	162	162	162	162
CB Visit 5	*r*	-.027	.054	-.066	-.191	-.131
	p	.798	.607	.535	.068	.214
	n	92	92	92	92	92
CB Visit 7	*r*	-.096	.070	.027	-.203	-.030
	p	.464	.596	.835	.120	.823
	n	60	60	60	60	60
CB Visit 9	*r*	-.079	.236	.143	.039	.167
	p	.695	.236	.475	.846	.404
	n	27	27	27	27	27
CB Visit 11	*r*	-.259	.008	.212	-.155	-.031
	p	.392	.980	.486	.612	.920
	n	13	13	13	13	13
CB Visit 13	*r*	-.163	-.513	-.779	-.837	-.678
	p	.793	.377	.120	.077	.209
	n	5	5	5	5	5

Note. CB: Counting Blessings
**p* < .05; ***p* < .01; ****p* < .001; all 2-tailed

Table 49

Religiosity Use by Visit

	n	Min	Max	*M*	*SD*
RG Visit 1	195	0	3.00	1.77	0.71
RG Visit 3	145	0	3.00	1.72	0.70
RG Visit 5	81	0	2.67	1.76	0.76
RG Visit 7	52	0	2.67	1.79	0.69
RG Visit 9	23	0	2.67	1.83	0.81
RG Visit 11	12	0	3.00	1.86	0.78
RG Visit 13	4	0	2.33	1.42	1.03
RG Visit 15	2	2.33	3.00	2.67	0.47

Note. RG: Religiosity

Table 50

Association of Personality Traits and Religiosity Coping Strategy Use

		NEO N	NEO E	NEO O	NEO A	NEO C
RG Visit 1	*r*	-.027	.136	-.027	-.024	.023
	p	.707	.058	.706	.735	.753
	n	195	195	195	195	195
RG Visit 3	*r*	-.120	.245**	.057	.075	.209**
	p	.130	.002	.472	.346	.008
	n	160	160	160	160	160
RG Visit 5	*r*	-.038	.197	-.094	-.150	-.050
	p	.717	.061	.378	.156	.638
	n	91	91	91	91	91
RG Visit 7	*r*	.085	.048	-.163	-.055	.001
	p	.519	.717	.214	.679	.996
	n	60	60	60	60	60
RG Visit 9	*r*	.141	.021	.262	-.038	.038
	p	.484	.917	.187	.850	.851
	n	27	27	27	27	27
RG Visit 11	*r*	.170	.077	.564	.039	-.296
	p	.597	.812	.056	.904	.351
	n	12	12	12	12	12
RG Visit 13	*r*	.554	-.701	-.472	-.652	-.939*
	p	.333	.187	.422	.233	.018
	n	5	5	5	5	5

Note. RG: Religiosity
**p* < .05; ***p* < .01; ****p* < .001; all 2-tailed

moderating effects of the interactions with the personality traits. As with the previous analyses, dementia duration at the time of the baseline visit was included to account for individual differences in time of first visit relative to dementia onset. All of these models were statistically significant with the addition of the interaction term. However, none of the interaction terms were statistically significant, signifying a lack of moderating effects within these models. The variables included in the models are presented in Tables 51, 52, 53, respectively.

Table 51

Time-Varying Avoidance and Personality Traits Predicting Severe Dementia Models

	Event	Censored	HR	*p*	CI (95%)
Avoidance & Neuroticism	37	103			
Avoidance			73.412	.040	1.219-4420.650
Neuroticism			1.087	.112	0.981- 1.205
Dementia Duration			1.291**	.002	1.095- 1.521
Avoidance *x* Neuroticism			0.942	.097	0.877- 1.011
Avoidance & Extraversion	37	103			
Avoidance			0.569	.769	0.013- 24.608
Extraversion			0.967	.587	0.855- 1.092
Dementia Duration			1.266**	.006	1.069- 1.500
Avoidance *x* Extraversion			1.035	.394	0.956- 1.122
Avoidance & Openness	37	103			
Avoidance			7.091	.278	0.206- 244.028
Openness			1.040	.506	0.927- 1.167
Dementia Duration			1.253**	.008	1.061- 1.480
Avoidance *x* Openness			0.978	.552	0.908- 1.053
Avoidance & Agreeableness	37	103			
Avoidance			0.246	.518	0.004- 17.252
Agreeableness			0.957	.396	0.865- 1.059
Dementia Duration			1.233*	.010	1.052- 1.447
Avoidance *x* Agreeableness			1.045	.274	0.965- 1.132
Avoidance & Conscientiousness	37	103			
Avoidance			15.195	.070	0.801-288.203
Conscientiousness			1.043	.349	0.955-1.140
Dementia Duration			1.254**	.008	1.061-1.481
Avoidance *x* Conscientiousness			0.962	.210	0.906-1.022

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

Table 52

Time-Varying Avoidance and Personality Traits with Neuropsychiatric Symptoms Predicting Severe Dementia Models

	Event	Censored	HR	*p*	CI (95%)
Avoidance & Neuroticism	36	101			
Avoidance			30.487	.128	0.372-2495.895
Neuroticism			1.054	.362	0.942- 1.179
Dementia Duration			1.251**	.009	1.057- 1.482
Avoidance *x* Neuroticism			0.959	.289	0.887- 1.036
Neuropsychiatric Sxs (t.v.)			1.053**	.004	1.017- 1.090
Avoidance & Extraversion	36	101			
Avoidance			1.459	.852	0.028- 76.010
Extraversion			0.986	.833	0.869- 1.120
Dementia Duration			1.221*	.019	1.033- 1.444
Avoidance *x* Extraversion			1.015	.727	0.933- 1.105
Neuropsychiatric Sxs (t.v.)			1.055**	.003	1.019- 1.092
Avoidance & Openness	36	101			
Avoidance			3.294	.517	0.089- 121.733
Openness			1.019	.756	0.905- 1.148
Dementia Duration			1.207*	.025	1.024- 1.423
Avoidance *x* Openness			0.996	.916	0.922- 1.075
Neuropsychiatric Sxs (t.v.)			1.058**	.001	1.022- 1.096
Avoidance & Agreeableness	36	101			
Avoidance			0.910	.965	0.013- 62.100
Agreeableness			0.990	.849	0.895- 1.095
Dementia Duration			1.206*	.021	1.028- 1.414
Avoidance *x* Agreeableness			1.022	.591	0.944- 1.107
Neuropsychiatric Sxs (t.v.)			1.058**	.002	1.021- 1.095
Avoidance & Conscientiousness	36	101			
Avoidance			8.066	.170	0.409- 159.149
Conscientiousness			1.027	.541	0.942- 1.121
Dementia Duration			1.211*	.023	1.027- 1.429
Avoidance *x* Conscientiousness			0.978	.467	0.920- 1.039
Neuropsychiatric Sxs (t.v.)			1.054**	.003	1.018- 1.091

Note. sxs: symptoms; t.v.: time varying
**p* < .05; ***p* < .01

Table 53

Time-Varying Conscientiousness and Personality Traits with Dementia Onset Age Predicting Severe Dementia Models

	Event	Censored	HR	*p*	CI (95%)
Counting Blessings & Neuroticism	96	50			
Counting Blessings			1.609	.635	0.226-11.432
Neuroticism			1.042	.354	0.955- 1.136
Dementia Duration			1.023	.690	0.913- 1.147
Counting Blessings *x* Neuroticism			0.983	.372	0.946- 1.021
Onset Age			1.074***	<.001	1.034- 1.115
Counting Blessings & Extraversion	96	50			
Counting Blessings			0.380	.332	0.054- 2.682
Extraversion			0.970	.499	0.888- 1.059
Dementia Duration			1.026	.658	0.916- 1.150
Counting Blessings *x* Extraversion			1.012	.548	0.973- 1.052
Onset Age			1.073***	<.001	1.034- 1.114
Counting Blessings & Openness	96	50			
Counting Blessings			0.622	.728	0.043- 8.994
Openness			0.995	.940	0.873- 1.134
Dementia Duration			1.021	.720	0.911- 1.143
Counting Blessings *x* Openness			1.002	.950	0.946- 1.061
Onset Age			1.073***	<.001	1.034- 1.114
Counting Blessings & Agreeableness	96	50			
Counting Blessings			0.338	.256	0.052- 2.196
Agreeableness			0.981	.597	0.912- 1.055
Dementia Duration			1.021	.725	0.910- 1.145
Counting Blessings *x* Agreeableness			1.013	.462	0.979- 1.047
Onset Age			1.072	<.001	1.033- 1.113
Counting Blessings & Conscientiousness	96	50			
Counting Blessings			0.391	.317	0.062- 2.465
Conscientiousness			0.968	.472	0.884- 1.059
Dementia Duration			1.030	.608	0.919- 1.155
Counting Blessings *x* Conscientiousness			1.012	.555	0.974- 1.051
Onset Age			1.077	<.001	1.036- 1.118

*$p < .05$; **$p < .01$

CHAPTER V

DISCUSSION

This project was designed to examine whether dementia caregiver personality traits and coping strategies are associated with the care recipient outcomes of severe dementia, institutionalization, and mortality. Specifically examined were caregivers' personality traits of Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Assessed coping strategies utilized by caregivers included Problem Focused, Seeks Social Support, Blames Self, Wishful Thinking, Avoidance, Blames Others, Counts Blessings, and Religiosity. In addition, this study assessed whether other caregiver factors, such as caregiver age, gender, kin relation to the care recipient, relationship closeness, and co-residency with care recipient, affected the predictive association between caregiver personality traits and coping strategies and care recipient outcomes. Care recipient factors were also examined, including gender, estimated onset age, completed education, and neuropsychiatric symptoms.

Using survival analysis, caregiver personality traits were not found to be individually predictive of care recipient outcomes. The lack of direct predictive association for personality traits on care recipient institutionalization is supported by previous findings that caregivers may make this decision in light of external factors, such as serious health events (McLennon, Habermann, & Davis, 2010). However, this is contrary to previous findings using the same dataset that care recipients display more rapid cognitive decline when their caregivers score high on Neuroticism (Norton et al., 2013). This difference may not have been seen in these analyses as personality traits were treated as continuous variables rather than comparing those with high scores to the rest of the sample. Additionally, statistical power may have been reduced due to the small number of individuals who experienced the outcome events, which was as low as one-third of the included sample size. In models incorporating personality traits and accounting for caregiver and care recipient factors, the only statistically significant predictors included caregiver reported relationship closeness and co-residency for severe dementia models, co-residency for institutionalization models, and dementia onset age for mortality models for each personality trait ($p < .05$). That is, caregivers who reported closer relationships at each visit were less likely to have care recipients develop severe dementia symptoms regardless of the caregivers' personality traits. This is consistent with previous research using the same dataset, which found that higher levels of relationship closeness predicted slower cognitive decline in individuals with dementia (Norton et al., 2009). Interestingly, relationship closeness was not found to be predictive of time to institutionalization as previous researchers found (Winter, Gitlin, & Dennis, 2011), but as noted above, there are many variables that may influence a caregiver's decision to institutionalize, such as the availability of financial resources, the caregivers' own health, and the quality of facilities available. Alternatively, care-recipients in dyads who did not co-reside at baseline were significantly more likely to develop severe dementia symptoms and to be institutionalized, regardless of caregivers' personality traits. Researchers have found that living alone is a risk factor for institutionalization (Dramé et al., 2012), which may be related to the findings in this study that non-co-residency was a risk factor increasing likelihood of institutionalization. Older dementia onset age was associated with greater risk of care recipient mortality, regardless of caregivers' personality traits. This supports previous research that also found that older dementia onset age was related to shorter survival times (Meng et al., 2011; Wolfson et al., 2001). However, other caregiver and care recipient factors previously found to be predictive of mortality, such as care recipient depressive symptoms and behavioral dysfunction (McClendon et al., 2004), gender (Meng et al., 2011), and care recipient age (Schäufele et al., 1999) were not statistically significant in this analysis. The current study measured behavioral symptoms and depression using one measure (NPI), while the McClendon et al. (2004) study used two measures, including one specific to depression (Center for Epidemiologic Studies Depression Scale). Although Meng et al. (2011) found a significant effect for gender, other researchers, including Schäufele et al. (1999), did not find this to be a significant predictor as in the current study. Additionally, Schäufele et al. (1999) controlled for dementia severity, while the current study attempted to account for differences in time of study inclusion by controlling for dementia duration instead. Other researchers found that shorter dementia duration at study entry predicted shorter survival times (Boersma, Van Den Brink, Deeg, Eefsting, & Van Tilburg, 1999). Thus, due to the differences in study entry time and the use of incident dementia cases in the present study, dementia duration was controlled in all analyses.

The second research question sought to examine the role of caregivers' utilization of coping strategies on the three care recipient outcomes. When accounting for time varying utilization of coping strategies, only increased use of Avoidance predicted severe dementia (HR = 1.881, p = 0.034) and remained a significant predictor of severe dementia while controlling for proposed caregiver and care recipient covariates (HR = 2.311, $p = 0.010$). Of these proposed covariates, only increased care recipient neuropsychiatric symptoms was predictive in the final model predicting time to severe dementia (HR = 1.061, $p < 0.001$). Although research has found that younger care recipients often have faster cognitive decline (e.g. Jacobs et al., 1994; Musicco et al., 2009), this association between dementia onset age and development of severe dementia was not found in these analyses. This may be due to the inclusion of individuals with dementia onset age less than 65 years in the study by Jacobs et al. (1994), while this study included only individuals whose dementia onset age was after age 65. Additionally, the average dementia onset age in the Musicco et al. (2009) study was much younger at 73 (8.2) years, while the average age of participants completing both measures in this study was 82.62 (5.83) years. Previous research in the sample community-based sample as the present project found that use of Problem Focused and Counting Blessings were associated with slower cognitive declines measured by the MMSE and time-varying use of Problem Focused, Seeking Social Support, Wishful Thinking were associated with slower worsening of dementia symptoms measured by the CDR (Tschanz et al., 2013). However, this effect was not seen in the current analyses examining effects of time-varying coping and combining these measures into one overall indicator of severe dementia. Additionally, none of the time-varying coping strategies significantly predicted time to care recipient institutionalization. This finding supported previous research that showed no association between instrumental (problem focused) and acceptance coping strategies with care recipient survival time (McClendon et al., 2004), but did not mirror findings from that study that caregivers’ use of wishfulness-intrapsychic coping was related to shorter care recipient survival. In fact, caregivers’ use of Counting Blessings was associated with a slower time to mortality for care recipients. The models predicting these care recipient outcomes were only statistically significant when caregiver and care recipient covariates were included. Male caregivers, non-co-residing dyads at baseline, older care recipient dementia onset age, and greater care recipient neuropsychiatric symptoms predicted increased care recipient institutionalization. Other researchers have shown that certain neuropsychiatric symptoms are associated with care recipient institutionalization (i.e. depression, delusions, and agitation) and mortality (i.e. depression and hallucinations; Okura et al., 2011). However, because this study looked at neuropsychiatric symptoms as a combined factor, the results cannot speak to specific neuropsychiatric symptom predictors for these outcomes. The role of neuropsychiatric symptoms on care recipient outcomes is important, especially if related to coping strategies, as researchers have shown that attempts at training caregivers can reduce problematic behaviors and delay institutionalization (Teri, 1999). Only older dementia onset age was predictive in models predicting mortality, which was consistent with the analyses of personality traits predicting mortality.

The third research question examined the association between caregiver personality traits and coping strategies. The analyses revealed weak but statistically significant positive associations between Neuroticism and use of Blaming Self, Wishful Thinking, Avoidance, and Blaming Others, while negatively being associated with use of

Counting Blessings. This is consistent with previous research that found positive associations between Neuroticism and emotion-focused coping (Blaming Self, Avoidance, and Wishful Thinking) and negative associations between Neuroticism and use of Problem Focused and Seeking Social Support coping (Hooker et al., 1994).

Additionally, the trait of Openness was only associated with Problem Focused coping. This could be related to individuals high in Openness seeing their stressors as challenges and being open to engaging in active, problem-solving strategies to alleviate their stress. Previous research has also failed to find associations between Openness and coping strategies (Hooker et al., 1994; McCrae & Costa, 1986). One study proposed that the lack of association may be an artifact of the sample of individuals who volunteer to participate in this type of study, "restricting variance on (Openness) and constricting correlations artificially" (Hooker et al., 1994, p. 389). In this study, Openness had the least variation among the five personality traits. The personality trait of Conscientiousness was not associated with any of the coping strategies and coping strategy of Religiosity was not associated with any of the NEO personality traits. The coping strategy of Wishful Thinking was negatively associated with Extraversion and Agreeableness, which may be related to the finding that individuals high in Extraversion often engage in problem-focused coping rather than emotion-focused coping strategies (Connor-Smith & Flachsbart, 2007). The association between some personality traits and coping strategies differed at varying visits, such as the associations with Neuroticism and Blamed Self and Wishful Thinking becoming stronger with later visits. This might be attributable to changes in caregivers' use of coping strategies, but it might also represent changes in the nature of the sample, such as attrition due to dropouts or mortality. A previous examination of mean scores across visits from this study showed little change in the use of coping strategies over time (Tschanz et al., 2013). The direction of association between personality trait and coping strategy was not statistically significant in different directions at later visits for any of the coping strategies or personality traits. This confirms that the direction of association was relatively stable across visits.

Previous researchers have proposed that coping strategies are thought to be influenced in early childhood by personality traits (Derryberry et al., 2003). However, this association does not necessarily mean that individuals' use of coping strategies is determined by personality, and this is supported by the lack of strong associations between the personality traits and coping strategies. The lack of association in this dataset may be attributable to the possibility that the referenced situations with which the caregivers were coping at the time of completing the measure for this study elicited a specific set of coping strategies that were not related to the caregivers' dominant personality traits.

Personality traits are generally thought to be stable over adulthood, with only minimal age-related changes (Eysenck & Eysenck, 1985). Thus, it might be interpreted as good news to some that, for the most part, caregivers' personality traits are not predictive of care recipient development of severe dementia, institutionalization, or mortality. Specifically, we are examining family members who were faced with helping their loved one suffering from an incurable degenerative disorder. These family caregivers have taken on the role of caring for loved ones out of necessity, not out of their choice of occupation or their natural skill set. Due to this selection bias, their personality traits are not accounted for in taking on the role of caregiving. Additionally, there exists little research that suggests personality traits are changeable. Thus, if these personality traits did predict care recipient outcomes, we might suggest against some family members providing care because there would be little hope that they could change their personality to allow for more beneficial care recipient outcomes. Unfortunately, in some situations, there may not be an available alternative caregiver within the family whose personality traits would predict better outcomes. In these cases, it may be recommended that institutionalization of the care recipient be considered for both the health of the care recipient as well as the potential caregivers.

Unlike the stability of personality traits, Lazarus and Folkman (1984) defined coping as an individual's response to a situation that is based on his or her appraisals of that situation and that requires "constantly changing cognitive and behavioral efforts" (p. 141). Thus, it can be assumed that individuals are not locked into a certain coping strategy across changes in time or situations. This allows for the possibility that caregivers can exercise adaptability and flexibility in utilization of various types of coping strategies. Previous research has found that caregivers' use of coping strategies tend to be stable over time (Tschanz et al., 2013), but this was measured in the absence of attempts to educate caregivers or alter their coping strategies. The ability to change one's use of coping strategies is particularly significant when those coping strategies have such serious consequences. For instance, this study found significant effects for caregivers' use of coping strategies on care recipients' development of severe dementia and mortality. That is, increased use of Avoidance (as well as increased care recipient neuropsychiatric symptoms) increased the likelihood of care recipients developing severe dementia. Additionally, increased Counting Blessings (in a model with dementia onset age) was associated with decreased the risk of care recipient mortality. It remains to be seen if active interventions could effectively encourage caregivers to utilize coping strategies that have been identified to be most helpful to the care recipient by more effectively managing stressors or responding to problematic care recipient behaviors. For instance, the 36% reduction in care recipient mortality associated with caregivers' use of Counting Blessings coping strategy might suggest the possibility of encouraging faith-based avenues for assisting caregivers of persons with dementia.

Strengths

The longitudinal data collection procedure of this study was a strength that allowed for an examination of caregiver coping and personality traits. The care recipient and caregiver dyads were identified and collected from a community-based, primarily non-institutionalized population, and sustained participation rates were excellent, with follow-up rates for participants near 95% (excluding those lost to follow-up due to death). This was important specifically for these analyses in which data from multiple visits were used. Additionally, a relatively large number of caregiver-care recipient dyads met inclusion criteria for the analyses. This study was also able to examine the possible effects of a large number of caregiver and care recipient variables due to the wide array of measures used in data collection.

The majority culture of the sample is affiliated with The Church of Jesus Christ of Latter Day Saints, which emphasizes family-centered values. Thus, many of the individuals with dementia contacted for participation in this study had a family member, usually a spouse or adult child, who was able and willing to spend time with that individual on a regular basis, and who was willing to spend time providing information for this study. This likely increased response and follow-up rates for caregivers and care recipients.

Limitations

The longitudinal nature of the study allowed for multiple data points for each dyad, but this also presented some problems, especially for this study examining caregiver effects. Visits were conducted with the person with dementia as close as possible to a 6-month interval, so if the key caregiver was unavailable, the assessment team met with a caregiver who assisted in providing care at the time. Due to the study procedures including only visits for which the key caregiver provided information, any factors that influenced key caregivers' ongoing participation also affected the amount of care recipient information included in study analyses. A more liberal policy on dyad inclusion may overcome this limitation in future studies.

Although the sample size was large, the number of individuals with dementia who experienced the examined outcomes was relatively small, with less than 27% of included care recipients meeting criteria for severe dementia, and less than half institutionalized while the key caregiver served as the informant. The event occurrence rate determines the overall power in the survival analyses, so the analyses may not have yielded statistically significant results due to a power issue, rather than a true lack of results. Furthermore, the large sample size represented a limited diversity of individuals' race/ethnicity, which may limit the generalizability of the findings to individuals of other backgrounds.

The amount of missing data may have affected the conclusions of this study. Caregivers and care recipients may have selectively skipped items either due to privacy concerns or burden related to the number of items on each of the measures. Although a limited number of missing items were allowed for imputation, missing items in excess of 10% of the overall number of items limited the ability to derive overall index scores. A procedural attempt at reducing burden on the caregivers and care recipients may have also affected these analyses. That is, caregivers were only asked to rate their use of coping strategies on odd-numbered visits. This meant that if a key caregiver missed an odd visit, their data was likely missing for at least one years' time. Although we did forward impute visit scores if caregivers served before and after the missing data point, this data collection procedure may be less sensitive than if it were measured at all visits. Arguing against this however, is the relative stability of the use of coping strategies over time.

The tool used to measure caregivers' utilization of coping strategies requested that caregivers report a problem with which they were coping at the time of the interview. The study aimed to learn how caregivers were coping with the role of providing care to their loved one, but caregivers were not cued to think of this problem when rating their coping responses. In fact, a previous study using the same dataset found that although providing care was the most frequently cited stressor, it was only mentioned by 37.6% of caregivers (Snyder et al., 2014). If coping strategies are as situation-specific as some researchers suggest, this could affect the ability of these analyses to truly examine the effects on the caregiving relationship as intended.

Finally, this study primarily examined the personality traits and the coping strategies independent of each other. This study did examine interactions between previously identified significant coping strategies and personality traits, but did so only in pairs of a coping strategy and a personality trait. That is, caregivers were not categorized into personality trait profiles or into coping profiles based on quantitative usage of each coping strategy.

Future Directions

Future studies in this area could consider analyzing personality and coping profiles rather than examining traits and strategies as individual factors. This might allow for greater understanding of the full relationship dynamics that occur between caregivers and care recipients, which perhaps could better predict care recipient outcomes.

Additionally, future studies could more closely examine how caregiver personality traits and coping strategies translate into behavioral differences in interactions with care recipients. Specifically, it seems likely that caregiver coping might affect care recipient outcomes by first affecting the caregivers' caring behaviors towards the care recipient, which then might elicit either beneficial or harmful outcomes for the care recipient. For instance, do caregivers higher in Extraversion engage the care recipients in social interactions longer into their dementia course? Or, do caregivers who utilize Seeks Social Support as a coping strategy also engage their care recipients in seeking support, and does this promote cognitive engagement of the care recipient? This would potentially allow researchers to measure factors that are more directly related to care recipient outcomes. Finally, it might be helpful for studies to look at specific strategies aimed at teaching caregivers skills for coping with stressors and assessing whether these interventions might be able to strengthen positive coping strategies in order to promote better care recipient outcomes.

Currently, there is no cure for dementia. Additionally, the progressive nature of the disease leads to compounding problems for individuals with dementia as well as their caregivers. While medical studies are attempting to identify ways to treat the biological basis of the disease, it is important that we do not neglect the psychosocial contributors to the interpersonal variations in course and progression of problematic symptoms. Caregivers are too often thrust into the role of caring for their spouse or parent who has developed dementia with little to no knowledge of or training in providing care to promote the best outcomes for the care recipient. If we can encourage utilization of coping strategies that may promote more healthy caring dyads, we might be able to positively affect the course of dementia and reduce negative care recipient outcomes through this social relationship.

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APPENDIX

Severe Dementia LML Plots

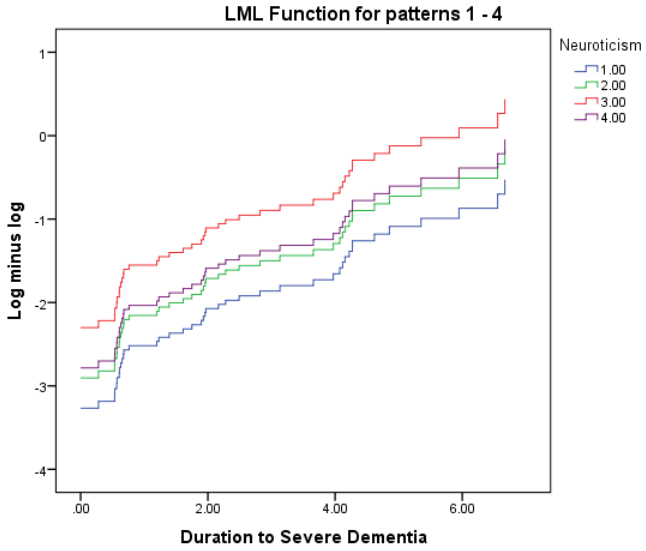

Figure 1. Neuroticism and Severe Dementia LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

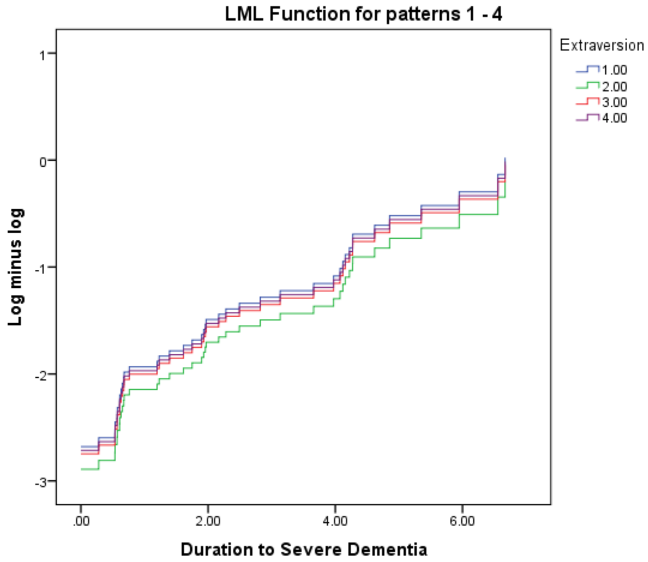

Figure 2. Extraversion and Severe Dementia LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

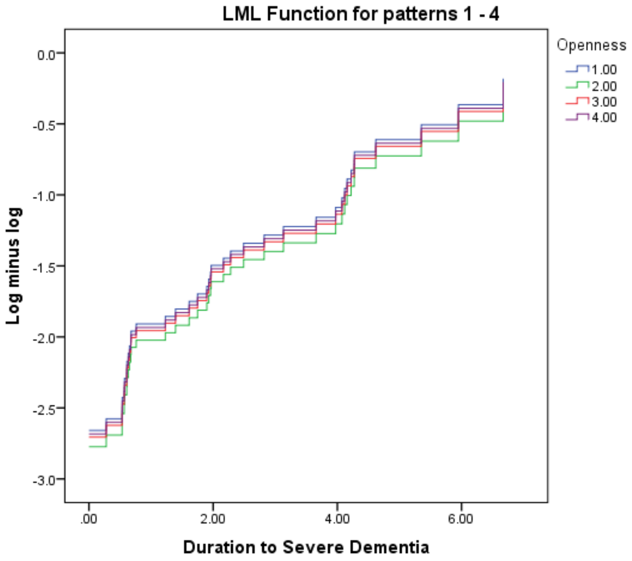

Figure 3. Openness and Severe Dementia LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

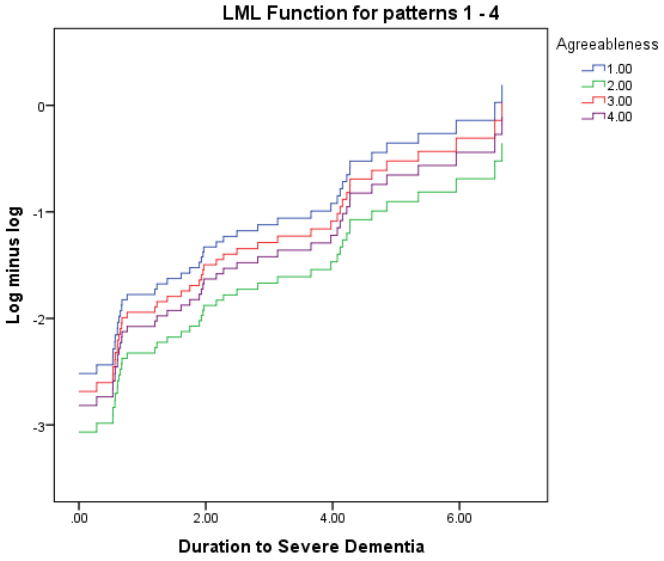

Figure 4. Agreeableness and Severe Dementia LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

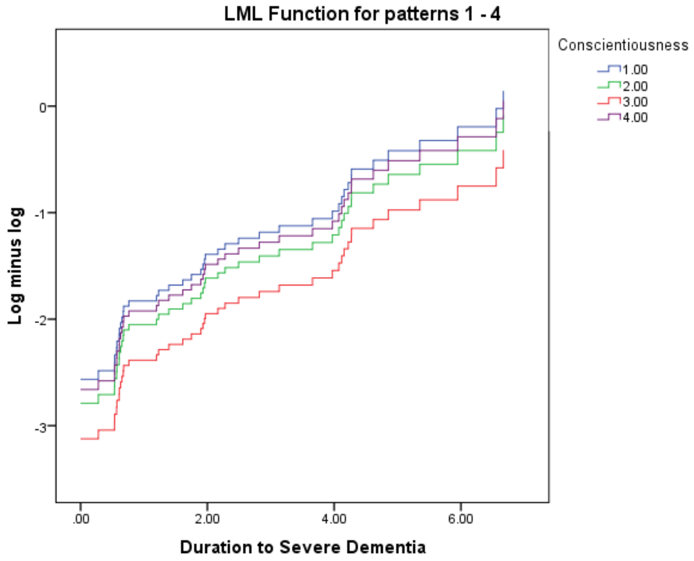

Figure 5. Conscientiousness and Severe Dementia LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

Institutionalization LML Plots

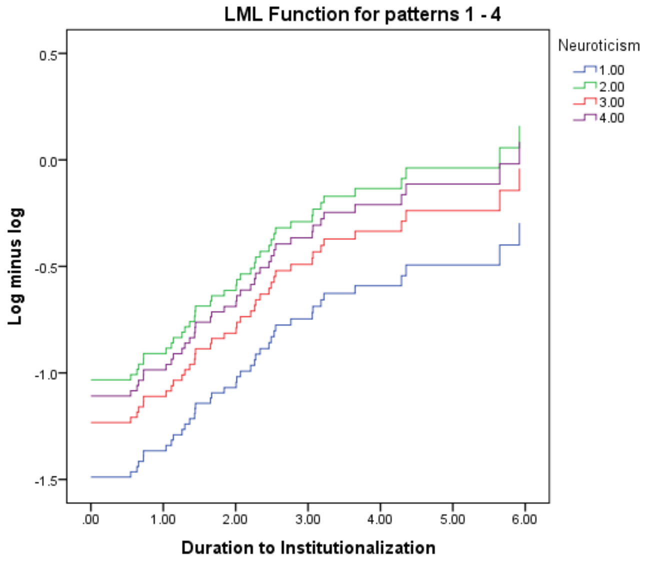

Figure 6. Neuroticism and Institutionalization LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

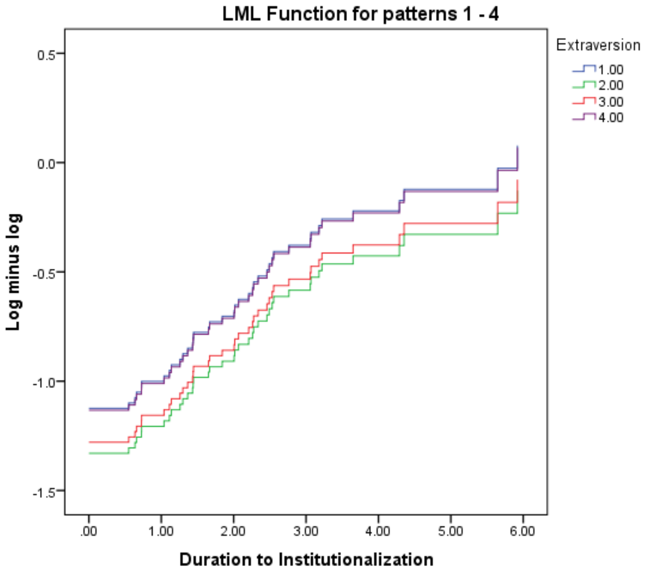

Figure 7. Extraversion and Institutionalization LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

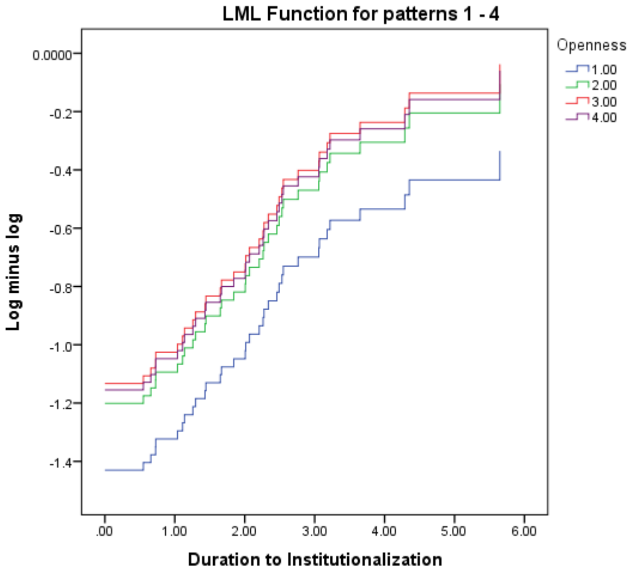

Figure 8. Openness and Institutionalization LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

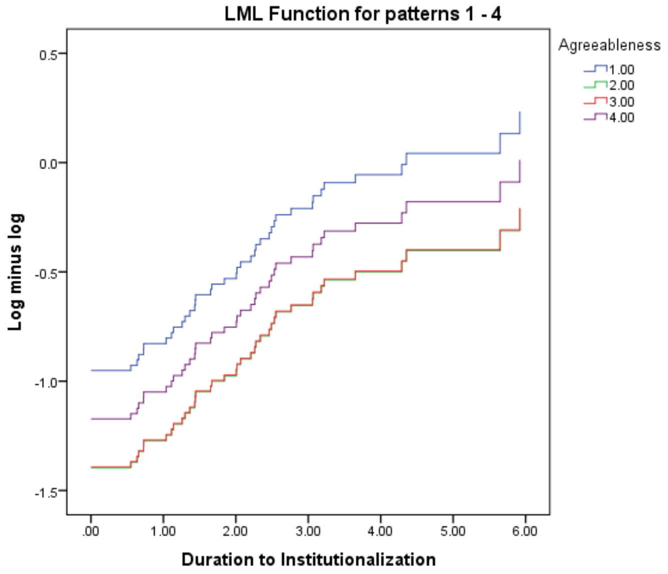

Figure 9. Agreeableness and Institutionalization LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

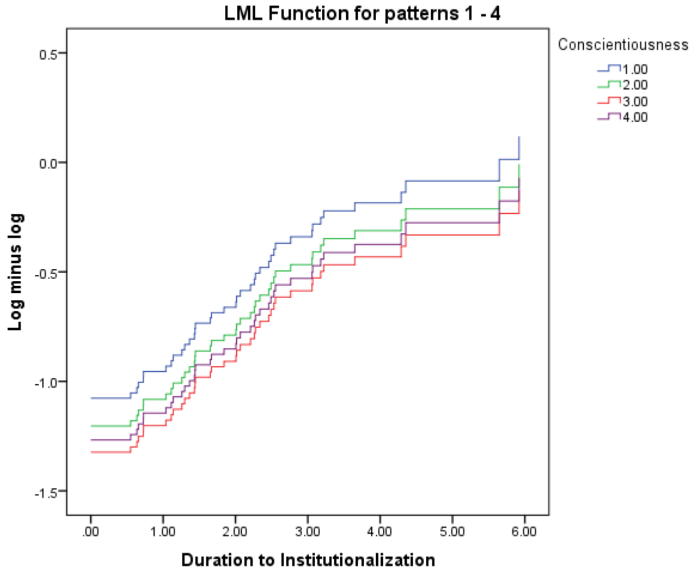

Figure 10. Conscientiousness and Institutionalization LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

Mortality LML Plots

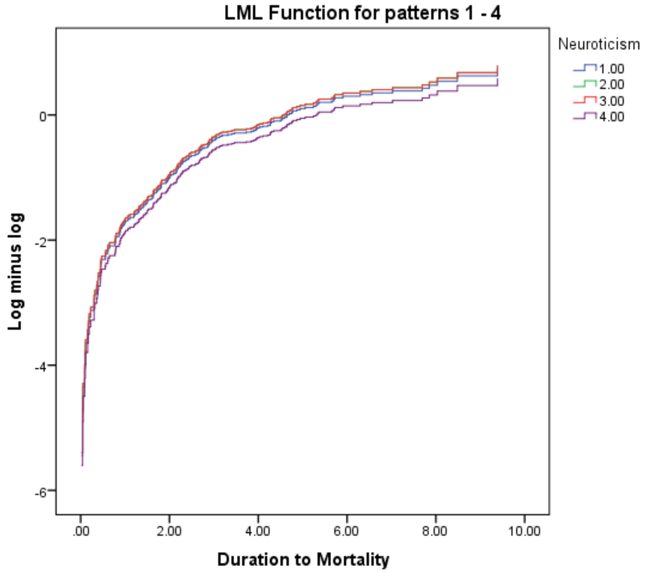

Figure 11. Neuroticism and Mortality LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

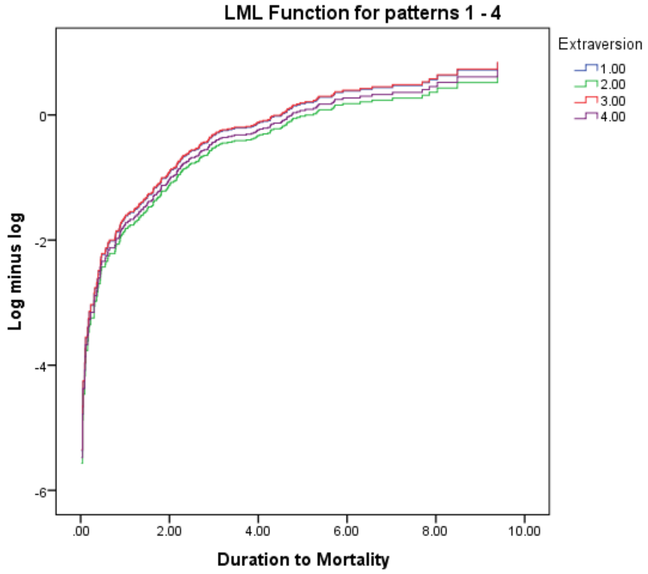

Figure 12. Extraversion and Mortality LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

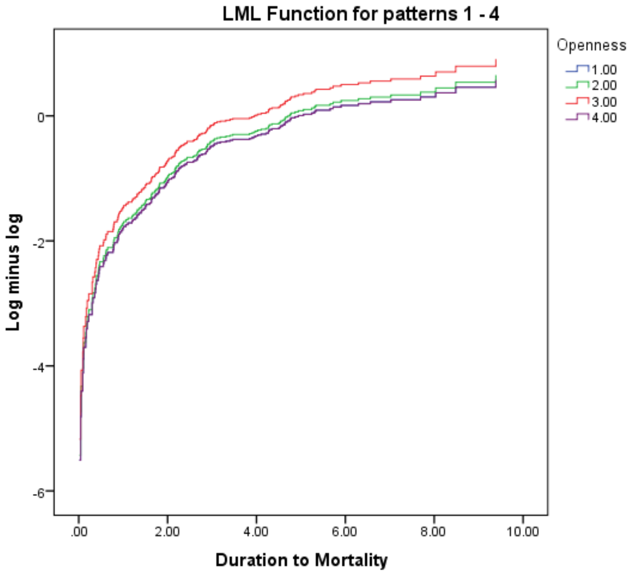

Figure 13. Openness and Mortality LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

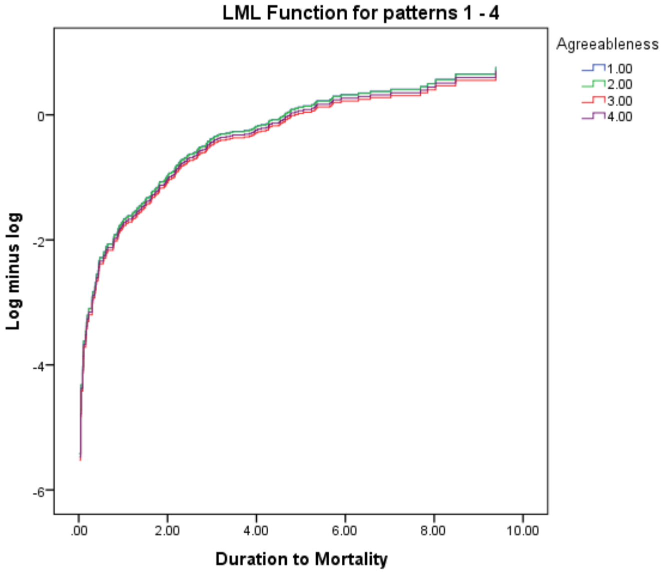

Figure 14. Agreeableness and Mortality LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

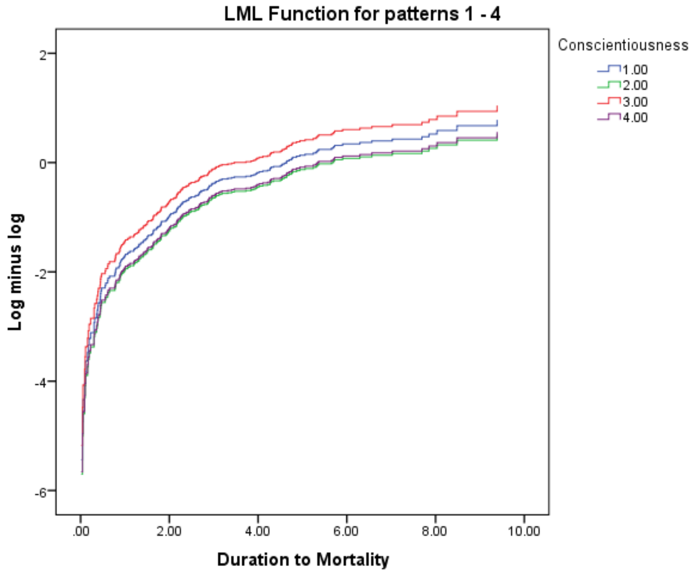

Figure 15. Conscientiousness and Mortality LML Plot. This figure illustrates the log minus log plots to test for proportional hazard.

CURRICULUM VITAE

CHRISTINE M. SNYDER

EDUCATION

Ph.D.
(Expected 7/2015)

Utah State University, Logan, Utah
Combined Clinical/Counseling/School Psychology (APA Accredited)
Dissertation topic: *Dementia caregiver personality traits and coping strategies: Association with care recipient outcomes.*
Chair: *JoAnn T. Tschanz, Ph.D.*

M.S.
2011

Utah State University, Logan, Utah
Counseling Psychology
Thesis: *A comparison of caregiver report and performance-based measures of functional ability in dementia: An examination of moderating variables.*
Chair: *JoAnn T. Tschanz, Ph.D.*

B.A.
2008

University of Arkansas, Fayetteville, Arkansas
Psychology; *Summa cum laude*
Honors Thesis: *Interpersonal and consequential factors related to interactional injustices affect individuals' perceptions and reactions.*
Advisor: *David Schroeder, Ph.D.*
Minor in General Business

CLINICAL EXPERIENCE

8/15 – 8/16
(Anticipated)

Health Psychology/Sleep Medicine Postdoctoral Resident
South Texas Veterans Health Care System – San Antonio, Texas
Training Director: *Karin McCoy, Ph.D.*

7/14 – 7/15

Clinical Psychology Predoctoral Intern, Primary Care/Health Psychology Emphasis
South Texas Veterans Health Care System – San Antonio, Texas
Training Director: *Allyson Baker, Psy.D.*

–**Clinical therapy rotations,** *Licensed supervisors*:

- **Primary Care / Behavioral Health**, *Lavina Sanders, Ph.D.*
- **Spinal Cord Injury Clinic**, *Jeffrey Dersh, Ph.D.*
- **Post-Traumatic Stress Disorder Clinic**, *Timothy Emge-Hoog, Ph.D.*
- **Polytrauma Clinic**, *Robert Beck, Ph.D.*
- **Sleep Disorder Clinic** (minor), *Paul Ingmundson, Ph.D.*

–**Assessment rotations,** *Supervisors*:

- **WAIS assessment administration/interpretation**, *Jonathan Highsmith, Ph.D.; Janice Marceaux, Ph.D.*
- **Transplant evaluations**, *Teresa Hale, Ph.D.*

7/12 – 6/14 **Student Therapist** – Graduate Assistant
Utah State University Student Health and Wellness Center – Logan, Utah
Supervisor*: M. Scott DeBerard, Ph.D.*

6/11 – 5/14 **Student Therapist**
Utah State University Psychology Community Clinic – Logan, Utah
Supervisor*: M. Scott DeBerard, Ph.D.*

5/13 – 3/14 **Student Therapist** – Practicum in Psychology
George E. Wahlen Department of Veterans Affairs Medical Center – Salt Lake City, Utah
Supervisor*: Tracy Black, Ph.D.*

4/12 – 12/13 **Student Therapist**
Huntsman-Intermountain Cancer Center – Logan, Utah
Supervisor*: M. Scott DeBerard, Ph.D.*

7/11 – 6/12 **Student Therapist** – Graduate Assistant
Utah State University Center for Persons with Disabilities, Clinical Services – Logan, Utah
Supervisor*: Martin Toohill, Ph.D.*

5/11 – 6/12 **Student Therapist** – Practicum in Counseling/Clinical Psychology
Utah State University Student Health and Wellness Center – Logan, Utah
Supervisor*: M. Scott DeBerard, Ph.D.*

5/09 – 9/12 **Neuropsychology Technician and Research Nurse**
Cache County Dementia Progression Study – Logan, Utah
Supervisor*: JoAnn T. Tschanz, Ph.D.*

8/10 – 6/11 **Student Therapist –** Practicum in Clinical Child/School Psychology
Utah State University Center for Persons with Disabilities, Clinical Services – Logan, Utah
Supervisor*: Martin Toohill, Ph.D.*

5/10 – 12/10 **Student Therapist**
Utah State University Psychology Community Clinic – Logan, Utah
Supervisors*: Susan Crowley, Ph.D. and Gretchen Peacock, Ph.D.*

8/09 – 5/10 **Student Therapist –** Integrated Practicum with Adults, Adolescents, and Children
Utah State University Psychology Community Clinic – Logan, Utah
Supervisors*: Kyle Hancock, Ph.D., Susan Crowley, Ph.D., and Gretchen Peacock, Ph.D.*

RESEARCH EXPERIENCE

5/09 – 6/12 **Graduate Research Assistant**

Cache County Dementia Progression Study – Logan, Utah
Supervisor: *JoAnn T. Tschanz, Ph.D.*

5/06 – 5/08 **Undergraduate Research Assistant**
University of Arkansas Department of Psychology – Fayetteville, Arkansas
Supervisor: *David Schroeder, Ph.D.*

TEACHING EXPERIENCE

8/10 – 1/11 **Teaching Assistant**
Graduate-level Intellectual Assessment (Psy 6310) **–** Utah State University
Instructor: *Kyle Hancock, Ph.D.*

8/09 – 5/10 **Teaching Assistant**
Undergraduate-level Introduction to Psychology (Psy 1010) **–** Utah State University.
Instructor*: Angie Dahl, M.S.,* fall semester 2009
Instructor: *Jenna Glover, Ph.D.,* spring semester 2010

PUBLICATIONS

Gilbert, M., **Snyder, C.**, Hess, K., Corcoran, C., Norton, M.C., Lyketsos, C.G., & Tschanz, J.T. (2014). The association of traumatic brain injury with rate of progression of cognitive and functional impairment in a population based cohort of Alzheimer's Disease: The Cache County Study. *International Psychogeriatrics*, *26*(10), 1593-601. doi: 10.1017/S1041610214000842

Snyder, C., Fauth, E., Piercy, K. W., Norton, M.C., Corcoran, C., Rabins, P.V., Lyketsos, C.G., & Tschanz, J.T. (2014). Dementia caregivers' coping strategies and their relationship to caregivers' health and well-being: The Cache County Study. *Aging and Mental Health*, 2014 Aug 5: 1-10 (epub ahead of print). doi: 10.1080/13607863.2014.939610

Tschanz, J. T., Piercy, K., Corcoran, C. D., Fauth, E., Norton, M. C., Rabins, P. V., Tschanz, B. T., DeBerard, M. S., **Snyder, C.**, Smith, C., Lee, L., & Lyketsos, C. G. (2013). Caregiver coping strategies predict cognitive and functional decline in dementia: The Cache County Dementia Progression Study. *American Journal of Geriatric Psychiatry*, *21*(1), 57-66. doi: http://dx.doi.org/10.1016/j.jagp.2012.10.005

PAPER PRESENTATIONS

Gilbert, M., Hess, K., Corcoran, C., **Snyder, C.**, Norton, M.C., Rao, V., Welsh-Bohmer, K.A., Breitner, J.C.S., Lyketsos, C., Tschanz, J. *Does history of traumatic brain injury affect the rate of cognitive and functional decline in Alzheimer's disease?* Paper presented at the Alzheimer's Association International Conference on Alzheimer's Disease, July 2012, Vancouver, B.C.

Snyder, C., & Schroeder, D. A. *Relationships, consequences, and interactional injustice: Reactions to being excluded.* Paper presented at the convention of the Southeastern Psychological Association, Feb 2009, New Orleans, LA.

Tschanz, J., Hess, K., Corcoran, C., **Snyder, C.**, Wanzek, J., Norton, M.C., Piercy, K., Rabins, P.V., Fauth, E., Lyketsos, C.G. *Caregiver Coping Strategies Predict Neuropsychiatric Symptoms in Dementia.* Paper presented at the Alzheimer's Association International Conference on Alzheimer's Disease, July 2012, Vancouver, B.C.

POSTER PRESENTATIONS

Prout, K., **Snyder, C.**, & DeBerard, M. S. (2012, April). *A pilot study examining change in the OQ-45 across four visits to a doctoral psychology training clinic.* Poster presented at the annual meeting of the Society of Behavioral Medicine, New Orleans, LA.

Snyder, C., & Schroeder, D. A. (2009, February). *Relationships, outcomes, revenge, and affective reactions to procedural injustice*. Poster presented at the annual meeting of the Society for Personality and Social Psychology, Tampa, FL.

Snyder, C., Smith, C., Lee, S., Norton, M., Piercy, K., Fauth, E., Corcoran, C., DeBerard, S., Schwartz, S., Morrison, A., Rabins, P., Lyketsos, C. G., & Tschanz, J. (2010, November). *Dementia Caregivers and Coping Strategies: Relationship to Health and Well-Being.* The Cache County Dementia Progression Study. Poster presented at the annual conference of the Gerontological Society of America, New Orleans, LA.

Snyder, C., Wheeler, A., Grewe, J., Dance, C., DeBerard, M. S. (2013). *Biopsychosocial Variables Predict Compensation and Medical Costs of Rotator Cuff Surgery in Utah Workers' Compensation Patients.* Poster presented at the annual conference of the Society of Behavioral Medicine, San Francisco, CA.

Tschanz, J. T., Corcoran, C., Norton, M., Piercy, K., Rabins, P. V., Fauth, E., DeBerard, S., **Snyder, C.**, Smith, C., Lee, L. S., Morrison, A., & Lyketsos, C. G. (2010, July). *Caregiver coping strategies predict cognitive decline in dementia: The Cache County Dementia Progression Study.* Poster presented at the International Conference on Alzheimer's Disease, Honolulu, HI.

SPECIALTY TRAINING

Allies on Campus Training Seminar. (2009, February). Smith, M.; Half-day workshop. Utah State University, Logan, UT.

An Integrated Approach to Complex Psychological Trauma. (2010, April). Briere, J.; Utah State University, Logan, Utah.

Autism Diagnostic Observation Schedule Workshop. (2011, April). Farley, M.; Two-day workshop. University of Utah, Salt Lake City, UT.

Breaking the silence; Healing the shame of male survivors of sexual abuse and sexual assault. (2013, January). Struve, J.; Utah State University, Logan, UT.

Cognitive Processing Therapy. VISN 17 Provider Certification Training. (2014, September 10-12). San Antonio, Texas.

Cognitive Processing Therapy: A web-based learning course (2013, June). Medical University of South Carolina and Navy Medicine. https://cpt.musc.edu

Columbia Suicide Severity Rating Scale. (2014, August). Online training/certification.

CPR Certification (2014, July). American Heart Association 2-year certification.

Epidemiology of Insomnia in the Military. (2014). Taylor, D.; Grand Rounds Presentation. Distinguished Visiting Professor, Lackland Air Force Base, San Antonio, TX.

Experiential Acceptance and Commitment Therapy Workshop. (2009, April). Hayes, S. Two-day workshop. Utah State University Counseling and Psychological Services and Avalon Hills Residential Eating Disorder Program, Logan, UT.

In-person and Internet CBT for Insomnia in the Military. (2014). Taylor, D.; 3-hour workshop. Distinguished Visiting Professor, Lackland Air Force Base, San Antonio, TX.

Multicultural Acceptance and Commitment Training. (2008). Twohig, M. & Domenech-Rodriguez, M.; Half-day workshop. Utah State University, Logan, UT.

Psychopharmacology Workshops: Child/Adolescent and Adult Psychopharmacology. (2010, May). Preston, J.; Full day workshop. Utah Psychology Association, Salt Lake City, UT.

Using Motivational Interviewing and Behavior Change. (2009, April). Burrow-Sanchez, J., & Call, M.; Half day workshop. Utah State University, Logan, Utah.