

AGE IS BUT A NUMBER: INVESTIGATING THE RELATIONSHIP BETWEEN
CAREGIVER BURDEN AND SUBJECTIVE ASPECTS
OF AGING

by

Kristen Hardin-Sigler, B.S.

A thesis submitted to the Graduate Council of
Texas State University in partial fulfillment
of the requirements for the degree of
Master of Arts
with a major in Psychological Research
May 2021

Committee Members:

Rebecca G. Deason, Chair

Krista Howard

Kelly Haskard-Zolnierak

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ACKNOWLEDGEMENTS

I first want to thank my committee chair, Dr. Rebecca Deason, for sharing her passion, ideas, and providing her constant support, encouragement, and the best mentorship I could have asked for during the development of my thesis and throughout the completion of my degree. She provided me consistency and guidance throughout my ever-changing life and academic plans, and I am eternally grateful to have called her a mentor for the last two years.

I would also like to extend my deepest gratitude to my committee member, Dr. Krista Howard for all of their wisdom and assistance throughout the creation of my thesis, and the numerous other projects she has allowed me to be a part of. Her guidance has been invaluable throughout my statistical blunders, and she has been a voice of reason during very uncertain times. She has been absolutely invaluable in my growth as a researcher, and I am very grateful to have had her on my team.

I also want to extend my thanks to my committee member, Dr. Kelly Haskard-Zolnierek, for her guidance and feedback in the development of my thesis and other projects I had the pleasure to work with her on. She has been such a valuable resource to me in my research journey, and I couldn't have accomplished my goals in this program without her assistance.

I would be remiss if I did not express my endless gratitude to my family and friends, who have unconditionally loved and supported me throughout this adventure. To my husband, Dylan, for enduring the late nights, cooking countless meals when I

inevitably forgot to eat, and for being a constant support throughout all of my academic endeavors. My parents and sister, who may not have always understood this strange world of science, but have given me their endless encouragement and support to carry on. My dear friend and fellow cohort member Kennedy Anderson, who has been a constant sounding board and rock for me throughout this program. Thank you for always answering my late-night calls and texts, for talking me off the ledge when I was certain I couldn't make it any further, and for being such a wonderful friend to me throughout this entire process. I also want to thank Madiha Ali and Taylor McDonald, for their love, support, commiserating, and encouragement over the last two years.

Finally, I would like to thank all of the past and present members of the Memory and Cognition Lab for their support and assistance over the last two years. Mark Stern and Alyse Finch were absolutely instrumental in both the development of my thesis and my development as a researcher and instructor. I am forever grateful to have had the opportunity to work with them. I also want to thank every single lab assistant who has helped me collect data for this project.

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LIST OF ABBREVIATIONS

| Abbreviation | Description |
|---------------------|--|
| ADAPS | Alzheimer's Disease and Aging Perception Scale |
| ADRD | Alzheimer's Disease and Related Dementias |
| ATOA | Attitudes Toward Own Aging |
| COVID-19 | Coronavirus Disease 2019 |
| GDS | Geriatric Depression Scale |
| MIDUS | Midlife Development in the United States |
| NIH | National Institutes of Health |
| PHQ-9 | Patient Health Questionnaire |
| PRMQ | Prospective and Retrospective Memory Questionnaire |
| SMCs | Subjective Memory Complaints |
| SMCQ | Subjective Memory Complaints Questionnaire |
| ZBI-S | Zarit Burden Interview – Short |

ABSTRACT

The caregiving experience impacts many aspects of life for family caregivers of individuals with Alzheimer's disease and related dementias (ADRD). The psychological, physical, emotional, and financial toll of caregiving often results in caregiver burden. With all of these different impacts on life, it can be assumed that the subjective aging process is also affected by caregiving. The purpose of this study was to investigate how subjective aging is related to caregiver burden in family caregivers for individuals with ADRD. This study set out to answer three questions: 1) how is caregiver burden associated with subjective aging? 2) are more negative subjective aging ideals predictive of increased caregiver burden? and 3) how do caregivers and noncaregivers differ in their subjective aging experience? Participants ($N = 185$) completed a survey assessing caregiver burden and several different aspects of subjective aging, including subjective age, subjective well-being, subjective memory, attitudes toward aging, and aging stereotype endorsement. Results indicated caregiver burden was moderately associated with and predicted by subjective age, subjective well-being, and attitudes toward own aging (ATOA), in that increased levels of caregiver burden were related to increased subjective age ratings, decreased subjective well-being, and more negative ATOA. Furthermore, caregivers reported significantly more subjective memory complaints (SMCs), older subjective age, and overidentified normal symptoms of aging as symptoms of mild Alzheimer's disease more often than noncaregivers. These findings suggest that interventions related to subjective aging may be effective in mitigating caregiver burden.

I. INTRODUCTION

Caregiver burden is the result of the psychological, physiological, and financial stressors associated with caring for a terminally ill or permanently disabled individual (Andren & Elmstahl, 2007; Werner et al., 2011). Current research into caregiver burden addresses the more tangible and objective measures of the caregiving experience, including the physical, cognitive, psychological, and social aspects. However, very little research investigates how the caregiver truly experiences caregiving and associations with subjective views on aging as a whole. For the purposes of this study, subjective aging is defined as subjective age or felt age and can be influenced by subjective well-being, subjective memory, attitudes toward own aging, and the endorsement of aging stereotypes. Investigating each of these potential contributors to subjective aging may help provide a more complete view of how caregivers and noncaregivers alike experience the subjective aging process.

This survey-based study investigated relationship between the caregiving experience, particularly caregiver burden, and subjective aging. We compared a sample of family caregivers for individuals with Alzheimer's disease and related dementias (ADRD), to a demographically similar sample of noncaregivers on subjective age, subjective well-being, subjective memory, attitudes toward own aging, and the endorsement of both positive and negative aging stereotypes. The primary goal of this study was to discover and define the ways in which the family caregiver's subjective aging experience may impact the burden associated with caregiving for an individual with ADRD.

Caregiver Burden

Caregiver burden is defined as the negative impacts of providing care to a terminally ill or permanently disabled individual (Andren & Elmstahl, 2007). Caregiver burden is a multifaceted concept, and it encompasses the physical, psychological, financial, and social stressors associated with providing care to a family member or close friend (Andren & Elmstahl, 2007; Werner et al., 2011). These effects can be particularly prevalent in caregivers of individuals with ADRD. Informal caregivers for those with ADRD provide around 18.1 billion hours of care annually, valued at 470 billion dollars (Lathan et al., 2018; Zimmerman et al., 2018).

The physical effects of caregiver burden include fatigue, pain, discomfort, irritability, and sleep deprivation (Andren & Elmstahl, 2007; Baxter et al., 2013; Buyck et al., 2011; Halm et al., 2006). Reported levels of fatigue and pain are dependent on the extent of assistance the care recipient requires (Baxter et al., 2013). Due to shorter hospital stays, longer lifespans, and acute and chronic comorbid diseases, caregivers are now handling medical tasks that are traditionally completed by medical professionals (Zimmerman et al., 2018). Often, medical equipment, such as lifts, gait belts, and wheelchairs are necessary to keep a care recipient at home (Baxter et al., 2013). Unfortunately, this equipment is not always readily available or affordable; therefore, the caregiver must use their own resources and means to provide the necessary care, which can increase the risk for injury. Furthermore, some care recipients require hands-on assistance with personal care tasks such as toileting, bathing, and dressing. Without proper medical training and equipment, these tasks can lead to increased risk of physical

strain and injury, as well as increased risk of premature physical decline for the caregiver (Camak et al., 2015; Halm et al., 2006).

The psychological symptoms of caregiver burden are equally as important to note. Caregivers have reported elevated emotional stress, depression, anxiety, and use of psychotropic medications (Zimmerman et al., 2018). Caregivers have also reported increased isolation due to caregiving responsibilities, as well as excessive emotional attachment to their care recipient (Andren & Elmstahl, 2007). This leads to difficulty coping once the care recipient is either institutionalized or dies. In addition, caregivers tend to perform significantly worse on cognitive evaluations. In a study by Lathan and colleagues (2018), caregivers were assessed with the Zarit Burden interview, the Patient Health Questionnaire (PHQ-9), the M3, which assesses risk for several psychological disorders, notably depression and anxiety, a sleep deprivation scale, and a digital neurocognitive assessment designed to assess changes in cognitive performance pre and post educational resource intervention. Results suggested caregivers tended to perform significantly worse on cognitive evaluations, and had increased rates of mild depression prior to educational intervention (Lathan et al., 2018). This difference has been attributed to the hours spent caregiving, perceived social support, and stress (Lathan et al., 2018).

Subjective Age

Subjective age is the age that an individual most identifies as when considering how old they presently feel, their attitudes toward their own aging, and their awareness of age-related changes as compared to their chronological age (Brothers et al., 2017; Montepare & Lachman, 1989). The concept of subjective age is multidimensional and dynamic and varies throughout different stages of life. Young adults typically report

feeling their chronological age or older until their mid-to-late twenties, and healthy older adults tend to report a subjective age that is younger than their chronological age (Montepare & Lachman, 1989).

The measurement of subjective age has been a highly contested topic throughout the years. In the Montepare and Lachman (1989) study, participants were asked to provide the age in years that was most representative of the way they felt and looked, as well as the age of a person who had similar interests to their own, and how old they would be if they could pick out an age at that particular moment. However, methods like this may increase the chance that there is bias from chronological age. More recent studies, such as that conducted by Hughes et al. (2013), have attempted to eliminate the bias of chronological age by asking participants to indicate how old they felt at that particular moment by making a tick mark on a 120 mm line. Each millimeter represented a year and was then measured to determine the participant's subjective age.

In addition to being dynamic, subjective age is malleable, particularly in an experimental setting. Previous research indicates that reported subjective age in older adults can change following cognitive testing, physical performance, the exposure to positive feedback, and sleep changes (Hughes et al., 2013; Stephan et al., 2016; Stephan et al., 2017; Strickland-Hughes et al., 2017). A study conducted by Hughes et al. (2013) found that after a brief memory test, adults reported feeling older than their chronological age. Another study by Strickland-Hughes and colleagues (2017) provided false feedback (positive, negative, and neutral) to participants following their participation in a brief memory survey and found that memory self-efficacy was sustained following positive feedback. Participants who received negative and neutral feedback showed a decrease in

memory self-efficacy and reported older subjective age following testing (Strickland-Hughes et al., 2017). These results suggest that subjective age, and potentially other aspects related to it, such as subjective memory function, are easily manipulated. This suggests that negative subjective aging ideals could be overridden with positive feedback and perhaps the reframing of the presentation of cognitive testing.

Previous research has also indicated that subjective age may have implications for health outcomes and memory functioning. A study conducted by Brothers et al. (2017) established a relationship between the constructs of subjective age and physical health. The study found that more positive attitudes toward one's own aging, including feeling younger than their chronological age, was associated with positive self-reported functional health (Brothers et al., 2017). Another study conducted by Stephan et al. (2016), found that younger subjective age in older adults was associated with decreased memory decline over time as compared to those who reported an older subjective age than their chronological age.

Subjective Well-Being

Subjective well-being is a multidimensional concept that can be defined as how positively or negatively an individual assesses their present state of being (Westerhof & Barrett, 2005). Three of the most commonly assessed constructs of subjective well-being include overall life satisfaction, positive affect, and negative affect (Westerhof & Barrett, 2005). Researchers used the Midlife Development in the United States (MIDUS) data for the United States and the German Aging Survey in Germany to evaluate life satisfaction and positive and negative affect. Life satisfaction in the U.S. sample was assessed with a modified version of the Cantril Self-Anchoring Scale (Cantril, 1965), and negative and

positive affect were assessed with a 5-point Likert scale assessing how often participants experienced six aspects of positive affect and six aspects of negative affect in the last 30 days. The German sample completed the Positive and Negative Affect Schedule and the Satisfaction with Life Scale to measure the same constructs (Pavot & Diener, 1993; Watson et al., 1988). The study conducted by Westerhof & Barrett (2005) found the maintenance of a youthful identity was associated with higher subjective well-being. Additionally, this study found that positive affect mediated the effect of actual age, promoting more positive evaluations of subjective well-being (Westerhof & Barrett, 2005).

Another aspect of subjective well-being worth evaluating is autonomy. A study by Sheldon and colleagues (2005) found the feelings of autonomy and choice, particularly in social responsibilities, were associated with higher subjective well-being. As people age, they tend to accept and internalize their place as pillars in society, which directly contributes to their subjective well-being (Sheldon et al., 2005). With this in mind, we can also assume that negative aging stereotypes constructed by society would also be internalized, and, therefore, be associated with subjective well-being. This effect can be seen in previous subjective aging research. A study conducted by Montepare and Lachman (1989) found that fears of aging and the endorsement of aging stereotypes were negatively correlated with life satisfaction, in that the more negative views on aging were associated with lower reported life satisfaction.

Additionally, current literature indicates that the social changes associated with aging, including shifts toward a more positive affect and alteration of values, are associated with subjective age (Jivraj et al., 2014; Cho et al., 2015; Montepare &

Lachman, 1989; von Hippel, 2007). Older adults tend to express more positive emotions than younger adults, and a similar pattern of increased positive affect is found in older adults who feel younger (Montepare & Lachman, 1989; von Hippel, 2007). However, this research also cited that although subjective well-being is typically higher in older adults than it is in younger adults, it is also seemingly more fragile (Cho et al., 2015; Jivraj et al., 2014). Studies conducted by Jivraj et al. (2014) and Cho et al. (2015) suggested subjective well-being is dependent on social support and resources, physical health, level of cognitive function, and age-related life events. Deteriorating well-being in older adults is often attributed to the loss of a spouse, retirement, and poor health (Jivraj et al., 2014). These results suggested subjective well-being may be the most fragile and impressionable of the aspects of subjective aging we measured for this study.

Subjective Memory

Subjective memory, or perceived memory functioning, is an individual's subjective assessment of their own memory functioning. Subjective memory is typically assessed by the individual based on their memory performance and other psychological factors, such as depressive symptoms (Hulur et al., 2015). In a study done by Chasteen et al. (2015), self-perceptions of memory functioning were associated with actual performance in memory tasks. Specifically, the study indicated that more negative self-perceptions of memory functioning were associated with poorer performance on memory tasks. Another study conducted by Hulur and colleagues (2015) found results consistent with these findings, in that better subjective memory ratings were associated with a higher level of episodic memory performance. Furthermore, Strickland-Hughes et al. (2017), found that individuals with more positive evaluations of general memory

functioning had higher memory self-efficacy and felt younger relative to their chronological age.

A particular aspect of subjective memory function worth further discussion is subjective memory complaints (SMCs). SMCs have been previously associated with mild cognitive impairment and have even been attributed as an early indicator of dementia (Reid & MacLulich, 2006). However, the predictive factor of SMCs in cognitive decline has been highly disputed. Some research suggests that rather than SMCs predicting dementia, SMCs may actually be more indicative of depression and depression-related symptoms (Reid & MacLulich, 2006). Another study conducted by Schweizer et al. (2018) also indicated that depressive symptoms were associated with SMCs in a healthy adult population, even while controlling for current cognitive functioning. Even more interesting, this study also indicated that depressive symptoms were also significantly correlated with objective memory function and actual cognitive performance (including memory, language, attention, verbal fluency, and visuospatial ability), though demographic factors and cognitive ability could not be ruled out as a mediator in this relationship (Schweizer et al., 2018). However, other research has suggested both cognitive decline and depressive symptoms can be predicted by SMCs. A more recent longitudinal study completed by Brailean and colleagues (2019) suggested an increase in depressive symptoms over time was associated with both subjective and objective cognitive decline in a general population sample. This study also found that depressive symptoms were only linked to subjective memory performance, and not objective memory performance in individuals who were considered cognitively impaired (Brailean

et al., 2019). More research is necessary to further clarify and define the relationship between SMCs, cognitive decline, and depressive symptoms.

In addition to being correlated with actual memory functioning, subjective memory is related to, and even predicted by, personality traits (Hulur et al., 2015). Hulur and colleagues (2015) found that the Big Five personality traits were associated with and predictive of subjective memory in that higher conscientiousness, openness, and extraversion predicted better subjective memory ratings, as well as improved memory performance. In addition, the study found that low levels of neuroticism and agreeableness were also predictive of higher subjective memory ratings (Hulur et al., 2015).

Attitudes Toward Own Aging

Attitudes toward one's own aging (ATOA) are a construct of subjective age and are defined as the ideas and beliefs individuals hold toward their own aging process (Bodner et al., 2017; Brothers et al., 2015). ATOA encompass the affective, cognitive, and behavioral components of aging, and have been associated with functional health, life satisfaction, and psychological functioning (Brothers et al., 2015). Previous research has indicated that ATOA are used as a coping mechanism to deal with the challenges and changes that arise throughout the aging process, therefore indicating more positive ATOA are associated with more positive outcomes for well-being, physical health, and cognitive health (Bodner et al., 2017). This concept works just the opposite as well, in that negative ATOA are associated with poorer physical and cognitive functioning.

A study completed by Bodner and colleagues (2017) found that individuals that held more negative ATOA reported an accelerated increase in their own subjective age

after a 4-year period, indicating that their negative ATOA was associated with them reporting a subjective age over 5 years older than their actual age. Another study found that more negative ATOA was associated with poor hearing and memory performance as compared to those with positive ATOA (Chasteen et al., 2015). Additionally, a study conducted by Brothers et al. (2015) found that ATOA were associated with more negative behavior-specific age-related changes that are indicative of decline in physical and psychological functioning.

Aging Stereotypes

Aging stereotypes are positive or negative societally constructed ideas of aging. Negative aging stereotypes include the idea that older adults are incapable of learning new skills, or are feeble and weak. On the other hand, positive aging stereotypes include viewing older adults as wise and experienced. Negative aging stereotypes often have a larger effect than positive aging stereotypes, and they have been associated with poor performance on memory tasks, handwriting, ambulation, and cardiovascular stress (Strickland-Hughes et al., 2017; Westerhof & Barrett, 2005). In a study conducted by Stephan et al. (2015), age discrimination was associated with older subjective age, indicating that the social experiences affect how old an individual feels. Furthermore, Strickland-Hughes and colleagues (2017) found that exposure to false negative feedback related to negative aging stereotypes was associated with poor memory self-efficacy and more negative ATOA. Another study by Geraci et al. (2018) found that the endorsement of aging stereotypes, as well as the belief that age-related changes are unavoidable, was predictive of subjective age, in that the endorsement of negative aging stereotypes can predict older subjective age as compared to chronological age.

The Present Study

Currently, there is an abundance of psychoeducational resources available to those with caregiver burden, and extensive work is being done to make medical training and information more available for caregivers to help reduce burden. However, there is no comprehensive research available discussing how caregiver burden is related to the aging process and the beliefs surrounding it. The present study set out to investigate how subjective aspects of aging may be associated with caregiver burden for family caregivers of those with ADRD. Specifically, I investigated how subjective age, subjective well-being, subjective memory complaints, attitudes toward one's own aging, and the endorsement of aging stereotypes, relate to, or even predict caregiver burden. Due to the malleable nature of subjective age, it's critical to identify whether or not caregiver burden is associated with the subjective aging experience, as intervention for any existing negative outlooks on the subjective aging process may be cost-effective and straightforward to research and develop therefore improving the subjective aging experience for caregivers of individuals with ADRD. Particularly, considering the literature on subjective age and subjective well-being in the general population of older adults, interventions that address and perhaps reframe life and age-related changes surrounding the caregiving process may be especially useful in addressing negative subjective aging ideals (Cho et al., 2015; Hughes, Geraci, & De Forrest, 2013; Jivraj et al., 2014; Stephan, Sutin, Caudroit, & Terracciano, 2016; Stephan, Sutin, Bayard, & Terracciano, 2017; Strickland-Hughes et al., 2017).

Hypotheses

I had several hypotheses for the current study. First, I anticipated poor subjective aging outcomes would be related to and predictive of higher caregiver burden. When compared to individuals without caregiving responsibilities, I predicted individuals who are family caregivers for an individual with Alzheimer's Disease and experience caregiver burden would report: 1) older subjective age as compared to chronological age, 2) poorer subjective well-being, 3) more subjective memory complaints, 4) more negative attitudes towards their own aging, and 5) endorsement of more negative aging stereotypes, than those not suffering from caregiver burden.

II. METHOD

Design

This correlational study was designed to evaluate the relationship between the caregiver experience and subjective aspects of aging. Participants were asked “Are you currently the primary caregiver for an individual with Alzheimer’s disease or a related dementia?” Participants who answered “yes” were redirected to the caregiver specific measures. Participants who answered “no” only responded to measures regarding subjective aspects of aging, as well as additional measures that were not included in the analysis for this study. The data collected for the two groups was compared to evaluate the differences in subjective aging between caregivers and noncaregivers.

Participants

A total of 308 participants were initially recruited for this study. Participants were primarily recruited through targeted Facebook advertisements; however, additional participants were recruited via other social media and community outreach. Participants who did not complete 60% or more of the survey were excluded from participation, leaving a total sample of 185 participants with an average age of 56.29 years ($SD = 13.719$). Of the 185 participants, 93 identified as the primary family caregiver for an individual with ADRD, and 92 participants identified as noncaregivers. The sample was primarily female ($n = 160$), and 88.1% of the sample identified as White/Caucasian.

A family caregiver was defined as an individual who maintains responsibility for the physical, emotional, psychological, medical, and/or financial needs of an individual with Alzheimer’s disease or a related dementia. Family caregivers were not excluded if the care recipient lived independently from the caregiver and were still eligible to

participate if the care recipient lived in a care facility, including assisted living facilities, memory care facilities, and long-term care facilities. The group of noncaregiver participants served as a noncaregiver control group ($n = 92$) and consisted of individuals with similar demographics to that of the caregiver group that did not currently identify as family caregivers for or have family members with ADRD.

Measures

Measures included a demographic measure, several validated scales, and a debriefing questionnaire. Additional questionnaires, such as one created specifically to evaluate current world events (e.g., increased caregiver burden associated with COVID-19), were included but not analyzed as part of this study.

Demographics

Basic demographic information was requested from the participants to assess and control for individual differences. Participants were asked to report their age, gender, race, ethnicity, education level, and employment status for the basic demographics. Additionally, participants in the caregiver group were asked to report caregiver-specific demographic information, which included: relationship to the care recipient, hours spent caregiving, familial care support, and an assessment of the activities of daily living that the caregiver performed for the care recipient. This caregiver-specific information was particularly vital, as previous research has indicated these factors can significantly impact the level of burden experienced.

Caregiver Burden

The Zarit Burden Interview – Short (ZBI-S) was used to assess caregiver burden (Bedard et al., 2001). This measure is widely used as both an interview and self-report

measure (dependent on the researcher's delivery) to evaluate burden in dementia caregivers and has a Cronbach's alpha of .88 (Bedard et al., 2001). The ZBI-S has 12 items, including items like "do you feel you could be doing a better job caring for your relative?" and "do you feel strained when you're around your relative?" Participants responded on a Likert scale of never (0) to always (4).

Subjective Age

Subjective age, or felt age, was assessed using a slider bar built into the survey tool. The slider bar was labeled "0 years" on the left end and "120 years" on the right end. This method was adapted from a similar method utilized by Geraci and colleagues (2018), in which they asked participants to make a tick mark indicative of their subjective age on a 120 mm line. Participants were prompted to slide the bar to indicate "how old [they] feel at this moment." Difference scores were calculated comparing the subjective age scores to the participants' chronological ages. Felt age was assessed at the beginning and the end of the survey, and these measures were used to assess any differences that may have been present following the discussion of the caregiving experience and survey testing.

Subjective Memory Assessment

The Subjective Memory Complaints Questionnaire (SMCQ) was used to assess subjective memory complaints in our sample (Youn et al., 2009). Participants were asked a series of questions to which they were asked to respond "yes" or "no." Responses to these items were coded 1 and 2 respectively for analysis. This measure has a reported Cronbach's alpha of .86. The SMCQ has 14 items, including questions such as "do you think you have a memory problem?" as well as "Do you have difficulty in recognizing

familiar people?” Higher scores were indicative of fewer subjective memory complaints, and lower scores indicated more subjective memory complaints.

We also used the Prospective and Retrospective Memory Questionnaire (PRMQ; $\alpha = .89$) to assess subjective memory (Crawford et al., 2003). The PRMQ contains 16 items, including “do you fail to recall things that have happened to you in the last few days?” to assess retrospective memory, and “do you forget to tell someone something you had meant to mention a few minutes ago?” to assess prospective memory. Higher PRMQ scores suggested better prospective and retrospective memory function, whereas lower scores suggested poor function.

Measurement of Life Satisfaction

The Measurement of Life Satisfaction Index A was used to assess subjective well-being within our sample (Neugarten et al., 1961). This 20-item scale includes items such as “as I grow older, things seem better than I thought they would be,” and “this is the dreariest time of my life” to evaluate the individual’s current well-being with regard to the aging process. Responses on items were summed, and higher scores indicated higher life satisfaction.

Attitudes Toward Aging

Attitudes toward own aging were assessed with factor two of the Philadelphia Geriatric Center Morale Scale (Lawton, 1975). This is a three-factor scale intended to investigate overall morale, specifically in older adults. However, the second factor contains seven items that focus specifically on attitudes toward own aging and includes items such as “as I get older, things are better than I thought they would be,” and “things

keep getting worse as I get older.” Participants responded that they either agreed or disagreed with the statement, and responses were coded and scored for analysis.

In addition, the Alzheimer’s Disease and Aging Perception Scale (ADAPS) was used to assess participants’ general understanding of the differences between normal age-related changes and changes associated with the onset of Alzheimer’s disease (Bettens et al., 2014). This scale includes 25 items such as “takes longer to solve problems efficiently,” which is a normal age-related change, as well as items like “trouble recognizing a famous landmark” which is associated with mild Alzheimer’s disease. Participants are asked to determine whether or not these items are associated with normal aging. This scale has a Cronbach’s alpha of .70, and is particularly important when evaluating caregivers, as it allowed us to see how their understanding of age-related changes has been altered with the caregiving experience. There were three different scores associated with this scale. This first was a composite score, which simply stated how many total items the participant correctly identified. The second score included only normal aging items, and the final score included only items that were associated with mild Alzheimer’s disease. The two additional scores were generated in order to determine any differences in identifying symptomology associated with ADRD between caregivers and the noncaregiver control group.

Aging Stereotypes

For the purposes of this study, the endorsement of both positive and negative aging stereotypes was assessed. In order to complete this, I adapted a scale previously developed by Chasteen, Schwarz, and Park (2002) used to assess aging stereotypes. Participants viewed terms associated with positive aging ideals (e.g., experienced,

patient, mature) as well as negative aging ideals (e.g., senile, feeble, bitter), and rated these items in regards to older adults as 1 (*very uncharacteristic*) to 5 (*very characteristic*). The participants were given two scores for this measure, one of which assessed their endorsement of positive and negative aging stereotypes. Aging ideals were presented in a random order using the randomized item option on Qualtrics, so both negative and positive aging stereotypes were presented in no particular order to encourage consideration of each individual word rather than a grouping of each definitive stereotype.

Geriatric Depression Scale

The GDS ($\alpha = .92$) was selected to assess depression as previous literature has indicated that caregivers are most often times spouses and adult children of the individual with an ADRD diagnosis (Yesavage et al., 1983). This scale was included to ensure that depression levels did not need to be controlled for in statistical analysis. The GDS felt most appropriate when considering the demographic of caregivers cited in previous literature. This scale contains 30 items, such as “are you basically satisfied with your life?” and “do you often feel downhearted and blue?” to assess depression in older adults. Participants answer questions with a “yes” or “no.” Scores are divided into normal (0 to 9), mild depressives (10 to 19), and severe depressives (20 to 30), with points awarded for each answer indicating depression (Yesavage et al., 1983).

Other Measures

Additional measures included in the survey included an end of survey questionnaire, a loneliness measure, and emotional support measure pulled from the National Institute of Health Toolbox, and two questionnaires developed by faculty at

Texas State University to evaluate attitudes and behavior changes associated with the COVID-19 pandemic.

Procedure

This study was delivered via an online survey developed on Qualtrics. Following access to the survey link, participants had the opportunity to review the informed consent document and proceeded with the survey upon consent. Following completion of the demographic information, participants completed the subjective aging measures, followed by the additional questionnaires. Finally, the participants were asked to complete the debriefing questionnaire and were offered the opportunity to complete a separate survey to enter for a chance to win an Amazon gift card for their participation. Funds to support this study were awarded from the university department of psychology and the graduate college.

III. RESULTS

Demographic Analyses Results

Caregivers and noncaregivers were compared using chi-square analyses to determine whether any significant differences in the demographic information would need to be controlled for in further analysis. Any missing data throughout all analyses conducted were excluded pairwise. Full demographic information can be found in Table 1, and caregiver specific information, which divulges a more detailed look into the composition of the caregiver sample, can be found in Table 2.

Chi-square analyses yielded primarily nonsignificant results. There were no significant differences between caregivers and noncaregivers on gender ($\chi^2(2) = 2.720, p = .257$), employment status ($\chi^2(6) = 4.223, p = .647$), marital status ($\chi^2(4) = 3.436, p = .488$), or race/ethnicity ($\chi^2(5) = 6.494, p = .261$). However, there was a marginally significant difference between the groups in education levels, $\chi^2(7) = 13.879, p = .053$. The variable age was normally distributed, and the assumption of homogeneity of variance was met. The independent samples *t*-test revealed no significant differences in age between caregivers ($M = 54.73, SD = 14.72$) and noncaregivers ($M = 57.82, SD = 12.55$), $t(179) = -1.521, p = .130$.

Finally, we ran an independent *t*-test to test for any differences between caregivers and noncaregivers on depression as measured by the GDS, to ensure that depression did not need to be included as a covariate in any further analyses. Results indicated that there were no significant differences between caregivers ($M = 11.63, SD = 8.49$) and noncaregivers ($M = 10.47, SD = 7.68$) on depression scores, $t(167) = .932, p =$

.352. However, it is worth noting that the mean depression scores across the sample did meet the GDS criteria for mild depression (see Table 3).

Relationship Analyses between Caregiver Burden and Subjective Aging

A series of Pearson's r bivariate correlations were completed to examine the relationship between caregiver burden and subjective aging variables. The ZBI – S scores were used as a measure of caregiver burden and were compared to the composite scores of the scales used to assess the subjective aging variables. Higher scores on the ZBI – S were indicative of higher levels of caregiver burden. There were three significant correlations found. Significant correlations were found between caregiver burden and the following variables of subjective aging: subjective age difference scores ($r(88) = .227, p = .016$; see Figure 1), subjective well-being ($r(91) = -.457, p < .001$; see Figure 2), and ATOA ($r(91) = -.422, p < .001$; see Figure 3). No significant relationships were established between caregiver burden and the following variables: subjective memory, which was assessed with the SMCQ ($r(91) = -.233, p = 0.25$), and PRMQ ($r(82) = .214, p = .050$), positive aging ideals ($r(91) = -.170, p = .104$), negative aging ideals ($r(91) = .166, p = .111$) nor with the ADAPS composite score ($r(91) = .195, p = .061$).

Based on the correlation results, a multiple regression was completed to assess whether or not the subjective aging components that were significantly correlated with caregiver burden were also predictive of caregiver burden in the caregiver sample. The predictor variables included in the model were subjective age, as measured by subjective age difference scores, subjective well-being and ATOA. The outcome variable was the scores on the ZBI – S, which represented caregiver burden. The model had an $R^2 = .230$ indicating that 23.0% of the variance in caregiver burden could be attributed to subjective

age, subjective well-being and ATOA. The model was determined to be a significant predictor of caregiver burden, $F(3,86) = 8.554, p < .001$. While subjective well-being scores made a significant contribution to the model ($\beta = -.646, p = .031$), subjective age ($\beta = .034, p = .497$) and ATOA did not ($\beta = -.791, p = .216$). The final predictive model was as follows:

$$\text{Caregiver Burden} = 44.092 + (.034 * \text{Subjective Age}) (-.646 * \text{Subjective Well-Being}) + (-.791 * \text{ATOA})$$

Subjective Age Comparisons between Caregivers and Noncaregivers

Finally, a series of independent samples *t*-tests were conducted to assess any differences between the caregiver group and the noncaregiver control group on each aspect of subjective aging. All dependent variables were normally distributed and met the homogeneity of variance assumption unless otherwise stated. Descriptive statistics for all variables included in this analysis can be found in Table 2.

Subjective Age. There was no significant difference between caregivers and noncaregivers on their baseline subjective age measures, $t(183) = 1.263, p = .208$.

However, when difference scores were calculated between subjective age and chronological age, there was a significant difference. Caregivers reported feeling significantly older than their chronological age as compared to non-caregivers, who on average reported feeling younger than their chronological age, $t(179) = 2.522, p = .013$, Cohen's $d = .375$.

Attitudes Towards Aging. Neither the scores on the ATOA scale ($t(183) = -1.083, p = .280$), nor the ADAPS composite score ($t(182) = -.447, p = .655$) yielded any significant differences between groups.

Table 1. General Demographic Information for Study Sample

| Variable | Total Sample | Caregivers | Noncaregivers |
|----------------------|--------------|------------|---------------|
| Gender | | | |
| <i>n</i> | 185 | 93 | 92 |
| % Male | 13.0 | 9.7 | 16.3 |
| % Female | 86.5 | 89.2 | 83.7 |
| % Non-binary | 0.5 | 1.1 | 0 |
| Employment | | | |
| <i>n</i> | 185 | 93 | 92 |
| % Full-time | 32.4 | 30.1 | 34.8 |
| % Part-time | 11.4 | 10.8 | 12.0 |
| % Unemployed | 9.2 | 10.8 | 7.6 |
| % Retired | 42.2 | 43.0 | 41.3 |
| % Volunteer | 1.1 | 0 | 2.2 |
| % Student | 2.2 | 3.2 | 1.1 |
| % Other | 1.6 | 2.2 | 1.1 |
| Marital Status | | | |
| <i>n</i> | 185 | 93 | 92 |
| % Single | 20.5 | 21.5 | 19.6 |
| % Married | 58.9 | 62.4 | 55.4 |
| % Divorced | 12.4 | 9.7 | 15.2 |
| % Widowed | 5.4 | 3.2 | 7.6 |
| % Other | 2.7 | 3.2 | 2.2 |
| Race/Ethnicity | | | |
| <i>n</i> | 185 | 93 | 92 |
| % White/Caucasian | 88.1 | 86.0 | 90.2 |
| % African American | 4.9 | 7.5 | 2.2 |
| % Hispanic/Latinx | 3.2 | 2.2 | 4.3 |
| % Asian American | 2.2 | 2.2 | 2.2 |
| % Native American | 1.1 | 2.2 | 0 |
| % Other | 0.5 | 0 | 1.1 |
| Education | | | |
| <i>n</i> | 185 | 93 | 92 |
| % Elementary | 1.1 | 0 | 2.2 |
| % GED Certificate | 2.2 | 2.2 | 2.2 |
| % High School | 21.1 | 18.3 | 23.9 |
| % Technical Degree | 7.0 | 7.5 | 6.5 |
| % Associate's Degree | 20.0 | 28.0 | 12.0 |
| % Bachelor's Degree | 21.6 | 19.4 | 23.9 |
| % Master's Degree | 21.1 | 22.6 | 19.6 |
| % Doctoral Degree | 5.9 | 2.2 | 9.8 |

Table 2. Caregiver Specific Demographics

| Variable | Caregivers | |
|---------------------------------|---------------|---------------|
| Dementia Type | | |
| <i>n</i> | 92 | |
| % Alzheimer's Disease | | 51.6 |
| % Vascular Dementia | | 21.5 |
| % Lewy-Body Dementia | | 4.3 |
| % Frontotemporal Dementia | | 9.7 |
| % Other | | 11.8 |
| Relationship to Care Recipient | | |
| <i>n</i> | 93 | |
| % Spouse | | 19.4 |
| % Child | | 43.0 |
| % Other | | 37.6 |
| Length of Care | | |
| <i>n</i> | 81 | |
| % Less than 1 year | | 1.1 |
| % 1 to 5 years | | 63.4 |
| % 5 to 10 years | | 14.0 |
| % More than 10 years | | 8.6 |
| Care Recipient Living Situation | | |
| <i>n</i> | 93 | |
| % Lives with Caregiver | | 57.0 |
| % Lives Alone | | 16.1 |
| % Assisted Living Facility | | 10.8 |
| % Long Term Care Facility | | 5.4 |
| % Other | | 10.8 |
| Outside Care | | |
| <i>n</i> | 86 | |
| % Receiving Outside Care | | 44.1 |
| % Not Receiving Outside Care | | 48.4 |
| Personal Care | | |
| <i>n</i> | 93 | |
| % Providing Personal Care | | 72.0 |
| % Not Providing Personal Care | | 28.0 |
| Time Spent Caregiving | | |
| Hours Weekly | <i>M (SD)</i> | 55.28 (55.16) |
| Caregiver Burden | | |
| ZBI-S Score | <i>M (SD)</i> | 34.60 (9.40) |

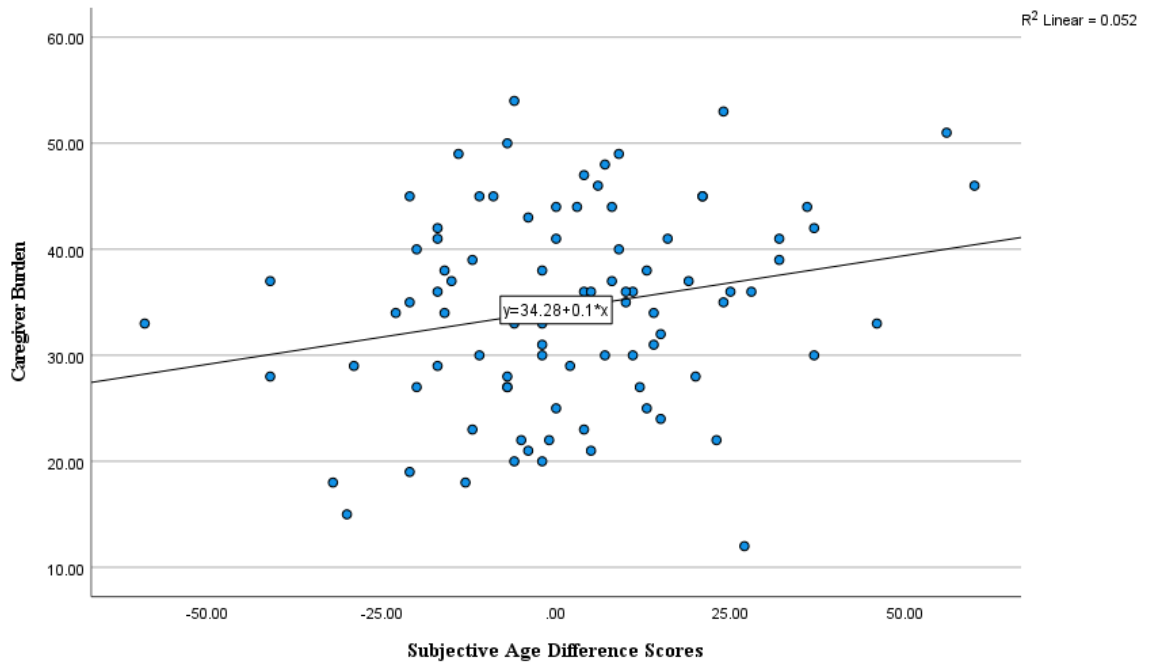


Figure 1. Association Between Caregiver Burden and Subjective Age

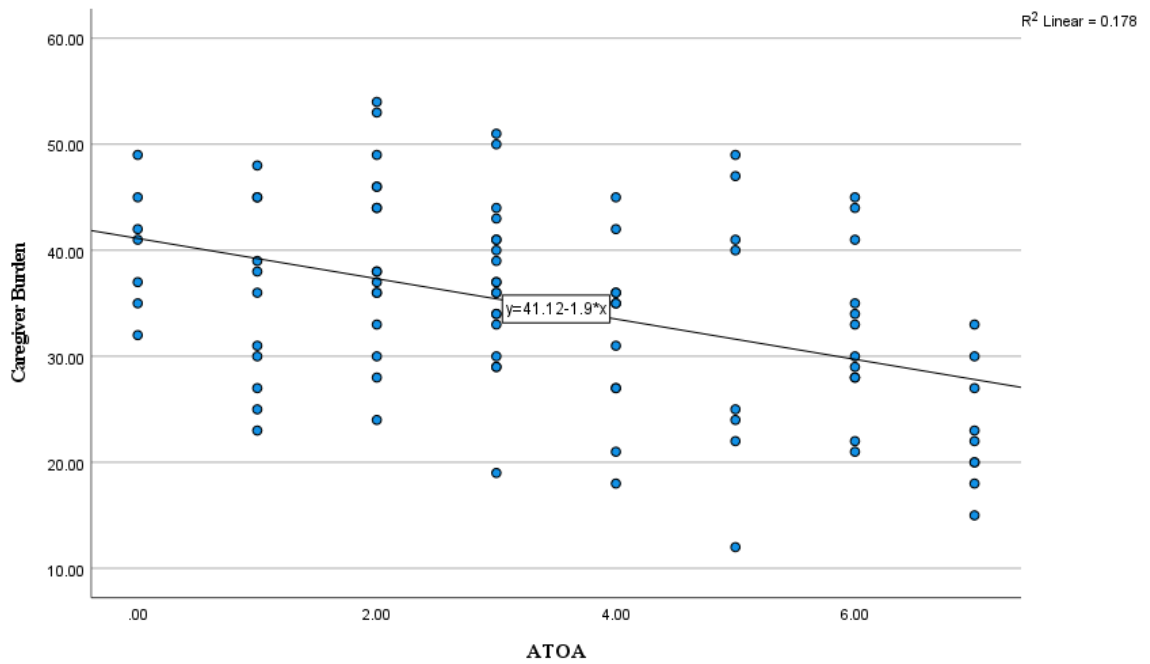


Figure 2. Association Between Caregiver Burden and ATOA

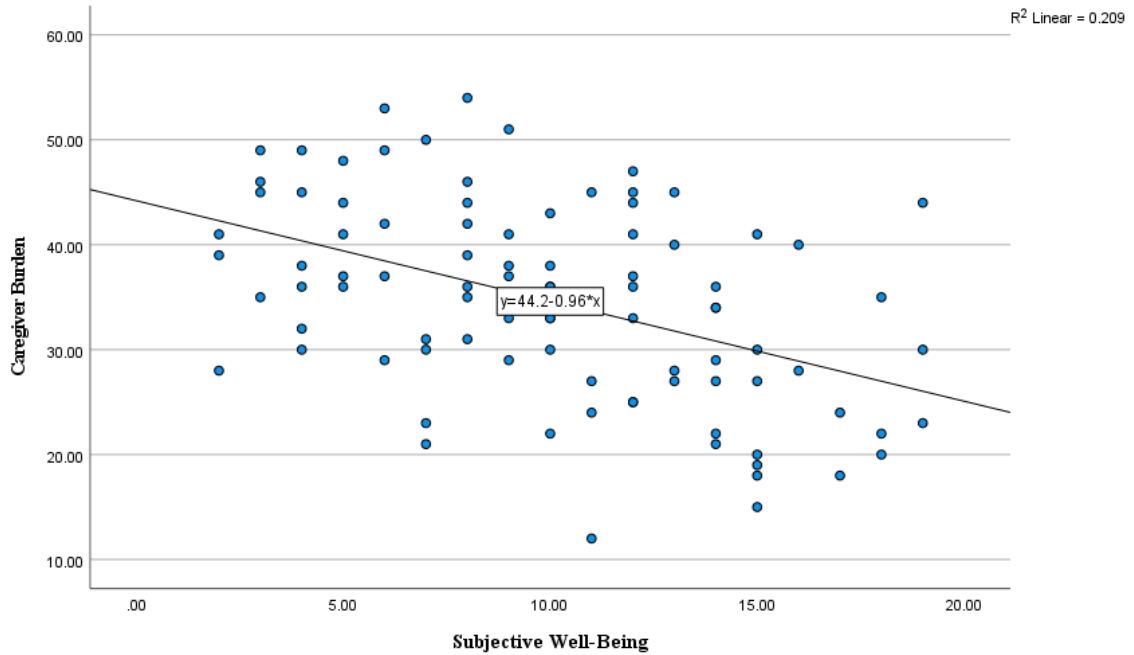


Figure 3. Association Between Caregiver Burden and Subjective Well-Being

The scores for the normal aging items and the Alzheimer’s disease items from the ADAPS scale did not meet the assumption of homogeneity of variance. While there was no significant difference in identifying Alzheimer’s-related symptoms from the ADAPS scale ($t(176.708) = .987, p = .325$), there was a significant difference between caregivers and noncaregivers in identifying items associated with normal aging (such as “*takes longer to solve problems efficiently*”), $t(174.797) = -3.709, p < .001$. Caregivers identified significantly fewer items associated with normal aging when compared to the noncaregiver control group.

Aging Stereotypes. There were no significant differences between caregivers and noncaregivers on endorsing either the positive aging stereotypes ($t(182) = .510, p = .611$), or negative aging stereotypes ($t(181) = -.099, p = .921$).

Subjective Well-Being. No significant differences were found between caregivers and noncaregivers on subjective well-being scores, $t(182) = -.534, p = .594$.

Subjective Memory. There was a significant difference between groups on subjective memory performance for the SMCQ, in that caregivers reported significantly more subjective memory complaints than the noncaregiver control group, $t(183) = 2.517, p = .013$, Cohen's $d = .370$. Additionally, there was a marginally significant difference between groups on PRMQ scores, with noncaregivers reporting significantly better prospective and retrospective memory function than caregivers, $t(168) = -1.926, p = .056$, Cohen's $d = -.296$.

A one-way ANCOVA was conducted to ensure that difference in the SMCQ results between caregivers and noncaregivers could not be attributed to depressive symptoms. With GDS scores included as a covariate, there was still a significant difference between caregivers ($M = 24.98, SD = 3.09$) and noncaregivers ($M = 23.71, SD = 3.53$) on SMCQ scores, in that caregivers reported significantly more SMCs than noncaregivers $F(1, 166) = 10.318, p = .002$, partial $\eta^2 = .059$.

Table 3. Descriptive Statistics for Subjective Aging Variables

| Variable | Caregivers M (SD) | Noncaregivers M (SD) | Significance <i>p</i> |
|---------------------------------|----------------------|-------------------------|--------------------------|
| Subjective Age Difference Score | 2.03 (20.69) | -5.01 (16.69) | .013* |
| Subjective Well-Being | 10.04 (4.50) | 10.40 (4.46) | .594 |
| Subjective Memory: SMCQ | 24.97 (3.12) | 23.73 (3.57) | .013* |
| Subjective Memory: PRMQ | 33.32 (10.04) | 36.20 (9.43) | .056 |
| ATOA | 3.43 (2.09) | 3.76 (2.07) | .280 |
| ADAPS Composite Score | 17.37 (3.99) | 17.62 (3.57) | .655 |
| ADAPS: Normal Aging | 4.68 (1.79) | 5.56 (1.42) | .001** |
| ADAPS: Alzheimer's | 12.69 (4.76) | 12.05 (3.91) | .325 |
| Positive Aging Stereotypes | 41.40 (6.12) | 40.87 (7.89) | .611 |
| Negative Aging Stereotypes | 35.0 (8.57) | 35.11(6.39) | .921 |
| GDS Scores | 11.63 (8.49) | 10.47 (8.49) | .352 |

* indicates significance at $p < .05$

** indicates significance at $p < .001$

IV. DISCUSSION

The purpose of this study was to investigate how caregiver burden altered the subjective views that individuals had on aging. We anticipated that overall, caregivers would report a more negative subjective aging experience as compared to noncaregivers. Our results indicate that while there are significant differences in caregivers and noncaregivers on their perceptions on some aspects of the aging experience, caregiving burden may not impact views of subjective aging as a whole.

Significant relationships were established between caregiver burden and three facets of subjective aging. There was a positive correlation between caregiver burden and subjective age, in that caregivers tend to feel older than their actual age as caregiver burden increases. Current research suggests that poor physical and mental health are predictors of older subjective age (Brothers et al., 2017; Hughes et al., 2013; Stephan et al., 2016; Stephan et al., 2017; Strickland-Hughes et al., 2017). Considering the physiological and psychological effects of caregiver burden in this context, it is consistent with prior research that caregivers who experience caregiver burden would feel older than their subjective age.

Furthermore, there was a moderate negative correlation between caregiver burden and subjective well-being, in that as caregiver burden increased, subjective well-being scores decreased. This result is consistent with current, related literature (Andren & Elmstahl, 2007; Baxter et al., 2013; Buyck et al., 2011; Halm et al., 2006; Zimmerman et al., 2018). Caregivers of individuals with ADRD experience physical and psychological stressors that aren't often experienced outside of the caregiving experience, including strain from providing medical care without proper training and increased social isolation

and emotional distress (Andren & Elmstahl, 2007; Camak et al., 2015; Halm et al., 2006; Zimmerman et al., 2018). Furthermore, autonomy and choice that comes with participation in social obligations, which has previously been associated with higher subjective-well-being, is essentially stripped away from family caregivers due to the responsibility associated with caring for the care recipient (Sheldon et al., 2005). This, in turn, may lead to a lack of perceived social support and increased isolation that is so commonly associated with caregiver burden.

There was also a moderate negative correlation between caregiver burden and attitudes toward own aging (ATOA). As caregiver burden scores increased, caregivers reported more negative ATOA. ATOA are deeply intertwined with functional health, life satisfaction, and psychological and cognitive health (Bodner et al., 2017; Brothers et al., 2015). Since caregivers often report a myriad of negative physical, psychological, and cognitive symptoms associated with caregiving, these results were also consistent with prior research (Andren & Elmstahl, 2007; Baxter et al., 2013; Buyck et al., 2011; Halm et al., 2006; Zimmerman et al., 2018). However, it is interesting to note that while caregiver burden was associated with ATOA, caregiver burden was not significantly related to negative or positive aging stereotypes. Additionally, caregivers were no more likely than noncaregivers to endorse positive and negative aging stereotypes. These results suggest that while caregiving may be impacting the caregiver's outlook on their own aging experience, it is not having the same impact on their views of the aging process for others.

The multiple regression run based on our correlational results found that subjective age, ATOA and subjective well-being were all significant predictors of

caregiver burden. In combination with the correlation results, it would seem that older subjective age and more negative ATOA, paired with poor subjective well-being may predict caregiver burden in family caregivers of individuals with ADRD. This partially supports the previously stated hypothesis, as it does appear aspects of poor subjective aging do indeed predict caregiver burden.

Partial support for the hypotheses can also be identified in the comparisons between caregivers and noncaregivers. Results suggest that caregivers identify as significantly older than their chronological age and report significantly more subjective memory complaints than the noncaregiver control group. In fact, caregivers reported an average of about 2 years older than their chronological age, while noncaregivers identified as approximately 5 years younger than their chronological age. This result provides support for the difference between caregivers and noncaregivers on SMCs. Previous literature indicates that older subjective age ratings may be associated with poor memory function, and that younger subjective age may actually be related to an increase in memory efficacy over time (Stephan et al., 2016).

Considering the complicated relationship between SMCs and depressive symptoms, I wanted to ensure the differences between caregivers and noncaregivers were not due to differences in depressive symptoms. Results indicated that with depressive symptoms controlled for, there was a significant difference between caregivers and noncaregivers in SMCs, in that caregivers reported significantly more SMCs than noncaregivers. This may suggest that perhaps a different mechanism is causing caregivers to report more SMCs. Based on the complex relationship established in previous literature between SMCs and depressive symptoms, further research should investigate

how this relationship may differ between caregivers and noncaregivers (Reid & MacLulich, 2006; Schweizer et al., 2018).

A particularly interesting and surprising result from this study is that caregivers significantly differed from noncaregivers in their ability to differentiate symptoms of normal aging from symptoms associated with mild AD. Caregivers were significantly more likely to attribute general symptoms of normal aging to symptoms of AD than noncaregivers were. This could indicate that caregivers are more hypervigilant when it comes to assessing the aging process as compared to noncaregivers. This scale was used to further assess attitudes and perceptions regarding aging, and previous research does indicate that negative ATOA may be associated with poorer cognitive function and memory performance (Bodner et al., 2017). Therefore, these results may be representative of the relationship between ATOA and the burden associated with caregiving.

While these results do paint a rather bleak outcome for caregivers, it is heartening to know that caregivers did not differ from noncaregivers on subjective well-being and the endorsement of aging stereotypes. The caregiving experience affects so many aspects of life for family caregivers, so the lack of difference in well-being and stereotype endorsement does suggest that there are some parts of life that caregiving may not touch as deeply.

Additionally, the results from this study provide a basic framework for future research on aging and caregiver burden, as well as the development of resources and interventions to improve caregiver outlook on their own aging process. A study conducted by Zimmerman and colleagues (2018) indicated that family caregivers of

individuals with ADRD reported reduction of anxiety and depression related to caregiver burden when provided with educational resources about managing the care of individuals with ADRD. This same concept could be applied with the educational information about the aging process. Our results indicated that caregiver burden was most significantly related to subjective age, subjective well-being and ATOA. Therefore, resources that address the different aspects of each of these subjective aging facets may be useful in improving the caregiver's overall subjective aging experience.

Limitations

The most glaring limitation is that this was a primarily White and female sample. This may be indicative of the demographic most likely to identify as a family caregiver, however it could simply be that these individuals were more likely to engage in Facebook advertisement as compared to other demographic groups. It is quite probable that the results would be very different if the study included a more diverse and representative sample of all caregivers. Additionally, the data collected for this project included no objective measures of memory function, which may have been beneficial to more accurately represent any differences present between caregivers and noncaregivers in memory function. Furthermore, it is worth noting that this data was collected in the midst of the global COVID-19 pandemic, which has undoubtedly impacted the health (both physical and mental) and well-being of the general population. This could have influenced our results in many ways and may explain why our entire sample of both caregivers and noncaregivers had an average score that met the criteria for mild depression on the GDS.

Future Directions

With this information, the intent is to explore interventions for these negative attitudes toward the aging process to preserve the integrity and health of caregivers of individuals with ADRD. Furthermore, the hope is that this study brings attention and awareness to the implications of caregiving on the individual aging process and addresses Alzheimer's disease as a family diagnosis rather than an individual diagnosis. Moreover, these results will help inform future research conducted with the plethora of data we collected during this study but did not analyze for this particular thesis. Finally, an investigation of the effects of the COVID-19 pandemic on the caregiving experience is necessary and should provide interesting results as to how the pandemic has affected perceptions of the aging process for the family caregivers.

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