Financial Stress and Loneliness in Older Adults

THESIS

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Abstract

The population of older adults is growing in developed nations worldwide. This demographic trend, attributed to falling fertility and mortality rates, has shifted the focus of researchers toward this population, with the goal of improving health and well-being outcomes. This study focuses on the economic and mental health well-being of older adults in the United States. Previous research indicates that low income status is associated with feelings of isolation and loneliness in older adults. This study builds on that prior research by examining how subjective and objective financial changes are associated with general loneliness in the population of older adults in the U.S. Subjectively, financial stress is represented by a measure of subjective financial strain, while it is measured objectively using changes in income and assets. Data from the Health and Retirement Study (HRS), a sample of U.S. older adults, will be used to examine the relationship between financial changes and loneliness, and to determine if the relationship is mediated by mental health, social participation, or personality. First-differencing analysis is used to determine if household financial changes are related to changes in general loneliness. Preliminary analysis indicates that there is a relationship between the subjective measure of subjective financial strain and general loneliness, independent of mental health, social participation, and personality mediators.

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Chapter 1: Introduction

With a growing population of older adults, it is important to examine the experiences of this group in order to improve health and well-being outcomes. Through examining the relationship between financial stress and general loneliness, this study focuses on financial and mental well-being. The results of this study may have policy and program implications aimed to reduce financial stress and promote relationships and social participation.

Using the theoretical frameworks of Bronfenbrenner's (1977) Ecological Systems Model and Pearlin's (1981) Stress Process Model, the study examines how both objective and subjective changes in household finances are related to general loneliness, and whether this relationship is mediated by mental health, social participation, or personality. The study uses longitudinal data from the Health and Retirement Study (HRS), a national sample of older adults in the United States.

Background

Older adulthood is being redefined as society shifts to account for longer lives, and there are several ways to define this period. This study defines older adulthood as beginning at 62 years of age, which is when individuals in the sample cohort can begin collecting Social Security benefits (Social Security, 2019). As another way to break down the lifespan after midlife and parenting, Phyllis Moen presents the idea of Encore

Adulthood (2016), a time period when individuals no longer have resident children and they are beginning to think about retirement and their next stage of life. These changing roles and the expenses associated with them are not yet understood. It is important to study this period of life so that we can improve the well-being of encore and older adults.

Financial stress can be objective or subjective. Objective financial stress is a monetary representation of changes in your income or assets. Subjective financial stress is a measure of how you feel about your economic situation (Keese, 2012). Women, individuals with restricted access to credit, and people with loans that are not tied to an asset are more likely to feel financial stress (Dunn & Mirzaie, 2016; Gathergood, 2012; Hojman, Miranda, & Ruiz-Tagle, 2016; Keese, 2012; Shen et al., 2014). Different periods of the life course are also associated with higher likelihoods of financial stress. Younger adults experience an increase in financial stress because they are beginning their independent lives with new jobs and new families, events that generally increase daily stressors (Shen et al., 2014). During older adulthood, individuals live on fixed incomes and feel more constrained by their financial situation due to their later stage in life (Keese, 2012). Most research on financial stress has been done on individuals in young adulthood or midlife (Dunn & Mirzaie, 2016; Gathergood, 2012; Hojman, Miranda, & Ruiz-Tagle, 2016; Keese, 2012; Shen et al., 2014). This study will focus on older adults to better understand how financial stress during this period of life affects well-being.

The Longitudinal Aging Study Amsterdam (LASA) is a sample of older Dutch adults that has been used in several studies of loneliness. One study found that loneliness was a predictor of early mortality in later life (Holwerda et al., 2016). Poor health and

widowhood are risk factors for loneliness. Awareness of these risk factors was associated with lower levels of loneliness in older adults (Schoenmakers, Van Tilburg, & Fokkema, 2014). Adults ages 54-65 were more likely to be socially lonely if they had experienced a divorce, even if they had remarried, compared to married adults who had never divorced (Van Tilburg, Aartsen, & van der Pas, 2015). Loneliness was found to be a mediator between emotional support and cognitive functioning in later life (Ellwardt et al., 2013). There is a study from LASA examining a relationship between an economic measure and loneliness. In this study, researchers found that older adults who had incomes that did not match the income status of their neighborhood (i.e. high income living in a low-status neighborhood) had higher levels of loneliness than older adults whose income was matched (Deeg & Thomése, 2005). The findings from these studies show that loneliness is a nuanced phenomenon that affects older adults in many ways. Exploring the relationship between financial change and loneliness will provide a deeper understanding of factors affecting the well-being of older adults, allowing for the development of interventions to reduce subjective financial strain and therefore loneliness.

There have been a limited number of studies exploring the relationship between financial problems and loneliness in older adults. A Finish study found that low household incomes were related to social isolation and loneliness in older adults (Tanskanen & Anttila, 2016). In a qualitative study of older African American homeowners in the US, those who were stressed by their mortgage reported feelings of social isolation (Keene, Cowan, & Castro Baker, 2015). In a Canadian study, older adults reported higher levels of loneliness following a financial downturn (De Jong Gierveld,

Keating, & Fast, 2015). High levels of social isolation and emotional loneliness were found in older English adults with an annual income below £10,000 (MacDonald, Nixon, & Deacon, 2018). A study of older adults in a metropolitan English community found that income discomfort was associated with increases in both social and emotional loneliness (Dahlberg & Mckee, 2014). This literature supports the idea that there is a relationship between financial difficulties and loneliness, especially for older adults. It also highlights a need for a quantitative study in the US, and an exploration of change in financial measures specifically.

Changes in household finances, specifically decreases in income and assets, are problems that older adults may experience, which can be associated with their social participation and may lead to feelings of loneliness. Expenses associated with a social life, such as transportation and cost of activities, can be too great for individuals with financial problems (Green-LaPierre et al., 2012), which may lead to an increase in feelings of social loneliness due to a loss of social contacts (Cacioppo & Hawkley, 2009).

Based on this literature review, and guided by theory, this study contributes new understanding on the impacts to loneliness in midlife and late adulthood. First, the study examines changes in household finances rather than measures of total finances as a predictor of loneliness. Second, the study focuses on older adults, which is a growing proportion of the global population. Third, the study uses longitudinal data from the Health and Retirement Study (HRS), a U.S. sample of older adults. This will allow for an understanding of how financial change may impact the well-being of older adults.

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Theory

Pearlin's stress process model provides a conceptual framework for understanding how events, strains, and resources can come together to produce stress that increase negative mental health outcomes (Pearlin et al., 1981; Pearlin & Schooler, 1978). As outlined in the stress process model, limited financial resources are associated with feelings of anxiety and depression. Older adults can be prevented from socializing by health issues that may be intensified by financial burdens (Drentea & Reynolds, 2015).

Bronfenbrenner's (1977) Bioecological Systems Theory provides a clear framework for understanding the personal, environmental, and relational factors that inform human behavior and experience. Bronfenbrenner used his theory to create a model that allows for the testing of his theory. This model is called the Person-Process-Context-Time (PPCT) model.

The person component of the PPCT acknowledges that every individual has personal characteristics that influence the way they interact with the environment and the way the environment, or other people, interact with them. According to Bronfenbrenner, there are three types of personal characteristics: demand, resource, and force. Demand characteristics are immediate stimuli to others and the environment such as age, gender, or race. Education level, homeownership, and past experiences are classified as resource characteristics. The last type of personal characteristic is that of force. Force characteristics are internal and can often play a large role in how an individual interacts with their environment and their experiences. These include self-efficacy, depression, anxiety, and personality (Bronfenbrenner, 1986; Tudge et al. 2009). By including the

variables mentioned above, this study measures personal characteristics and accounts for them in the analyses. Force characteristics may be especially salient in the relationship between financial strain and loneliness and are thus conceptualized as potential mediators.

Proximal processes, or process in the PPCT model, are the reciprocal interactions that occur between an individual and others or the environment. What is most important about this element is that it also conceptualizes the interactions occurring between the other three elements of the model. You cannot study interactions independent of the personal characteristics of the individuals involved or the environment in which they occur. Bronfenbrenner's model is one of interdependence (Bronfenbrenner, 1986; Tudge et al. 2009). Since this study is concerned with determining the general loneliness of older adults, the proximal processes that are focused upon are the social participation in which an individual engages. These variables, frequency of contact with friends, proximity of friends, and closeness of children, all serve as measures of how our sample interacts with their social environment.

Context is another word for environment and is made up of four systems. These systems are the microsystem, mesosystem, exosystem, and macrosystem. This study is able to measure the microsystem and the mesosystem, while using the exosystem and macrosystem to assist in understanding the results. The microsystem is an individual's immediate environment, and an individual can have more than one. Their home, the number of people they live with, and importantly their relationship with those individuals, such as their marital status, can be one microsystem. Another can be their

work environment or their religious community. The mesosystem is how the microsystems interact (Bronfenbrenner, 1986; Tudge et al. 2009). The predictor variables of interest largely measure context. The study examines how general loneliness is affected in the context of household financial change. For example, if a change occurs in the work microsystem that affects total income, such as retirement or a cut in hours, that will change interactions in the home microsystem and will also impact proximal processes guided by personal characteristics. The same reasoning can be used for the conceptualization of the relationship between general loneliness and assets or subjective financial strain.

Finally, the Bioecological Systems Theory stresses the importance of considering time. This study is of longitudinal design, spanning four years. By using this type of design, the study is able to capture the change of the first three elements of the PPCT model through time, continuing to test the interdependence of Bronfenbrenner's (1986) model. This final element will also assist in the interpretation of results, as it is important to consider where in history the study takes place. As the study covers the timespan of 2006-2010, the study occurs during the Great Recession of 2008.

<div align="center">Research Questions & Hypotheses:</div>

1. Do older adults who experience a decrease in income and/or assets experience a change in general loneliness that is different from those who experience an increase or no change in income and/or assets?

a. Older adults who experience a decrease in income and/or assets will experience a significantly greater increase in general loneliness than those who experience no change or an increase in income and/or assets.

2. Do older adults who experience an increase in feelings of subjective financial strain experience a change in general loneliness that is different from those who experience a decrease or no change in subjective financial strain?

a. Older adults who experience an increase in feelings of subjective financial strain will experience a significantly greater increase in general loneliness than those who experience no change or a decrease in feelings of subjective financial strain.

3. Is the relationship between change in household finances and change in general loneliness mediated by social participation, mental health or personality?

a. The relationship between changes in household finances and changes in general loneliness will be mediated by mental health, social participation, or personality.

Chapter 2: Methods

The study is of longitudinal design pulling from the 2006 and 2010 waves of the Health and Retirement Study (HRS). The purpose of the HRS is to collect survey data to support research and inform policymakers on the issues surrounding health and retirement for older Americans (The Health and Retirement Study: An Introduction, 2018).

Participants

The participants were drawn from 2006 and 2010 waves of the HRS. The sample is restricted to participants who were interviewed in both waves (N=42,051), completed the leave-behind psychosocial questionnaire, and answered the financial and loneliness questions (N=5,385). The sample was further restricted to those who were aged 62 or older in the 2006 wave (N=3,587) and those living outside of a nursing home. This left a sample of 3,542 individuals. Descriptive statistics of the sample are provided in Table 1. The subsample used in this study does differ from the overall HRS sample in several ways. The study sample is less female, older, has a larger proportion of Non-Hispanic Whites, has a lower income and has a greater proportion of married or partnered individuals.

The HRS has a cohort longitudinal design structure. Surveys are conducted every two years with half the sample surveyed via telephone and the other half surveyed

through an Enhanced-Face-to-Face (EFTF) interview. Both interviews include the same comprehensive survey, and the EFTF interview adds physical measures, saliva samples, and blood biomarkers, as well as a mail-back psychosocial self-administered questionnaire (The Health and Retirement Study: An Introduction, 2018).

<p align="center">Measures</p>

The outcome variable of interest is general loneliness. The HRS uses a 3-item measure of general loneliness developed from the R-UCLA Loneliness Scale (Hughes et al., 2004). The responses for all three items are "3=Hardly ever", "2= Some of the time", and "1=Often." The items are "How often do you feel that you lack companionship?", "How often do you feel left out?", and "How often do you feel isolated from others?" The items were reverse coded and then summed, creating a loneliness composite score ranging from 3-9 where higher scores indicate higher levels of loneliness.

The predictor variables of interest are total assets, total income, and subjective financial strain. The financial variables come from the RAND HRS Longitudinal File. RAND Center for the Study of Aging is an independent company that creates data files with cleaned and processed variables with intuitive naming conventions that are consistent across all waves of the HRS (Data Products of the Center for the Study of Aging, 2019). Total assets and total income were transformed using a log transformation. Subjective financial strain is assessed using the question, "Have you experienced ongoing financial strain that has lasted 12 months or longer?" The response is a scale with options "1=no, didn't happen", "2=yes, but not upsetting". "3=yes, somewhat upsetting", and "4=yes, very upsetting".

Potential Mediators

The analysis accounts for mental health, social participation, and personality variables, which may serve as mediators of the relationship between household financial change and general loneliness.

Self-efficacy, representing a personal characteristic from Bronfenbrenner's (1986) PPCT model, will be included as potential mental health mediator. In the HRS the Midlife Developmental Inventory; scale of control (MIDI) is used to measure mastery, perceived constraints and self-efficacy (O'Shea, Dotson, & Fieo, 2017; Ward, 2013). There are five items assessing mastery with statements such as "I can do just about anything I really set my mind to." There were also five items assessing perceived constraints with statements such as "I often feel helpless in dealing with problems of life." All items have response scales from "1=strongly disagree" to "6=strongly agree". Items for perceived constraints are reverse coded, and an index of mastery and an index of constraints are created by averaging the scores across their respective items (Health and Retirement Study, 2017). Self-efficacy is a composite score using all items of the mastery scale and two items from the constraints scale (O'Shea, Dotson, & Fieo, 2017). The mastery index and constraint index are both strongly correlated with self-efficacy, so only self-efficacy is used in our analysis.

Anxiety and depression are also included as potential mental health mediators and are theorized as such using the personal characteristic element of the PPCT model. In the HRS anxiety is measured using the Beck Anxiety Inventory (Wilkinson, 2016). Anxiety is measured using five items with questions such as "How often in the past week have

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you had fear of the worst happening?" Responses ranged from "1=never" to "4=most of the time". Responses were averaged across items for a score of anxiety. Depression was measured using an abbreviated 8-item index from the Center for Epidemiological Studies-Depression (CES-D) scale in the HRS (Wilkinson, 2016). Items included statements such as, "Much of the time during the past week…You felt that everything you did was an effort." Respondents answered yes or no. The responses to the eight items were summed, obtaining a measure of depression where higher values indicate higher levels of depression (Health and Retirement Study, 2017).

Social participation describes a set of measures that are also potential mediators representing the proximal processes element of the PPCT model. Child close is a dummy variable representing if the participant has a child that lives within 10 miles of them. Friend near is a dummy variable of the yes/no response given by participants to the question, "Do you have good friends that live near?" Another measure of social participation is a frequency of contact measure that is a value of how often participants get together with friends in a month.

Personality is included as a potential personal characteristic mediator as theorized using Bronfenbrenner's (1986) PPCT model. The Midlife Developmental Inventory (MIDI) is used to measure the Big 5 Personality traits. The five traits are openness, conscientiousness, extraversion, agreeableness, and neuroticism (Health and Retirement Study, 2017). Thirty-one traits are used to assess personality. Participants are asked to indicate how well each trait describes them on a scale of "1=a lot" to "4=not at all".

Variables were coded according to the *Psychosocial and Lifestyle Questionnaire 2006-2016: Documentation Report Core Section LB.*

A set of socio-demographic controls will be included. Binary measures will be gender, if the respondent is a homeowner, and if the respondent has moved since the last wave. Categorical measures will include race, education, marital status, and employment status. Continuous variables will be age and household size.

Data Analyses

Ordinary least squares (OLS) linear regression with first differencing was performed using STATA 16. Change in general loneliness serves as the dependent variable. Three predictor variables of interest were tested: change in assets, change in income, and change in feeling of subjective financial strain. Each predictor variable was tested on its own through a series of model specifications and a final model with all three predictors was run through all model specifications.

In the baseline model specification, general loneliness was regressed on each of the household financial change predictors and includes a set of socio-demographic controls. The second specification adds the proposed mental health mediators to the model. The proposed social participation mediators are added in the third specification of the model. In the final model the proposed mediator of personality is included.

A series of OLS regression models are fit iteratively in order to test the contribution of the proposed mediators and determine full, partial, or no mediation of the relationship between subjective financial strain and general loneliness (MacKinnon,

Warsi, & Dwyer, 1995). By fitting models this way, the researcher is able to determine if the significance of a predictor of interest is explained by the addition of another predictor.

In mediation analysis, X predicts the mediator, M, which in turn predicts Y (MacKinnon, Warsi, & Dwyer, 1995). In order to test completely for this, additional OLS regressions were run using X as the predictor of the proposed mediators that were significant in the previous OLS regression models.

The Hayes PROCESS macro for SPSS was run as a test of the robustness of findings from the linear regression models. IBM SPSS 26 was used for this analysis. The PROCESS macro is a path analysis modeling tool for OLS and logistic regression supporting a variety of mediation and moderation models (Hayes, 2017). Using PROCESS model #4, general loneliness served as Y, subjective financial strain served as X, self-efficacy as M1, depression as M2, anxiety as M3, the social participation measures as M4-6 and the personality measures as M7-11. The previously used covariates were also included.

Chapter 3: Results

The three financial predictors of asset change, income change, and change in subjective financial strain are first run separately from each other. Change in assets and change in income do not significantly predict a change in general loneliness between the 2006 wave and the 2010 wave of the HRS. Change in subjective financial strain is a significant predictor of change in general loneliness, and remains a significant predictor when change in assets and change in income are controlled for. Therefore, the final iterative regression models, using change in subjective financial strain as the primary predictor while controlling for asset and income change are presented in Table 2.

Hypothesis 1: Older adults who experience a decrease in income and/or assets will experience a significantly greater increase in general loneliness than those who experience no change or an increase in income and/or assets.

Hypothesis 1 is not supported by the results of this study. Changes in objective financial stress, measured by income and assets, are not significant predictors of a change in general loneliness.

Hypothesis 2: Older adults who experience an increase in feelings of subjective financial strain will experience a significantly greater increase in general loneliness than those who experience no change or a decrease in feelings of subjective financial strain.

The results of this study indicate that hypothesis 2 is supported. Change in feelings of subjective financial strain is a significant predictor of general loneliness. The relationship is positive such that increases in feelings of subjective financial strain are associated with increases in feelings of general loneliness, controlling for age, race, gender, marital status, employment status, homeownership status, and all three changes in statuses. Specifically, a one unit increase in feelings of subjective financial strain, measured on a four-point scale, is associated with a 0.122 ($p=0.000$) increase in general loneliness, measured on a nine-point scale.

Hypothesis 3: The relationship between changes in household finances and changes in general loneliness will be mediated by mental health, social participation, or personality.

Hypothesis 3 is partially supported by the results of this study. The proposed mental health mediators are all significant predictors of general loneliness, and their introduction into the model changed the significance of change in subjective financial strain. There are three proposed mental health mediators: change in self-efficacy, change in depression, and change in anxiety. When they are added to the model, subjective financial strain moves from being significant at the 0.1% level to only being significant at the 5% level. This points towards a partial mediation by the mental health predictors. The proposed social participation and personality mediators are not significant and do not impact the significance of general loneliness, so they do not mediate the relationship between changes in feelings of subjective financial strain and changes in general loneliness.

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The three mental health predictors are significant predictors of changes in general loneliness. An increase in self-efficacy is associated with a significant decrease in general loneliness while an increase in depression is related to a significant increase in general loneliness. Similarly, an increase in anxiety is related to a significant increase in general loneliness in our sample.

Table 3 presents the results of OLS regression models with each of the three mental health mediators regressed on change in subjective financial strain. Change in subjective financial strain is significantly and positively related to changes in anxiety at the 0.1% level. Subjective financial strain change is negatively related to self-efficacy at 0.1% significance. Depression is not significantly predicted by subjective financial strain, meaning that while it is a significant predictor of general loneliness, depression does not mediate the relationship between subjective financial strain and general loneliness. All of these results show that the relationship between change in feelings of subjective financial strain and changes in general loneliness are partially mediated by self-efficacy and anxiety, but not by depression.

These results were further supported by the Hayes PROCESS model. The indirect effects of the proposed mediators and their confidence intervals are presented in Table 4. When the confidence interval crosses zero, that means the indirect effect is not significant and the variable is not a mediator. The only significant indirect effects come from self-efficacy and anxiety. As the direct effect of subjective financial strain on general loneliness is significant as demonstrated by the OLS regression and confirmed by the

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PROCESS macro, self-efficacy and anxiety partially mediate the relationship between subjective financial strain and general loneliness.

Chapter 4: Discussion

This study explores the relationship between changes in financial stress and general loneliness among older adults in the United States. The study investigated whether general loneliness is associated with objective or subjective financial stress and tested whether the associations are mediated by mental health, social participation, or personality. An increase in feelings of subjective financial strain is associated with an increase in feelings of general loneliness. Further, this relationship is partially mediated by measures of mental health, specifically anxiety and self-efficacy.

Objective measures of financial stress were not associated with general loneliness. The actual changes in assets or income are not important for predicting changes in general loneliness, rather it is how an individual feels about those changes that matter. It is also important to note that the transition from marriage to widowhood is a significant predictor of general loneliness in all models. Losing a spouse increases loneliness independent of an individual's financial, social, or mental situation.

This study fills a gap in the literature as previous studies of relationships between financial variables and loneliness among older adults are focused in Europe. This is also among the first studies to quantitatively investigate the association of loneliness and financial markers in the U.S. Previous studies focused on objective financial measures such as income (MacDonald, Nixon, & Deacon, 2018; Tanskanen & Anttila, 2016),

income mismatch (Deeg & Thomése, 2005) or financial downturn (De Jong Gierveld, Keating, & Fast, 2015). Few studies have used subjective measures, such as mortgage stress (Keene, Cowan, & Castor Baker, 2015) or income discomfort (Dahlberg & Mckee, 2014). This study demonstrates that is important to consider an individual's feelings about their economic situation, as well as their mental health when considering what may increase their feelings of general loneliness.

The findings support Bronfenbrenner's (1977) theory that personal characteristics, specifically force characteristics such as mental health are salient for understanding human behavior and experience. Interestingly, the measures of proximal processes in this study were not significant in the relationship between subjective financial stress and general loneliness. Proximal processes are fundamental to Bronfenbrenner's theory and are vital to understanding development and human behavior (Tudge, 2009). Perhaps the measures used in this study did not accurately capture this element of the PPCT model. In the very definition of proximal processes, Bronfenbrenner stressed that these are "complex reciprocal interactions" (Bronfenbrenner & Morris, 1988, p. 996). The measures used in this study were those of frequency of contact and proximity of children and friends. These measures fail to capture the reciprocity vital to the conceptualization of this element and are a limitation of this study.

Pearlin's (1981) stress process model which conceptualizes how events, strains, and resources come together to produce negative mental health outcomes was demonstrated in this study. Financial strain worked through the resource of self-efficacy

and the additional strain of anxiety to produce a negative outcome of increases in general loneliness.

This study found that subjective financial stress is more important in predicting general loneliness than objective financial stress. Previous literature would lead one to expect that both types of financial stress would be important in this relationship. Knowing this, we can begin to conceptualize why these findings may have occurred. One potential reason for this is that the loneliness measure used in this study did not fully capture the full range of loneliness and therefore may have missed an element of loneliness that is impacted by objective financial stress. One way to remedy this would be to use the 11-item Revised UCLA Loneliness Scale which the HRS began collecting in 2008 (Smith et al., 2013). Since this was not available for the first wave of this study, it was unable to be used, but may capture a relationship between objective financial stress and loneliness. Another way to remedy this would be to add a question to the shortened loneliness questionnaire such as "There is someone with whom I can discuss the difficulties I am experiencing." By adjusting the loneliness measure, a future study may find that objective financial stress is a predictor of general loneliness.

Another potential explanation for the results that show subjective financial stress as more important a predictor for general loneliness comes from the fact that the sample period included the Great Recession of 2008. The Great Recession was a time when the financial futures of the country and of many individuals and business was unclear. This could have increased feelings of subjective financial strain, anxiety, and therefore loneliness.

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This study also found that the relationship between subjective financial stress and general loneliness is mediated by the mental health measures of self-efficacy and anxiety. the subjective financial strain measure might be capturing a specific kind of anxiety: financial anxiety. However, subjective financial strain is associated with general loneliness above and beyond mental health.

This study has implications for policies and programs that could increase the well-being of older adults. Policies that would decrease financial stress during older age such as affordable healthcare or reverse mortgages could lead to a decrease in anxiety as well as a decrease in general loneliness. Low-cost or no-cost programs that encourage social participation and engagement would also be beneficial to this age group. Some such programs exist, such as senior centers or religious organizations, but should be extended to reach a wider range of older adults, especially those without a religious affiliation.

There are several limitations to this study. First, the HRS collects loneliness measures every four years instead of every two years, so the period of time for the change model is rather large. Additionally, since the loneliness measures, asked in the Psychosocial Leave-Behind Questionnaire, are asked of only half the total sample at a time, our sample is limited. These limitations to the sample mean that the study sample differs from the full HRS sample in age, gender, race, marital status, and total income.

<div align="center">Conclusion</div>

The population of older adults in the United States is growing. It is important that research is done to examine the factors that play a role in well-being during later life. This study demonstrated that subjective financial stress is associated with general

loneliness. An increase in feelings of subjective financial strain predicts an increase in general loneliness. This relationship is partially explained by an individual's mental health, specifically anxiety and self-efficacy. By understanding this relationship, we can work to improve the well-being of older adults through policies that decrease financial stress and encourage social engagement and relationships.

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Appendix A: Tables

Table 1. Sample Descriptives

	2006	2010
	% or Mean(SD)	% or Mean(SD)
Female	56.8%	
Race		
Non- Hispanic White	82.7%	
Non-Hispanic Black	10.4%	
Non-Hispanic Other	1.7%	
Hispanic	5.2%	
Age	71.6 (6.8)	75.7 (6.8)
Loneliness (3-9)	4.3 (1.5)	4.3 (1.5)
Change in Loneliness (-6-6)	0.011 (1.5)	
Total Assets (0-5.9 mil)	554,778.3 (732,799.2)	496,438.5 (661,866.7)
Change in Assets (-3.9 mil – 3 mil)	-54,167.4 (422,165.6)	
Total Income (0-353,364)	53,284.7 (49,139.1)	49,155.0 (45,317.6)
Change in Income (-300,779-260,377)	-3,518.9 (42,247.9)	
Subjective Financial Strain (1-4)	1.48 (0.81)	1.54 (0.84)
Change in Subjective Financial Strain (-3-3)	0.063 (0.81)	
Marital Status		
Married/Partnered	67.6%	60.8%
Divorced/Separated	9.7%	9.9%
Widowed	20.6%	27.0%
Never married	2.1%	2.3%
Marital Status Change		
No change	90.2%	
Married to Widowed	6.8%	
Other change	3.0%	
Employment Status		
Working	22.3%	12.5%
Retired	62.3%	73.4%
Other	15.4%	14.2%
Education		
HS or less	57.5%	
Some College	20.6%	
Bachelor's +	21.9%	

N = 3,542

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Table 2. First-Differenced OLS Coefficients General Loneliness on Financial Stress

	Model 1	Model 2	Model 3	Model 4
Subjective Financial Strain	0.123***	0.079*	0.089*	0.079*
Natural Log Assets	0.023	0.016	0.024	0.038
Natural Log Income	0.024	0.008	0.020	0.003
Age	0.006	0.001	0.003	0.002
Race				
Non-Hisp White	Reference			
Non-Hisp Black	-0.047	-0.011	-0.065	-0.013
Non-Hisp Other	0.236	0.260	0.336	0.284
Hispanic	-0.122	-0.129	-0.149	-0.118
Marital Status				
Married/Partnered	Reference			
Divorced/Separated	-0.125	-0.065	-0.073	-0.091
Widowed	-0.062	-0.028	-0.041	0.008
Never Married	0.131	0.157	0.104	0.098
Marital Status Change				
No Change	Reference			
Married to Widowed	0.929***	0.919***	0.802***	0.691***
Other Change	-0.045	-0.223	-0.300	-0.376
Female (=1)	0.087	0.093	0.100	0.089
Employment Status				
Working	Reference			
Retired	-0.022	0.004	0.019	0.025
Other	-0.119	-0.113	-0.113	-0.124
Homeowner (=1)	0.057	-0.003	-0.042	-0.027
Education				
HS or less	Reference			
Some College	-0.030	-0.018	0.005	-0.031
Bachelor's +	0.038	0.042	0.022	-0.015
Household Size 2006	-0.012	-0.009	0.026	0.037
Household Size 2010	0.026	0.022	-0.019	-0.026
Self-efficacy		-0.025***	-0.025***	-0.025***
Depression		0.084***	0.087***	0.086***
Anxiety		0.209***	0.181***	0.176***
Friends Near			-0.074	-0.058
Child Close			-0.104	-0.126
Frequency of Contact			-0.001	-0.001
Personality: Openness				0.014
Personality: Conscientiousness				0.043
Personality: Extraversion				0.189
Personality: Agreeableness				-0.009
Personality: Neuroticism				0.099
Constant	-0.598	-0.235	-0.344	-1.381*
F Statistic	4.59***	8.18***	6.25***	4.95***
Adjusted R^2	0.027	0.063	0.060	0.057
N	3242	2985	2547	2353

$^*p < .05,$ $^{**}p < .01,$ $^{***}p < .001$

Table 3. First-Differenced OLS Coefficients Mental Health Predictors on Subjective
Financial Strain

	Self-Efficacy	Anxiety	Depression
Subjective Financial Strain	-0.805***	0.086***	0.066
Age	-0.038	0.005**	0.010
Race			
Non-Hisp White	Reference		
Non-Hisp Black	0.516	-0.050	0.143
Non-Hisp Other	-0.037	0.073	-0.294
Hispanic	1.038	-0.099*	0.041
Marital Status			
Married/Partnered	Reference		
Divorced/Separated	0.690	0.019	-0.125
Widowed	-0.002	-0.017	-0.192*
Never Married	0.292	0.015	-0.427*
Marital Status Change			
No Change	Reference		
Married to Widowed	0.825	-0.009	0.691***
Other Change	-0.035	-0.081	-0.182
Female (=1)	-0.192	-0.019	0.088
Employment Status			
Working	Reference		
Retired	-0.125	-0.006	0.007
Other	-0.234	0.041	-0.252*
Homeowner (=1)	-0.427	0.035	0.129
Education			
HS or less	Reference		
Some college	0.409	0.001	0.011
Bachelor's +	0.152	-0.026	0.062
Household Size 2006	-0.010	0.010	0.007
Household Size 2010	-0.264	0.024	-0.006
Natural Log Assets	-0.030	0.006	0.032
Natural Log Income	0.129	-0.015	-0.057
Constant	3.141*	-0.415***	-0.853*
F Statistic	3.32***	5.41***	5.52***
Adjusted R^2	0.018	0.034	0.020
N	3134	3177	3139

$^*p < .05, ^{**}p < .01, ^{***}p < .001$

Table 4. Indirect Effects of Subjective Financial Strain on General Loneliness from Hayes Process Mediation Model

	Effect	Boot Confidence Interval
Self-Efficacy	0.016*	0.010 to 0.053
Depression	0.005	-0.005 to 0.015
Anxiety	0.014*	0.004 to 0.027
Friends Near	0.005	-0.002 to 0.004
Child Close	-0.004	-0.001 to 0.000
Frequency of Contact	-0.0003	-0.0031 to 0.0006
Personality: Openness	0.000	-0.002 to 0.002
Personality: Conscientiousness	0.001	-0.002 to 0.003
Personality: Extraversion	0.000	-0.003 to 0.003
Personality: Agreeableness	0.000	-0.002 to 0.001
Personality: Neuroticism	-0.001	-0.002 to 0.001

*significant effect

Table 5. Comparison of Sub-Sample to Full Sample

	Study Sub-sample 2006	Full HRS Sample 2006	Means Comparison
	% or Mean (SD)	% or Mean (SD)	
Female	56.8%	58.9%	p=0.013
Age	71.6 (6.8)	67.9 (11.1)	p=0.000
Race			
Non-Hispanic White	82.7%	74.6%	p=0.000
Non-Hispanic Black	10.4%	13.8%	
Non-Hispanic Other	1.7%	2.4%	
Hispanic	5.2%	9.3%	
Total Assets	554,778.3 (732,799.2)	559,974.6 (1,347,145)	p=0.675
Total Income	53,284.7 (49,247.9)	65,705.4 (319,250)	p=0.000
Marital Status			
Married/Partnered	67.6%	62.4%	p=0.000
Divorced/Separated	9.7%	12.4%	
Widowed	20.6%	21.7%	
Never Married	2.1%	3.4%	
N	3,542	18,364	