Loneliness and Behavioral Consequences of Negative Wealth Shock in Older Adults: Different During the Recession?

(Extended Abstract)

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Social relationships and a sense of social connectedness are critical for health and well-being, as is evident in the associations between social relationship deficits and poor health and mortality (Hawkley & Cacioppo, 2010; Holt-Lunstad et al., 2010, 2015). Although social relationships are complex and multidimensional, research has shown that simply feeling alone – commonly known as loneliness – is associated with a range of adverse physical and mental health outcomes (Cacioppo & Cacioppo, 2014). Loneliness is defined as a distressing feeling that accompanies a perceived discrepancy between actual and desired social relationships (Peplau & Perlman, 1982). Thus loneliness is correlated, but not synonymous, with actual social contacts and relationships. A number of factors increase risk for loneliness, but in older age these factors tend to revolve around losses – of spouse, friends and family members to death or geographic relocation; health; mobility; and independence, among other losses (Pinquart & Sorensen, 2003). Loneliness is more prevalent at the low end of the socioeconomic spectrum (income and/or education) (Cohen-Mansfield, Shmotkin, & Goldberg, 2009; Pinquart & Sorensen, 2003), and insufficient financial resources among older adults have been associated with an increased likelihood of becoming lonely 3.5 years later (Cohen-Mansfield et al., 2009). However, the effect of financial losses on loneliness has not been explored.

Financial shocks have been shown to increase stress levels and related psychosocial sequelae, including mental health conditions, substance abuse, and even suicide (Margerison-Zilko, Goldman-Mellor, Falconi, & Downing, 2016; Pool et al., 2017; Yilmazer, Babiarz, & Liu, 2015). As personal

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financial stress mounts, depression sets in (McInerney, Mellor & Nicholas, 2013). Shame or guilt about what are perceived as personal failings (foreclosures, wealth losses) may negatively affect relationship quality and cause people to actively withdraw from others, or to engage in self-protective emotional distancing in social relationships, thus increasing feelings of loneliness and isolation. Instead of relying on the support of others, sufferers may instead cope by abusing substances and neglecting their health through poor health behaviors (e.g., overeating, not exercising), a coping response that is more likely among older than younger adults (McInerney & Mellor, 2012).

Does this pattern of effects differ during a general economic downturn such as the Great Recession of 2008-10? When an external explanation is provided for "personal" failings, there may be a greater tendency to recognize that others, too, are suffering, leading to a sense of belonging to a group that shares a common experience. According to this "*amelioration hypothesis,*" financial shocks should have less of an impact on loneliness during than before or after a recession. This is consistent with research on period differences in risk for depressive symptoms and suicide, where risk increases during periods when financial shocks are rare relative to periods when they are more common (Corcoran & Arensman, 2010; McInerney & Mellor, 2012; Neeleman, 2002).

On the other hand, cumulative inequality theory views perceptions of the experience of negative wealth shock as more closely linked to outcomes than objective losses (Ferraro et al., 2009). The "*exacerbation hypothesis*" posits that negative perceptions may be exacerbated during recessionary periods when media bombard the public with data on the Recession's adverse financial, material and health consequences. Wilkinson (2016) found that decreased financial resources during the 2006-2010 period were associated with perceptions of financial strain which, in turn, were robustly associated with worsening mental health.

In the current study, we use longitudinal data from the Health and Retirement Survey to examine three interrelated questions: (1) whether negative wealth shocks are associated with increases in loneliness, (2) whether effects are ameliorated or exacerbated during the Great Recession, and (3) whether changes in social and health behaviors mediate effects of wealth shocks on loneliness. A conceptual

model illustrating our approach to these questions provided in Figure 1. We test the role of religious service attendance as a significant social behavior because churches and related organizations play a critical role in assisting those suffering from economic losses (Allard, Wathen, & Danziger, 2015), and potentially provide a safe environment to form and/or maintain social connections that alleviate loneliness. We single out alcohol consumption as a health behavior because previous research has shown that loneliness is associated with reduced alcohol use frequency among older adults (Canham, Mauro, Kaufmann, & Sixsmith, 2016). Nevertheless, older adults who lost retirement savings during the Recession were shown to consume 42% more alcohol than their peers (Mulia, Zemore, Murphy, Liu, & Catalano, 2013), and alcohol abuse may contribute to increased loneliness (Akerlind & Hornquist, 1992). A systematic mediation analysis of these social and health behaviors will help explain mechanisms underlying the association between wealth shocks and loneliness and potential variation by economic cycles.

[FIGURE 1 ABOUT HERE]

Methods

Sample

This study used data from the Health and Retirement Study (HRS), a longitudinal panel study of a nationally representative probability sample of older adults in the United States that began in 1992. HRS data are collected every other year (except for some modules), and thus there is a two-year interval between two consecutive waves. The current study relies on data from 2002 through 2014 in the RAND HRS Longitudinal File 2014 (v2). The baseline year, 2002, was chosen because religious service attendance, one of the key mediators to be analyzed in the study, is available in the core survey only since 2004. The study restricted the sample to those who were over 50 years old in 2002. The sample restrictions and the elimination of cases with missing values on negative wealth shock and the other covariates of interest yielded a sample of 17,883.

Measures

Net Household Wealth and Negative Wealth Shock. The information on household wealth and change of household wealth was drawn from RAND HRS. As defined by RAND, total household wealth is calculated as the sum of the value of the primary residence (secondary residences are excluded), real estate, vehicles, business, individual retirement account (IRA), stocks, mutual funds, investment trusts, checking, savings, money market accounts, certificates of deposits (CDs), government saving bonds, treasury bills, bonds, bond funds, and all other savings. Net household wealth is calculated by subtracting from total household wealth the sum of the value of mortgages, land contracts, all other home loans and all other debts. Missing data were replaced with multiply imputed values provided by RAND HRS. All net wealth values were adjusted to the 2013 Consumer Price Index (CPI) and were subjected to an inverse hyperbolic sine transformation due to skewness and negative values (Burbridge et al., 1988).

The treatment variable in this study is negative wealth shock. We operationalized negative wealth shock as has been done in prior research (Pool et al. 2017, 2018). Specifically, the loss of 75% or more of the total net household wealth between consecutive waves was defined as a negative wealth shock (see Figure 1). The person-wave observations with net household wealth less than or equal to zero were included in the analytical sample and were treated as though they had not experienced negative wealth shock. Data from 2002-2014 were included in analyses.

Outcome: Loneliness. This study used the loneliness item of the CES-D scale administered as part of the core interview at each wave of HRS. The item asks whether the respondent felt lonely or not (yes/no), and thus the variable is dichotomous. Data from 2004-2014 were included in analyses.

Mediators

Religious service attendance refers to the attendance at religious services in the past year, a variable characterizing one aspect of people's social engagement. The variable is coded in a binary manner with 2 categories: 0 = not at all, 1 = once a year or more. *Drinking behavior* refers to whether the respondent has had alcohol to drink in the past three months or not, coded as a dummy variable with 0 =

has not consumed alcohol. The mediators are concurrent with the outcome variable (see Figure 1), and thus they are drawn from 2004 to 2014 data.

Covariates

This study selected covariates based on potential confounding associations between household income and/or wealth and loneliness that have been observed in the literature. This study adjusted the models by the following time-invariant covariates: race (Black or non-Black), gender (male or female), age in years in 2002 which we grouped to permit identification of nonlinear associations (51-64, 65-74, 75-84, ≥85), and education (lower than high school, high school graduate or general education degree, some college, or college and above). Time-varying covariates in this study include labor force status (employed, retired or the other status including disabled and not in labor force), household income (adjusted to the 2013 CPI and household size, and log-transformed), total net household wealth, marital status (partnered or not), health insurance (have any health insurance or not). All the time-varying covariates were lagged by one wave prior to the outcome variable (see Figure 1), and thus information from the time-varying covariates was drawn from 2002 to 2012 data.

In addition to the variables given by HRS and RAND HRS, two other time-varying covariates were generated: *Recession*, a dummy variable denoting the 2010 wave (Wave 10), which marked the end of the Great Recession in 2008-2010; and W*ave*, a chronological indicator of the data collection wave from which an observation was drawn that was included to control for temporal changes in loneliness and permit evaluation of the unique effects of the Recession.

Statistical Analyses

Primary Analyses

To utilize the longitudinal feature of the HRS data and control for individual differences in the likelihood of feeling loneliness and the potentially confouding effects of time-invariant unobserved factors (Hedeker & Gibbons, 2006), this study used mixed models with random intercepts to estimate the causal effect of negative wealth shock on loneliness. Because loneliness is a dichotomous variable, the logistic link function was used for the models. Models were estimated using Stata (v. 21). In order to

explore mechanisms for the effect of negative wealth shock, we used "1-1-1 mixed model mediation analysis," also known as multilevel mediation modeling (for detail, see Zhang & Zyphur 2009). In a "1-1-1" model, treatment variables, mediators and outcome variables are each assumed to be at Level 1. Models were estimated using R (Tingley et al., 2014).

Sensitivity & Robustness Analyses

Three analyses were conducted to test the sensitivity and robustness of our findings. Each analysis followed the same procedure as was used for the primary analyses, except as noted below. All sensitivity analyses were implement using Stata.

Negative wealth shock is not mathematically possible in the group whose net wealth was zero or less, but increased indebtedness in this group is possible and this may have biased results. To deal with this concern, a sensitivity analysis excluded person-wave observations where net household wealth was less than or equal to zero.

The loneliness item used in our main analyses is part of the CESD depression scale (Radloff, 1977), and our loneliness effects may be largely confounded with depression effects which have been previously reported (Pool et al., 2017). To determine whether effects observed here were unique to loneliness, we summed responses to the remaining seven depressive symptom items and used the score as a covariate. Any residual effects on the single loneliness item can be considered independent of the association between depressive symptoms and loneliness.

Our final analysis tested whether the observed effects were robust to the choice of loneliness measure. Specifically, the single loneliness was replaced with scores on a validated 3-item UCLA Loneliness Scale (Hughes et al., 2004). The three 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?" Each item has three response options (1 = often, 2 = some of the time, 3 = hardly ever) and loneliness scores were calculated by summing all items and rescaling the totals to generate values that ranged from 0 to 6, with higher values indicating more frequent feelings of loneliness. For the analysis of the loneliness scale scores, we used an ordinal logistic link function to accommodate the 7 points in the ordinal scale.

The loneliness scale was measured every other wave (four year interval) for random halves of the sample (i.e., subsample A reported loneliness in 2006 and 2010, while subsample B reported loneliness in 2008 and 2012), but our longitudinal analyses included every wave of data, which resulted in each individual having one missing observation for every other person-wave observation. To accommodate this, we assumed that the person-wave observations were missing at random (MAR). Although the subsamples were randomly assigned, this assumption may still be too strong and may cause bias, but it was deemed adequate for the purposes of auxiliary sensitivity analysis.

Results

Sample Characteristics

Table 1 presents the summary statistics of the analytical sample at baseline, which correspond to the first year(s) for which data are included in the models. The outcome variables and mediators are from 2004, the negative wealth shock variable is the proportion who experienced shock between 2002 and 2004, and the covariates are from 2002. At baseline, about 17% of the respondents felt lonely and about 6% had experienced negative wealth shock. The proportion of respondents experiencing negative shock was higher during the Recession period, reaching 9.2% (not reported in Table 1). More than half of the analytical sample are female (57.5%), and 15.3% are black. Most have retired (57.1%) and have a spouse or partner (66.9%). The age of sample is roughly evenly divided among 50-64 year-olds (48.9%) and those 65 and older (51.1%).

Negative Shock, the Great Recession and Loneliness

Table 2 presents the results of the analyses. Six models in total are presented. The key variables of interest are included in a sequential fashion to permit assessment of their bivariate, additive and interactive effects. Model 1 assesses the impact of only negative wealth shock, Model 2 assesses only the Recession effect, Model 3 the additive effects of negative wealth shock and the Recession, and Model 4 the interaction of negative wealth shock and the Recession. Time-invariant covariates are included in all the models. Time-varying covariates are only included in Models 5 and 6, where the negative shock-by-Recession interaction is not included in Model 5 but is returned in Model 6.

In Model 1, negative wealth shock has a significant positive effect on feelings of loneliness. The magnitude and significance of the effect is maintained across all models, even after adjusting for time-varying covariates (Models 5 & 6). These findings show that a loss of more than 75% of one's wealth is associated with increased loneliness, consistent with prior findings on the link between negative wealth shock and poor mental health.

We do not observe a main effect of the Great Recession, however (Model 2). That is, changes in loneliness status are not differentially associated with the Recession period in 2008-2010 relative to non-Recession periods between 2002 and 2012. More importantly, the addition of the Negative Wealth Shock × Recession interaction terms conveys no significant effects regardless of whether time-varying covariates are controlled (Model 6) or not (Model 4). In other words, a negative wealth shock experienced during the Great Recession does not exert a significantly different effect on loneliness than a negative wealth shock experienced in other periods. These findings do not support either the amelioration or the exacerbation hypothesis.

The effects of time-varying covariates are also worth noting. For instance, economic well-being has a protective function even in the face of negative wealth shock. Respondents who have more income and wealth, and have health insurance, are less likely to feel lonely, controlling for a wealth shock and other factors. While the mechanism is not entirely clear, financial resources may be necessary for people to engage in certain types of social activities that could alleviate their feelings of loneliness. In addition, employed respondents are significantly less likely than others to feel lonely. Finally, consistent with prior research (Stack, 1999), married or partnered respondents are less likely to feel lonely than their unmarried peers. The ameliorative effects of employment and marriage can be attributable to the opportunities they provide for stable and frequent social interactions that convey feelings of connectedness.

Mediational Mechanisms

The presence of a significant effect of negative wealth shock on loneliness prompts the examination of explanatory mechanisms. Table 3 presents the regression models estimating the effects of negative shock on the mediator and the outcome which are used to calculate direct and mediated effects,

shown in Table 4. Table 3 shows that negative wealth shock is associated with a decrease in the likelihood of religious service attendance which, as expected, is associated with lower loneliness. Negative wealth shock is associated with a lower likelihood of having had alcohol to drink during the last three months, and recent consumption of alcohol is associated with lower odds of loneliness. As shown in Table 4, religious service attendance mediates about 1% of the total effect of negative wealth shock, a small but significant effect. Drinking mediates about 1.1% of the effect of negative shock on loneliness, also a small but significant effect. Overall, we can conclude that negative wealth shock affects feelings of loneliness in part through its impact on social and health behavior.

Sensitivity and Robustness Analyses

In the sensitivity analysis, we excluded cases with zero or negative wealth; a relatively small proportion of observations were affected (see Table 3 for number of observations). The pattern of effects was unchanged in this model (see Appendix A). In the fully adjusted model (Analysis 1, Appendix A), negative wealth shock continued to predict increased loneliness (B=0.368, SE=0.058, p<.001), the Recession had no effect, and the interaction of negative wealth shock and the Recession was not significant.

In the second analysis (Analysis 2, Appendix A), we tested the robustness of the effect of negative shock on the single CESD loneliness item by adjusting for the remaining depressive symptoms in the CESD. The pattern of effects was unchanged, although the magnitude of the effect of negative wealth shock on loneliness was attenuated (B=0.212, SE=0.059, p<.001).

In the final analysis (Analysis 3, Appendix A), we tested the robustness of the effect by using an alternative loneliness measure. Again, the pattern of effects was unchanged when scores on the UCLA Loneliness scale were the outcome. The fully adjusted model found a significant effect of negative wealth shock on loneliness (B=0.352, SE=0.08, p<.001), and not effect of the Recession or its interaction with negative shock.

Discussion

This study showed for the first time that a negative wealth shock affects feelings of loneliness. Specifically, in a nationally representative sample of older adults, those who experienced a loss of 75% of

their wealth or more over a two-year period were at increased risk of becoming lonely. In terms of odds ratios, a negative wealth shock increased the odds of loneliness by 50%, a large and potentially consequential effect given the health consequences that have been attributed to loneliness (Cacioppo & Cacioppo, 2014). This effect was independent of baseline levels of household income and wealth, each of which were associated with lower risk of loneliness as has been shown in the past (Cohen-Mansfield et al., 2009; Pinquart & Sorenson, 2003). Notably, the effect on loneliness was also independent of depressive symptoms, indicating that negative wealth shock influences not only mental health and general affective states (Margerison-Zilko et al., 2016), but specifically also affects one's perceived social connectedness. This was borne out in sensitivity analyses that used the abbreviated UCLA Loneliness scale rather than the single loneliness item. The UCLA loneliness scale is often preferred because it avoids the terms "lonely" and "loneliness," terms that have a stigma that can bias reporting. Certain subgroups are more likely than others to underreport loneliness when asked directly (Borys & Perlman, 1985; Nicolaisen & Thorsen, 2014). Use of this scale replicated the effects observed using the single CESD loneliness item.

We hypothesized that the impact of negative wealth shock on loneliness could be exacerbated or ameliorated during the Recession, but the data did not support either hypothesis. Negative wealth shock had a consistent adverse effect regardless of when the shock occurred. This finding runs counter to the exacerbation of mental health (e.g., depression) observed during the Recession relative to non-recession periods (McInerney et al., 2013; Sargent-Cox, Butterworth, and Anstey, 2011). Several factors may account for the difference. First, the timing of measurement matters for psychological health outcomes like depression and anxiety; in an Australian study of psychological health during the global financial crisis (Sargent-Cox et al., 2011), poor psychological health was a significantly greater problem after September 2009 than during the acute crisis period (April to September 2009). It is unknown whether loneliness develops and resolves on a different time scale than general psychological health. In our case, the post-recession loneliness measure was administered in 2010, toward the very end of the Recession period and possibly after peaks in loneliness had resolved.

Second, effects may be moderated by baseline economic status. In a US study that relied on HRS data (McInerney et al., 2013), the effects of the Recession on depressive symptoms were greatest among those with the highest levels of stock holdings prior to the crash. Although we did not examine this possibility explicitly, we controlled for depressive symptoms and nevertheless observed an effect of negative wealth shock on loneliness. To the extent that depressive symptoms are confounded with baseline economic status (i.e., stock holdings), these data suggest that loneliness may not be differentially influenced by baseline economic status. This conjecture should be tested in future research.

Additional moderators should also be considered. Among older adults, the timing of a negative wealth shock may be differentially impactful based on whether lost wealth can be recovered with time or by returning to the work force, or was lost late enough in life that the impact is greatly reduced (at least for own purposes if not for heirs). Thus employment status, health and mobility, and age are good moderator candidates. In addition, perceptions may be more important and impactful than objective indicators of financial loss. Wilkinson (2016) found that household income, financial wealth, home equity, and labor force participation did not predict worsening of mental health during the Recession, but perceptions of financial strain were associated with worsening of anxiety and depression even after adjusting for objective indicators of economic status. Loneliness may be as susceptible as anxiety and depression to the toxic effects of perceived financial strain, or perceived strain may exacerbate the effects of a negative wealth shock on loneliness.

Mechanisms for the effect of negative wealth shock on loneliness may include a wide range of behaviors that threaten the capacity of individuals to maintain supportive relationships and a sense of connectedness. We considered only two such behaviors and found evidence that they play a small role in explaining the effect of wealth loss on loneliness. The first of these was religious service attendance. In prior research, religious service attendance attenuated decreases in life satisfaction among individuals who lost employment (Lechner & Leopold, 2015), suggesting that religious attendance serves as a resource during stressful times. Consistent with these findings, Rote et al. found that religious attendance protected against loneliness by better integrating individuals in a social support network (Rote, Hill, &

Ellison, 2013). We, too, found that higher tendency of religious service attendance was associated with lower odds of loneliness. Ironically, our data showed that a negative wealth shock predicted a decrease in the likelihood of religious service attendance. Thus, a negative wealth shock triggers a behavior change that reduces the likelihood that individuals will have social contact and access to the help and support at the very time they need help dealing with a significant life stressor.

Of course, social contact and support can come from other sources, not only religious groups, and future research should examine whether people experiencing a negative wealth shock change their social behavior in other domains (e.g., frequency of informal socializing, volunteering, participating in organized groups). To the extent all social activity is curtailed, loneliness is more likely to ensue. However, because loneliness is not synonymous with being alone and socially inactive, the perception of isolation and loneliness may persist despite social engagement or lack thereof. In fact, being around others while dealing with the potentially shameful experience of wealth loss may diminish feelings of self-worth which tends to worsen feelings of loneliness (e.g., Aartsen & Jylhä, 2011). These conjectures warrant additional research.

The second behavioral mechanism we examined was alcohol consumption. Extant research has shown that individuals who experience financial shocks tend to increase their alcohol consumption (Margerison-Zilko et al., 2016). Loneliness, on the other hand, is associated with reduced frequency of alcohol use in older adults (Canham et al., 2016). Alcohol is often consumed in a social context, and social groups "lubricate" their interactions with alcohol. Thus, reduced alcohol consumption may be a marker for fewer social opportunities among lonely than nonlonely older adults. In this sense, reduced alcohol consumption may signal the onset or worsening of loneliness. Indeed, our data revealed an inverse association between having consumed alcohol in the past three months and risk for loneliness. Those who had not consumed alcohol were at increased risk for loneliness. In addition, however, negative wealth shock reduced the odds of having drunk alcohol in the past three months. Given that our measure did not assess alcohol abuse, a decrease in the likelihood of consuming alcohol may be reflective of the cost of alcohol during a time when personal finances may be at low levels. At the same time, the extent to

which individuals typically center their socializing around the shared experience of alcohol use, a negative wealth shock that diminishes alcohol use can diminish the quality of social life and increase risk for loneliness. It would be helpful in future research to probe the social contexts of alcohol use and assess its contextualized role in enhancing a sense of social connectedness.

Although both of the behavioral mechanisms – religious service attendance and alcohol consumption – mediated the effect of negative wealth shock on loneliness, the proportion of variance mediated was small. Each mediator explained less than 2% of the total effect. Additional research is needed to explore additional mechanisms that may account for the effect. Other social behaviors are reasonable candidates, as are additional indicators of psychological health. We found that adjusting for depressive symptoms reduced the magnitude of the coefficient for negative wealth shock by almost half (Table 2, Model 6, B=0.415; Table A1, Analysis 2, B=0.212). Nevertheless, significant variance remained unexplained.

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Table 1. Summary statistics of the analytical sample at baseline[a]

Variable	Statistic (mean, proportion)
Outcome	
CES-D Feel Lonely (%)	16.9
Treatment	
Negative Wealth Shock (%)	5.9
Mediator	
Religious Service Attendance (%)	
Not at all	23.3
Once or More	76.7
Alcohol Consumption (%)	
Do not drink currently	68.5
Drink currently	31.5
Sensitivity Analysis Measures	
Adapted UCLA-R Scale (mean)	2.448 (SD = 1.626)
CES-D without Loneliness (mean)	1.255 (SD = 1.68)
Time-Varying Covariates	
Total Household Income (Median, adjusted)	32033.78 (IQR = 17716.85, 57644,79)
——Zero Income (%)	0.59
Total Net Household Wealth (Median, adjusted)	273424 (IQR=6709.799, 691948.1)
Labor Force Status (%)	
Employed	26.8
Retired	57.1
Other	16.2
Marital Status (%)	
not Partnered	33.1
Partnered	66.9
Insurance (%)	
Insured	71.2
not Insured	28.8
Demographics	
Race (%)	
Black	15.3
Non-Black	84.7
Gender (%)	
Female	57.5
Male	42.5

Age Group (%)	
50-64	48.9
65-74	30.6
75-84	16.6
85 and over	3.9
Education (%)	
Lower than High School	27.5
High School or GED	31.1
Some College	21.4
College & Above	19.9

[a] For the specification of the baseline, see the results section.

Table 2. Logistic regression of loneliness (CESD loneliness item) on negative wealth shock, Recession period, and their interaction, adjusting for covariates (coefficients and standard errors).

	Model 1 Shock Only	Model 2 Recession Only	Model 3 Shock and Recession	Model 4 Interaction Added	Model 5 Shock and Recession	Model 6 Interaction Added
Negative Wealth Shock	0.335***		0.337***	0.349***	0.477***	0.415***
	(0.05)		(0.05)	(0.056)	(0.056)	(0.056)
Recession		-0.027	-0.037	-0.031	-0.026	-0.022
		(0.037)	(0.037)	(0.039)	(0.037)	(0.039)
Negative Wealth Shock × Recession				-0.060		-0.033
				(0.123)		(0.121)
Wave	0.040***	0.043***	0.042***	0.042***	-0.011	-0.011
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
Finance						
Total Household Income					-0.145***	-0.144***
					(0.02)	(0.02)
——Zero Income					-0.847**	-0.847**
					(0.244)	(0.244)
Total Net Household Wealth					-0.034***	-0.034***
					(0.003)	(0.003)
Labor Status (Ref = Employed)						
Retired					0.175***	0.175***
					(0.049)	(0.049)
Other					0.459***	0.459***
					(0.061)	(0.061)
Marital Status (Ref = not Partnered)						
Partnered					-0.788***	-0.788***
					(0.041)	(0.041)
Insurance (Ref = not Insured)						
Insured					-0.167***	-0.166***
					(0.037)	(0.037)

Demographics						
Black (versus non-Black)	0.296***	0.314***	0.295***	0.295***	-0.045	-0.045
	(0.064)	(0.064)	(0.064)	(0.064)	(0.061)	(0.061)
Female (versus Male)	0.747***	0.753***	0.747***	0.747***	0.434***	0.434***
	(0.048)	(0.049)	(0.048)	(0.048)	(0.047)	(0.047)
Age Group (Ref = 50-64)						
65-74	0.205***	0.200***	0.206***	0.206***	0.083	0.083
	(0.053)	(0.054)	(0.053)	(0.053)	(0.053)	(0.053)
75-84	0.76***	0.759***	0.759***	0.759***	0.479***	0.479***
	(0.066)	(0.067)	(0.066)	(0.066)	(0.066)	(0.066)
85 and over	1.411***	1.427***	1.409***	1.409***	0.830***	0.830***
	(0.126)	(0.126)	(0.126)	(0.126)	(0.121)	(0.121)
Education (ref = Lower than High School)						
High School or GED	-0.902***	-0.917***	-0.901***	-0.901***	-0.615***	-0.615***
	(0.059)	(0.059)	(0.059)	(0.059)	(0.057)	(0.057)
Some College	-1.132***	-1.15***	-1.132***	-1.132***	-0.770***	-0.770***
	(0.067)	(0.067)	(0.067)	(0.067)	(0.064)	(0.064)
College & Above	-1.652***	-1.678***	-1.651***	-1.651***	-1.093***	-1.093***
	(0.073)	(0.073)	(0.073)	(0.073)	(0.072)	(0.072)
Intercept	-3.758***	-3.760***	-3.766***	-3.766***	-0.529*	-0.530*
	(0.126)	(0.126)	(0.126)	(0.126)	(0.241)	(0.241)
Observations	73,287	73,287	73,287	73,287	73,287	73,287
Groups	17,886	17,886	17,886	17,886	17,886	17,886

Table 3. Mixed models used for estimating mediation effects of negative wealth shock on feelings of loneliness (coefficients and standard errors)

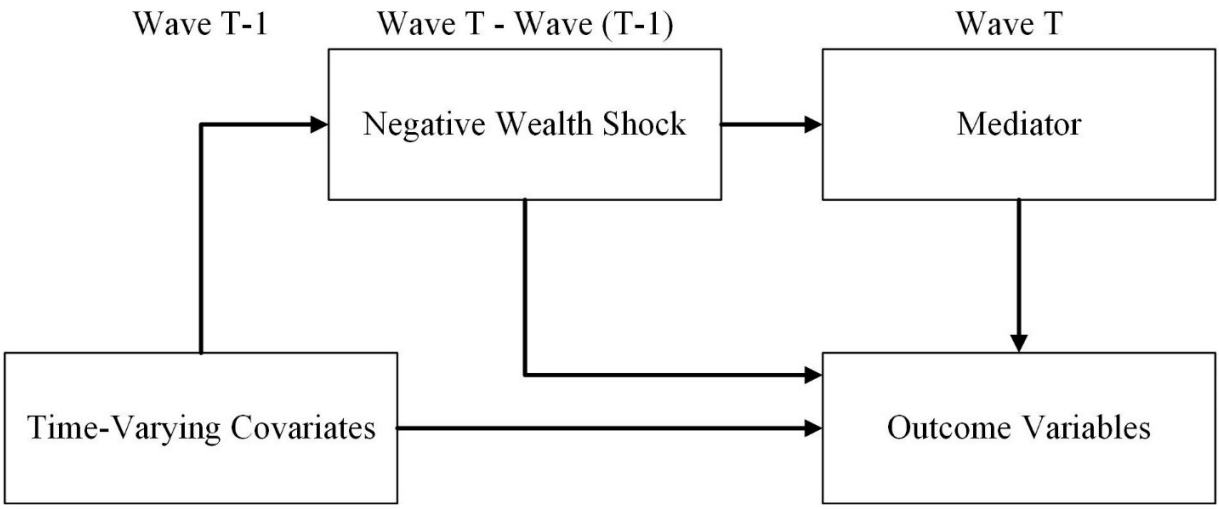
Mediator	Religious Service Attendance		Drinking in the Past Three Months	
Model	Predicting Mediator	Predicting loneliness	Predicting Mediator	Predicting loneliness
Negative Wealth Shock	-0.220**	0.407***	-0.276***	0.409***
	(0.069)	(0.049)	(0.069)	(0.049)
Recession	-0.072†	-0.026	0.037	-0.026
	(0.043)	(0.036)	(0.039)	(0.036)
Mediator		-0.213***		-0.206***
		(0.038)		(0.049)
Wave	-0.171***	-0.015†	0.001	-0.014†
	(0.011)	(0.009)	(0.010)	(0.009)
Finance				
Total Household Income	0.031	-0.145***	0.236***	-0.141***
	(0.027)	(0.020)	(0.025)	(0.020)
——Zero Income	0.303	-0.853***	2.389***	-0.820***
	(0.334)	(0.237)	(0.321)	(0.237)
Total Net Household Wealth	0.026***	-0.034***	0.028***	-0.034***
	(0.005)	(0.003)	(0.005)	(0.003)
Labor Status (Ref = Employed)				
Retired	0.151*	0.182***	0.022	0.184***
	(0.064)	(0.047)	(0.056)	(0.047)
Other	0.120	0.474***	-0.151†	0.475***
	(0.084)	(0.059)	(0.077)	(0.059)
Marital Status (Ref = not Partnered)				
Partnered	0.125†	-0.811***	0.004	-0.819***
	(0.069)	(0.039)	(0.062)	(0.039)
Insurance (Ref = not Insured)				
Insured	0.154**	-0.166***	0.191***	-0.169***
	(0.05)	(0.035)	(0.045)	(0.035)
Demographics				
Black (versus non-Black)	1.864***	-0.022	-1.232***	-0.069
	(0.141)	(0.058)	(0.117)	(0.058)

Female (versus Male)	0.902***	0.426***	-2.052***	0.380***
	(0.102)	(0.044)	(0.09)	(0.045)
Age Group (Ref = 50-64)				
65-74	0.297**	0.078	-0.801***	0.064
	(0.111)	(0.049)	(0.098)	(0.049)
75-84	-0.214	0.45***	-1.333***	0.435***
	(0.14)	(0.062)	(0.121)	(0.062)
85 and over	-1.266***	0.758***	-1.816***	0.751***
	(0.269)	(0.114)	(0.227)	(0.114)
Education (ref = Lower than High School)				
High School or GED	0.782***	-0.581***	1.201***	-0.585***
	(0.131)	(0.053)	(0.107)	(0.053)
Some College	0.766***	-0.729***	2.277***	-0.725***
	(0.144)	(0.060)	(0.123)	(0.061)
College & Above	1.351***	-1.022***	3.720***	-1.014***
	(0.151)	(0.067)	(0.141)	(0.068)
Intercept	2.471***	-0.235	-2.123***	-0.263
	(0.500)	(0.248)	(0.365)	(0.248)
Observations	73,287	73,287	73,287	73,287
Groups	17,886	17,886	17,886	17,886

Table 4. Mediation Analyses of the Direct and Indirect Effects of Negative Wealth Shock

Mediator	Average Direct Effect	Average Indirect Effect	Proportion of Indirect Effects in Total Effects
Religious Service Attendance	0.042085***	0.000408*	0.009708**
	(0.005073)	(0.000152)	(0.003402)
Drinking in the Past Three Months	0.040330***	0.000453**	0.011080**
	(0.005258)	(0.000157)	(0.003920)

Figure 1. Conceptual Model Illustrating Temporal Associations



Appendix A.

Table A1. Sensitivity Analyses

	Analysis 1 CES-D Loneliness Excluding Cases With Zero or Negative Wealth		Analysis 2 CES-D Loneliness Adjusted for other CES-D symptoms		Analysis 3 Adapted UCLA-R Loneliness Scale	
Negative Shock	0.359***	0.368***	0.203***	0.212***	0.309***	0.352***
	(0.053)	(0.058)	(0.053)	(0.059)	(0.07)	(0.08)
Recession	-0.033	-0.027	0.011	0.016	-0.037	-0.025
	(0.039)	(0.042)	(0.04)	(0.042)	(0.037)	(0.038)
Negative Shock × Recession		-0.047		-0.048		-0.169
		(0.124)		(0.131)		(0.15)
Wave	0.000	0.000	0.003	0.003	-0.065***	-0.065***
	(0.01)	(0.01)	(0.009)	(0.009)	(0.011)	(0.011)
Finance						
Total Household Income	-0.107***	-0.107***	-0.042*	-0.041*	-0.16***	-0.159***
	(0.022)	(0.022)	(0.021)	(0.021)	(0.024)	(0.024)
——Zero Income	-0.465	-0.464	-0.063	-0.062	-1.427***	-1.422***
	(0.284)	(0.284)	(0.256)	(0.256)	(0.324)	(0.324)
Total Net Household Wealth	-0.119***	-0.119***	-0.012***	-0.012***	-0.033***	-0.033***
	(0.011)	(0.011)	(0.003)	(0.003)	(0.004)	(0.004)
Labor Status (Ref = Employed)						
Retired	0.182***	0.182***	0.124*	0.124*	-0.061	-0.061
	(0.051)	(0.051)	(0.05)	(0.05)	(0.053)	(0.053)
Other	0.452***	0.452***	0.349***	0.349***	0.186*	0.186*
	(0.066)	(0.066)	(0.063)	(0.063)	(0.076)	(0.076)
Marital Status (Ref = not Partnered)						
Partnered	-0.743***	-0.743***	-0.971***	-0.971***	-0.881***	-0.881***
	(0.043)	(0.043)	(0.04)	(0.04)	(0.049)	(0.049)
Insurance (Ref = not Insured)						
Insured	-0.118**	-0.118**	-0.062†	-0.062†	-0.118**	-0.118**
	(0.038)	(0.038)	(0.037)	(0.037)	(0.042)	(0.042)

Demographics						
Black (versus non-Black)	-0.106 (0.067)	-0.106 (0.067)	-0.030 (0.055)	-0.030 (0.055)	0.004 (0.071)	0.004 (0.071)
Female (versus Male)	0.448*** (0.049)	0.448*** (0.049)	0.158*** (0.043)	0.158*** (0.043)	0.097† (0.051)	0.097† (0.051)
Age Group (Ref = 50-64)						
65-74	0.131* (0.055)	0.131* (0.055)	0.228*** (0.048)	0.227*** (0.048)	-0.212*** (0.056)	-0.212*** (0.056)
75-84	0.561*** (0.068)	0.561*** (0.068)	0.598*** (0.059)	0.598*** (0.059)	-0.139† (0.076)	-0.139† (0.076)
85 and over	0.901*** (0.127)	0.901*** (0.127)	0.812*** (0.109)	0.812*** (0.109)	0.103 (0.181)	0.102 (0.181)
Education (ref = Lower than High School)						
High School or GED	-0.555*** (0.06)	-0.556*** (0.06)	-0.208*** (0.051)	-0.208*** (0.051)	-0.310*** (0.066)	-0.311*** (0.066)
Some College	-0.673*** (0.068)	-0.673*** (0.068)	-0.331*** (0.058)	-0.331*** (0.058)	-0.408*** (0.072)	-0.408*** (0.072)
College & Above	-0.936*** (0.076)	-0.937*** (0.076)	-0.39*** (0.065)	-0.390*** (0.065)	-0.536*** (0.077)	-0.537*** (0.077)
Other CES-D Symptoms			0.838*** (0.01)	0.838*** (0.01)		
Intercept	-0.140 (0.27)	-0.143 (0.27)	-2.996*** (0.246)	-2.998*** (0.246)		
Observations	68,383	68,383	73,287	73,287	25,302	25,302
Groups	17,258	17,258	17,886	17,886	13,778	13,778