

Healthy Relationships: Examining Activities of Daily Living and Old Age Social Isolation

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Abstract

As the population in the United States ages, more individuals are expected to experience difficulties with activities of daily living (ADL). How do difficulties with ADLs affect social relationships? In this thesis, I draw on several theoretical perspectives to explore how ADL difficulties might relate to social isolation. Specifically, I consider how resource constraints, stress effects, health burdens, and "dose-response" effects might impact relationships with others. Using data from the Wisconsin Longitudinal Study, I separately examine associations between ADL difficulties and social isolation from family and friends when participants were in their 70s, and in a supplemental analysis, I explore associations between ADL difficulties and loneliness when respondents were in their 80s. I find that having an ADL difficulty is more detrimental to friendship ties than family ties, financial hardships and stress negatively impacts friendships, and having ADL difficulties is positively associated with being lonely a decade later. Implications from this study are that families, societies, and policymakers need to prepare and be proactive in addressing ADL difficulties and social isolation.

Healthy Relationships: Examining Activities of Daily Living and Old Age Social Isolation

A Thesis

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Introduction

In 2020 one in six Americans were age 65 and older (Caplan 2023). This number is projected to grow as baby boomers, those born between 1946 and 1964, will all be 65 and older by the year 2030. The aging of the population is expected to put a burden on healthcare, families, and the economy as this cohort retires and becomes more dependent on family, friends, and outside resources for assistance with finances, healthcare, and daily needs (Badley et al. 2015). One notable aspect of an aging population is that difficulties with activities of daily living (ADL) and instrumental activities of daily living (IADL) become more common. ADLs are the skills necessary for an individual to manage their basic physical needs such as grooming, bathing, using the toilet, walking, and eating (Mlinac and Feng 2016), while IADLs require more cognitive skills to complete; for example, managing medications, using the telephone, and preparing meals (Mlinac and Feng 2016). Having difficulties in any of these areas can greatly affect an individual's quality of life and for those who do not have strong social ties, there may be increased burdens financially, emotionally, and physically as decisions are made on how best to meet needs.

How do difficulties with ADLs affect social relationships? While a large body of research considers how social isolation can impact health (Freak-Poli et al. 2021; Holt-Lunstad et al. 2015; Steptoe et al. 2013), few studies consider the reverse, how ADL difficulties might determine social isolation. This is surprising given the important role of health in forming and maintaining social relationships (Smith and Christakis 2008). Having difficulties with ADLs makes it physically difficult to participate in activities, can be stressful and create tension in relationships, and can lead to financial and time burdens that make it difficult to participate in social life.

In this thesis, I use data from the Wisconsin Longitudinal Study (WLS) to examine associations between ADLs and social isolation. In doing so, I contribute to understandings of the needs and challenges of senior citizens which has implications for how families, societies, and policymakers can be better prepared and proactive in addressing issues related to ADLs and social isolation before they overwhelm available resources. Moreover, as the United States population continues to age and ADLs become more common, this research is relevant to policies regarding expanding healthcare insurance to supplement Medicare and policies that could be put in place to provide more funding for nonprofit services. Additionally, this research points to upstream causes of poor health (e.g. access to health care, resources, or diet) that could be addressed to limit later life health problems, and in turn, later life social isolation and associated health problems.

Background

Social isolation, loneliness, and being alone are terms that are often used interchangeably, although they each have their own distinct characteristics. Loneliness is typically measured subjectively based on how the individual feels about the social relationships they have (CDC 2023). Thus, while an individual may be physically alone, they may not feel lonely if they are satisfied with the relationships they have; however, someone who may be surrounded and have close contact with others can still feel lonely if those social relationships are not meaningful or what they desire. Social isolation is often measured based on how much contact individuals have socially with others or by the presence of social ties that are available to provide resources (e.g. emotional support).

In this research, I focus on social isolation, measured as having a close confidant or someone with whom people can share private feelings. A rich literature in Sociology has explored social isolation through a similar lens. Some of the most influential studies in this area used a “name generator” to document an individual’s core discussion network. In these studies, respondents were asked to name the individuals they discussed personal matters with or to name the individuals they see the most often, leading them to think about those they are closest to. Core discussion networks are thought to consist of the closest family and friends that people depend on when there are serious matters to be discussed and consists of strong social ties that tend to be stable throughout one’s life (Small 2017:6).

Research on core discussion networks and other aspects of social isolation shows that the risk of social isolation is not evenly shared across population subgroups. Women, those who live alone, have no children, and are not married are most susceptible to social isolation (Berg-Weger and Morley 2020; Emerson et al. 2021; Gerst-Emerson and Jayawardhana 2015). Additionally,

those who are unemployed and have lower income levels and educational attainment have a higher risk of social isolation (Berg-Weger and Morley 2020; Emerson et al. 2021).

A number of studies show that loneliness and social isolation can worsen health. In particular, having strong social ties is associated with decreased risks for cardiovascular diseases, experiencing cognitive decline, and mortality (Rook and Charles 2017). Moreover, social isolation is associated with an increased risk of diabetes, anxiety, addiction, and depression (CDC 2003; Clair et al. 2021). Yet, there has not been as much research regarding how health might predict loneliness and the likelihood of having close social ties. The few studies that have considered health as a determinant of loneliness find that individuals who have health problems experience higher levels of loneliness than those without health problems (Gerst-Emerson and Jayawardhana 2015). These individuals also report low levels of perceived social support (e.g., having someone who would be there to help if needed or to be a listening ear) and social isolation compared to those without health problems (Emerson et al. 2021).

There are a few notable reasons to suspect an association between ADL difficulties and social isolation. In particular, having an ADL difficulty can be a burden that limits the ability to participate in social relationships, can limit the available resources (e.g. money, time) individuals have to invest in relationships, and can create stress and tension that spillover into personal relationships. Below, I elaborate on each of these perspectives, discuss how these theories guide my expectations related to the associations between ADL difficulties and social isolation, and also consider how the relationship between ADL difficulties and social isolation might differ across relationship ties (i.e. family ties vs friendship ties), and by the number of ADL difficulties reported.

The *resource constraint perspective* considers how the lack of resources – both money and time – limits the ability to invest in and maintain social relationships. Relationships tend to be motivated by the principle of reciprocity, the giving and receiving of mutual aid and support (Chandola, Marmot, and Siegrist 2007; Cook et al. 2013; Uehara 1990). For those with lower incomes, they can either be excluded from social networks due to their inability to provide reciprocal assistance or will withdraw themselves if they feel like they cannot provide adequate contributions to the relationship (Desmond 2012; Dominguez and Watkins 2012; Offer 2012). When individuals do not have the time to invest in or the money to spend on social activities, this can lead to the loss of social ties (Bianchi and Vohs 2016; Huxhold, Fiori, and Windsor 2022). Notably, those with lower incomes have a smaller social network consisting of family ties and those located in close proximity, while individuals with higher incomes have a wider diversity of social ties in terms of both relationship type and physical distance (Böhnke and Link 2017). This association between resources and social relationships has implications for associations between ADL difficulties and social isolation. Individuals who have difficulties with ADLs may face additional financial burdens through direct costs for medical treatment and healthcare spending, and indirect costs by necessitating purchasing services (e.g. cleaning, prepared meals) as well as loss of income if having ADL difficulties impacts the ability to work. ADL difficulties also creates time burdens as individuals may spend more time receiving health care or need increased rest. The resource constraint perspective, therefore, suggests that ADL difficulties will lead to an increased risk of social isolation because ADL difficulties limits resources that can be invested in social relationships.

The *stress perspective* examines how tension related to ADL difficulties can create strain in relationships. Stress can lead to experiencing more conflict in relationships and an overall

decline in feeling satisfied in relationships (Lau et al. 2019). Poor health can lead to experiencing stress, presenting as feelings of being overwhelmed, isolated, or anxious (Mayo Clinic 2023). These symptoms can spill over into relationships which may cause a deterioration in relationship quality and even loss of contact. This is a particular risk when an individual's health necessitates caregiving from social ties. Caregiving relationships often involve unmatched reciprocity between an individual and their caregiver, leading to burnout and strain in the relationship. Feelings of anger, frustration, impatience, or guilt are common amongst caregivers and patients as they navigate how to best provide care (Family Caregiver Alliance 2014). The stress perspective suggests that ADL difficulties will be associated with an increased risk of social isolation because of the anxiety and anger associated with having ADL difficulties that leads to a deterioration in relationship quality.

The *health burden perspective* explains how individuals with poor health are at a disadvantage in developing close social relationships (Tough, Siegrist, and Fekete 2017). As participating in social activities is important in building connections with others, those who are unable to do so due to their health miss out on valuable opportunities to bond with likeminded people. Those in poor health are also less likely to be employed, and employment is associated with higher morale and greater life satisfaction (Aquino et al. 1996). In short, having ADL difficulties can make it difficult to physically participate in routine activities (e.g. going to work, participating in hobbies), and participating in activities is vital in developing strong relationships. As a result, the health burden perspective suggests that those with ADL difficulties will be less likely to have close social ties, independent of resource constraints or heightened stress.

While these perspectives suggest that ADL difficulties will affect social relationships, it could be that these difficulties have differential effects across different types of social ties,

namely family ties and friendships ties. Relatives tend to provide unconditional support while friends may not feel obligated to provide that same support (Rozer, Mollenhorst, Poortman 2016; Böhnke and Link 2017). More generally, there is research that suggests poor health itself can be stigmatizing (Akbari et al. 2023; Hatzenbuehler, Phelan, and Link 2013) - people may be embarrassed by their ADL limitation (e.g. not being able to walk/bathe/eat) and that may lead them to withdraw from friendship ties, but not family. In such cases that an individual needs additional support, they are more likely to rely on family members as they may feel it is less of a burden to ask them for help and does not require the same level of reciprocity that friendships may expect. As a result, individuals with ADL difficulties may retreat from their friends, but draw closer to family.

Finally, it could be the case that the number of ADL difficulties matter. In medicine, this is often referred to as a dose-response relationship—it may matter how much of a medication a person receives, not just whether someone receives a particular medicine or not. For ADLs, experiencing multiple limitations may exacerbate stress, constraints, and the ability to participate in activities in ways that experiencing one ADL difficulty does not. In essence, having multiple ADL difficulties might affect an individual more than just having one.

Data and Methods

I draw data from the Wisconsin Longitudinal Study (WLS), a longitudinal study of Wisconsin high school graduates that began in the 1950s (Herd, Carr, and Roan 2014). At the initial wave of data collection, a random sample of one-third of all Wisconsin high school graduates from the class of 1957 were selected to be part of the study (Herd et al. 2014). The baseline cohort consisted of 10,317 Wisconsin high school graduates, born between 1938 and 1940 (Herd et al. 2014).

Follow up interviews were conducted in 1964 (with the parents of the graduate), 1975, 1992, 2004, 2011, and 2020. Health questions were first asked in the 1992 survey (Herd et al. 2014) and then again in later waves. However, the health question and response options were inconsistent across waves. As a result, I focus on the 2011 wave to measure associations between an individual's ADLs and social isolation in their 70's. Additionally, in a supplemental analysis, I use the 2020 wave to measure loneliness when respondents are in their 80's.

At the time of the 2011 survey, 2,049 members of the cohort had died, 940 refused to participate, 96 could not be contacted, and 2,519 are lost because of missing data on individual items. The sample size is 4,713, losing approximately 54% of the original cohort.

Outcome Variables

I use two variables to measure social isolation from the 2011 wave when the respondents were 72. The first question asked graduates, "Is there a person in your family with whom you can really share your very private feelings and concerns?" Next, they were asked, "Is there a friend outside your family with whom you can really share your very private feelings and concerns?" Both questions had answer choices as either "yes" (1) or "no" (0). Like core discussion network questions, this question captures if a participant has any close social ties. This is significant

because those who report 0 or few ties are less likely to have someone to depend on in times of crises (McPherson, Smith-Lovin, and Brashears 2006).

In a supplemental analysis, I also use an item from the 2020 wave to measure loneliness. Specifically, respondents were asked, “On how many days during the past week did you feel lonely?” I combined 1-7 days as “1” and 0 days as “0” to create a dummy variable that captures any loneliness. Importantly, this question was asked at the height of the COVID-19 pandemic when many states had issued stay at home orders and individuals were required to remain indoors, often socially distanced from one another.

Health Variables

To measure respondent health, I use measures of ADLs from the 2011 wave. The survey asked graduates, “If because of a health or mental problem, [do you] have difficulty with dressing, walking, bathing, eating, getting in or out of bed, preparing a hot meal, shopping for groceries, making telephone calls, or taking medications?” For each activity, possible survey answers were “yes,” “can’t do,” “don’t do,” or “no.” I combined “yes” and “can’t do” to show respondents have difficulty, while I combine “no” and “don’t do” responses to indicate the graduate does not have difficulty in that area. I created a count variable that combines all ADL variables, coded as graduates having “zero”, “one”, “two”, or “three +” limitations, and I also created a dummy variable that measures if a respondent has at least one limitation (1) or zero (0).

Control Variables

To account for resource constraints, respondents were asked, “How difficult is it for you (and your family) to meet the monthly payments on your bills?” Answers included “extremely

difficult,” “very difficult,” “somewhat difficult,” and “slightly difficult,” which were combined into “yes, there are difficulties” (1), and “not at all difficult” was coded as “0”.

To account for the stress perspective, participants were asked a series of questions on how they have felt or behaved in the past week with a focus on anxiety and anger, known as the Spielberger Anxiety Index and Spielberger Anger Index. These scales rely on respondents' self-report and measure their feelings and emotions at a specific point in time (Spielberger and Reheiser 2009). Each set of questions was summarized into one variable per topic, with anxiety ranging from a score of 0-47 and anger from 0-49.

I also include control variables for marital status (married; widowed, divorced, or separated; never married), education (high school graduate, some college/associate's degree, college graduate), gender, number of children (0, 1, 2, 3, 4, 5+), employment status (employed or not employed), and annual household income divided by \$1,000.

Findings

Descriptive Statistics

Table 1 shows the percentage of respondents experiencing different ADL difficulties. In 2011, 12% reported having at least one difficulty while it was uncommon for participants to report multiple difficulties. Having trouble dressing and walking were the most common difficulties (5% and 4%, respectively) while eating, cooking, using the telephone, and taking medications were the least reported (1% each).

[Table 1 here]

Table 2 reports descriptive statistics for the full sample (Column 1) and also separately for those with and without ADL difficulties (Columns 2 and 3). The majority of the participants were female (54%), high school graduates (54%), and married (73%). Most had two or three children (26% and 27%, respectively), were not employed (73%), and 29% reported having trouble paying their bills. The average annual income was \$55,520. The mean numbers reported for anger index was 2.89 (SD=4.73) and anxiety index was 6.87 (SD=7.57).

In 2011, 88% of the respondents reported having at least one family member they can share their private feelings and concerns with, and 65% reported having a close friend with whom they could do the same. Overall, having close family ties is more common than close friend ties, and social isolation is relatively low among family relationships but higher amongst friendships.

There were notable differences between those with and without at least one ADL difficulty. Those with at least one ADL difficulty had a lower average income, had lower educational attainment, were less likely to be married, and less likely to be employed.

Additionally, respondents with at least one ADL difficulty had higher rates of trouble paying bills, had a higher anger score and a higher anxiety index score. They were also less likely to report having a close friend or family.

[Table 2 here]

Multivariable Analysis

Table 3 presents results from logistic regression models that estimate the likelihood of having a close family member to share very private feelings and concerns with. In the first column, the coefficient for having an ADL difficulty approached statistical significance ($p < .10$) when not controlling for having trouble paying bills, anger index, or anxiety index; however, the coefficient for having an ADL difficulty was not statistically significant when those were accounted for (Column 2). In both columns, relative to married participants, those who were widowed, divorced, or separated were less likely to have a close family member ($p < .001$), as were those who were never married ($p < .001$). While the coefficient for education approached statistical significance ($p < .10$), there was not a statistically significant difference between educational categories. Women were more likely to have a close family member than men ($p < .001$) and respondents with children were more likely to have a close family member than respondents without children. In the second column, the estimates show that those who had trouble paying bills were less likely to have a close family member ($p < .05$), and both anger ($p < .05$) and anxiety ($p < .001$) were negatively associated with having a close family member. Overall, results from these columns show that the coefficient for having an ADL difficulty approached statistical significance in Column 1, but not Column 2, suggesting a negative relationship with having a close family member; however, once we accounted for having trouble

paying bills, anger, and anxiety, there was no relationship between ADL and having a close family member.

Columns 3 and 4 test the dose-response hypothesis. The coefficient for having three or more ADL difficulties approached statistical significance ($p < .10$) when not controlling for having trouble paying bills, anger index, or anxiety index (Column 3). However, when controlling for these characteristics (Column 4), the coefficient was not statistically significant. Consistent with the estimates in Columns 1 and 2, compared to those who were married, those who were widowed, divorced, or separated were less likely to have a close family member ($p < .001$), as well as those who were never married ($p < .001$). The coefficient for college graduates in Column 3 approached statistical significance ($p < .10$), however no statistically significant differences were found. Women and those with children were more likely to report having a close family member compared to men and those without children ($p < .001$). In the fourth column, the estimates show that those who have trouble paying bills and anger were less likely to have a close family member ($p < .005$), as well as those with anxiety ($p < .001$). In summary, while having three or more ADL difficulties approached significance in Column 3 when not controlling for having trouble paying bills, anger index, or anxiety index, there were no statistically significant differences found; therefore, these findings were not consistent with a dose-response relationship for having a close family tie.

[Table 3 here]

Table 4 presents results from logistic regression models that estimate the likelihood of having a close friend to share very private feelings and concerns with. In the first column, when not controlling for having trouble paying bills, anger index, or anxiety index, having an ADL was negatively associated with having a close friend ($p < .05$), and the coefficient for having an ADL

difficulty approached statistical significance ($p < .10$) when controlling for trouble paying bills, anger index, or anxiety index in Column 2. Compared to those who were married, participants who were widowed, divorced, or separated were more likely to have a close friend ($p < .001$), as were those who were never married ($p < .01$). Relative to high school graduates, those who graduated from college were more likely to have a close friend ($p < .001$). Women were more likely than men to have a close friend ($p < .001$) as well as those with higher incomes ($p < .001$). Anxiety, but not anger, was negatively associated with having a close friend ($p < .001$).

In columns 3 and 4 in Table 4, having three or more difficulties was negatively associated with having a close friend ($p < .05$). Consistent with columns 1 and 2, respondents who were widowed, divorced, or separated were more likely than those who were married to have a close friend ($p < .001$), as were those who were never married ($p < .01$). College graduates, compared to high school graduates, were positively associated with having a close friend ($p < .001$) as were females compared to men ($p < .001$). Participants with higher incomes were more likely to have a close friend ($p < .001$), and those with anxiety were less likely to have one ($p < .001$). To summarize, there is some evidence that having ADL difficulties weakens friendship ties when accounting for having trouble paying bills, anger, and anxiety ($p < .10$), and the findings are consistent with dose-response relationship in that having three or more ADL difficulties is negatively associated with having close friendship ties.

[Table 4 here]

Table 5 presents results from a supplemental analysis. These logistic regression models estimate the likelihood of experiencing loneliness in 2020 when respondents were in their early 80s. The independent variables measure respondent characteristics in 2011, when respondents were in their 70s. In column 1, not controlling for having trouble paying bills, anger index, and

anxiety index, having an ADL difficulty was positively associated with being lonely ($p < .001$). In column 2, when trouble paying bills, anger index, and anxiety index are in the model, the association between having an ADL difficulty is weakened but remains statistically significant ($p < .05$).

In columns 3 and 4, having one ADL difficulty is positively associated with being lonely when not controlling for having trouble paying bills, anger index, and anxiety index ($p < .001$), while the same is true when controlling for them ($p < .05$). The lack of statistical significance for having multiple ADL difficulties may be due to a lack of power as of those who participated in the 2020 survey, only 67 had multiple ADL difficulties.

[Table 5 here]

Discussion

As the United States population continues to grow older, there is an expectation that the financial, healthcare, and daily needs of the elderly population will put a burden on society (Kahana and Kahana 2014; Knickman and Snell 2002). This is significant as all baby boomers will be 65 and older by 2030, equaling 20 percent of the population. An aging population means that there will be more health problems and an increase in people experiencing ADL difficulties (Maresova et al. 2019). For those who are socially isolated, there is an increased risk of cardiovascular diseases, diabetes, or early mortality (House, Landis, and Umberson 1998; Song et al. 2023).

In this thesis, I used data from the Wisconsin Longitudinal Study to examine associations between ADLs and social isolation. It was uncommon for participants in this study to have an ADL difficulty, with only 12% reporting so, and even less likely for them to experience more than one difficulty. The relationship between having an ADL difficulty and having a close family member approached statistical significance when not accounting for having trouble paying bills, anger, and anxiety, but was not significant once controlling for those items. This suggests that the stress perspective and resource constraints perspective are important when looking at how health is related to social isolation from family. This result also shows that family ties tend to be strong and resilient against the effects of having difficulties with ADLs. This is consistent with previous research that suggests strong social ties are reliable and very supportive while weaker ties tend to not provide as much support (Small 2017:17).

When not accounting for having trouble paying bills, anger, and anxiety, having an ADL difficulty was negatively associated with having a close friend. When controlling for these, there was still a negative association found, although the effect size was weakened. This is consistent

with the health burden perspective and suggests that the stress perspective and resource constraints perspectives are important for understanding this association. Moreover, I found that having three or more ADL difficulties was negatively associated with having a close friend, which is consistent with a dose-response relationship.

In the supplemental analysis, I examined associations between ADL difficulties when respondents were in their 70s and experiencing loneliness in their 80s. Having an ADL difficulty was positively associated with being lonely even after accounting for having trouble paying bills, anger, and anxiety. When looking at the dose-response relationship, I found that just having one ADL difficulty was associated with an increased risk of loneliness but not multiple ADLs, although this may be because there were only 67 respondents with multiple ADL difficulties that completed the 2020 survey.

Overall, this thesis documents three notable findings. First, having an ADL difficulty matters more in friendship ties than family ties. Second, ADL difficulties can impact friendships even when accounting for stress and financial hardships. Third, ADL difficulties can have lasting impacts as shown in the supplemental findings that having a difficulty is positively associated with being lonely nearly a decade later.

Other findings were consistent with past research on social isolation. Being married has been shown to reduce non-spousal ties (Gerstel and Sarkisian 2006) and this study shows that those who are unmarried are more likely to report having a close friend, and those who are widowed, divorced, or separated report higher instances of loneliness. Higher levels of education have been associated with a greater network of non-kin relationships (Fischer 1982:92), and research in core discussion network finds that one's circle expands as they become more educated (Marsden 1987). Consistent with these studies, I find that college graduates are more

likely to report having a close friend compared to other educational levels. Additionally, women are more likely to have close friendship ties than men, which follows previous research suggesting that women have more intimate and open relationships compared to men (Caldwell and Peplau 1982).

While this study documents important findings, there are limitations. First, most respondents are non-Hispanic White, and all graduated from high school. This limits the generalizability of the findings. Nonetheless, while the sample is not very diverse, 67% of Americans born in the late 1930's fit the WLS sample, and this sample can provide important information about this cohort (Herd et al. 2014). Second, the survey questions regarding health were not consistent across all waves, therefore, I was unable to take full advantage of the WLS being a longitudinal study. As a result, I cannot establish temporal order in my main analysis. It could be that being socially isolated leads to having ADL difficulties; however, the findings from the supplemental analysis, which uses ADLs when respondents were in their 70s to predict loneliness when respondents were in their 80s, shows that having ADL difficulties is positively associated with being lonely years later.

A third limitation is that respondents self-reported difficulties with ADLs. There is a possibility that people who do have ADL difficulties answered no to these questions, resulting in there being an underreporting of individuals who have difficulties. If this is the case, then this study may underestimate the effects of ADL difficulties on social isolation. Finally, my study only looks at a particular form of social isolation – having a close family member or friend to share private feelings and concerns with and ADL difficulties may impact social relationships in ways I am not capturing. For example, individuals who have difficulties with ADLs may be less likely to spend time with others or might have one close family or friend to share private feelings

with but not several. Additional research that considers other forms of social isolation and the quality of social relationships is needed.

Despite these limitations, this study addresses areas of concern regarding older adults who have ADL difficulties and are at an increased risk of being socially isolated or lonely. One way to help older adults with ADL difficulties is to expand healthcare insurance to supplement Medicare. As Medicare does not cover vision, hearing, or dental care and many fall in the 'donut hole' of not having their prescriptions paid for, it is important for there to be an affordable supplementary insurance to fill in those gaps (AARP 2023; UHC 2024). Having additional out of pocket health expenses could be detrimental for those with ADL difficulties as this could lead to greater resource constraints and fewer resources to invest in maintaining relationships.

Additionally, these findings point to an important role for nonprofit organizations. Nonprofit organizations provide vital services to their communities and can help foster social relationships and connections for those at risk of isolation (Ressler et al. 2021). One example is Meals on Wheels, a program that delivers food to low-income older adults who are unable to leave their homes. Not only does this allow them to save money on meals, but they are able to stay socially connected to the volunteers who deliver the meals, which is especially important for those who have no other social ties. Senior centers are also important for social connection as they provide a place for older adults to come together and foster friendship ties. For those with ADL difficulties, many senior centers offer exercise programs that are designed specifically for their needs. Nonprofits that serve the elderly and disabled populations understand that success is broader than their intended purposes. For example, Meals on Wheels is not just about delivering food, it is also about fostering social relationships, and it is imperative that nonprofit funding is prioritized.

The aging population is increasing in size and people are living longer. As a result, future generations are more likely to live more years with ADL difficulties. My research looked at people born in the 1930s, but if we looked at those born in the 1960s and later, demographic trends suggest social isolation might be even greater as more people are aging alone, divorcing at later ages, and are having fewer children (Brown and Lin 2022; Carney 2016; Kearney, Levine, and Pardue 2022). Insights learned from the WLS cohort could be used to minimize social isolation as younger cohorts enter older ages.

Finally, this research shows that having an ADL difficulty is associated with a decreased likelihood of having close friendship ties. Addressing the upstream causes of poor health can lessen later-life social isolation. Social determinants of health (e.g. access to health care, housing, and food) can follow an individual throughout their life, as what is experienced in mid-life may impact these same issues in later years (Lachman, Teshale, and Agrigoroaei 2015). In general, a focus on improving the nation's health at all ages, not just the elderly, could decrease social isolation at older ages. Addressing these upstream causes of poor health is important as preventing poor health can limit an individual's chance of social isolation, which in turn helps prevent other health problems from developing.

Table 1: Descriptive Statistics of 2011 Activities of Daily Living

2011 Activities of Daily Living	Percent
Dressing	5
Walking	4
Bathing	2
Eating	1
Getting In/Out of Bed	2
Getting On/Off Toilet	3
Cooking	1
Shopping	2
Using Telephone	1
Taking Medications	1
Have at Least 1 Difficulty	12
Number of Difficulties	
0	88
1	7
2	2
3+	2

Note: N=4,713

Table 2: Descriptive Statistics of Dependent and Control Variables

2011 Outcomes	All (N=4,713)		Individuals With at Least 1 Difficulty (N=555)		Individuals with 0 Difficulties (N=4,158)	
	Percent/Mean	Std Dev	Percent/Mean	Std Dev	Percent/Mean	Std Dev
Close Family	88		85		89	
Close Friend	65		60		65	
Annual Income (in \$1,000s)	55.52	44.10	46.59	38.24	56.71	44.69
Female	54		57		54	
Education						
High School	54		60		53	
Some College/Assoc. Degree	16		15		16	
College	30		25		31	
Marital Status						
Married	73		69		74	
Widowed, Divorced, Separated	24		27		23	
Never Married	3		5		3	
Children						
0	6		8		6	
1	5		6		5	
2	26		22		27	
3	27		26		27	
4	18		20		18	
5+	18		19		18	
Employment						
Employed	27		17		29	
Not Employed	73		83		71	
Trouble Paying Bills	29		47		26	
Anger Index	2.89	4.73	4.36	6.23	2.70	4.45
Anxiety Index	6.87	7.57	10.02	9.33	6.45	7.20

Table 3: Logistic Regressions Predicting Having a Close Family Member

	b/se	b/se	b/se	b/se
Has ADL Difficulty (Ref: No)	-0.258+ (0.134)	-0.034 (0.140)		
ADL Count (Ref: 0)				
1			-0.248 (0.163)	-0.077 (0.167)
2			0.004 (0.329)	0.285 (0.339)
3+			-0.499+ (0.272)	-0.149 (0.282)
Trouble Paying Bills		-0.212* (0.104)		-0.213* (0.104)
Anger Index		-0.020* (0.010)		-0.020* (0.010)
Anxiety Index		-0.038*** (0.007)		-0.038*** (0.007)
Marital Status (Ref: Married)				
Widowed, Divorced, Separated	-0.696*** (0.108)	-0.702*** (0.110)	-0.700*** (0.108)	-0.705*** (0.110)
Never Married	-1.005*** (0.266)	-0.996*** (0.269)	-1.001*** (0.266)	-0.990*** (0.269)
Education (Ref: High School Grad.)				
Some College/Assoc. Degree	-0.210+ (0.126)	-0.213+ (0.128)	-0.202 (0.126)	-0.206 (0.128)
College Graduate	0.211+ (0.118)	0.181 (0.120)	0.213+ (0.118)	0.183 (0.120)
Female	0.529*** (0.098)	0.570*** (0.100)	0.529*** (0.098)	0.569*** (0.100)
Children (Ref: 0)				
1	0.730* (0.285)	0.739* (0.288)	0.737** (0.285)	0.745** (0.288)
2	0.819*** (0.228)	0.800*** (0.230)	0.829*** (0.228)	0.807*** (0.231)
3	0.833*** (0.227)	0.822*** (0.229)	0.835*** (0.227)	0.823*** (0.230)
4	0.865*** (0.238)	0.864*** (0.241)	0.876*** (0.239)	0.869*** (0.241)
5+	0.842*** (0.237)	0.877*** (0.240)	0.845*** (0.237)	0.880*** (0.240)
Employment (Ref: Employed)	-0.005 (0.106)	0.016 (0.108)	-0.005 (0.106)	0.015 (0.108)
Income	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Constant	1.171*** (0.237)	1.613*** (0.245)	1.168*** (0.237)	1.612*** (0.245)

Note: + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. N=4,713

Table 4: Logistic Regressions Predicting Having a Close Friend

	b/se	b/se	b/se	b/se
Has ADL Difficulty (Ref: No)	-0.229*	-0.172+		
	(0.098)	(0.100)		
ADL Count (Ref: 0)				
1			-0.099	-0.060
			(0.122)	(0.123)
2			-0.355	-0.290
			(0.219)	(0.220)
3+			-0.529*	-0.430*
			(0.207)	(0.211)
Trouble Paying Bills		0.036		0.039
		(0.074)		(0.074)
Anger Index		0.005		0.005
		(0.008)		(0.008)
Anxiety Index		-0.021***		-0.021***
		(0.005)		(0.005)
Marital Status (Ref: Married)				
Widowed, Divorced, Separated	0.566***	0.570***	0.564***	0.568***
	(0.084)	(0.084)	(0.084)	(0.084)
Never Married	0.715**	0.746**	0.709**	0.739**
	(0.265)	(0.266)	(0.265)	(0.266)
Education (Ref: High School Grad.)				
Some College/Assoc. Degree	0.121	0.122	0.123	0.124
	(0.092)	(0.092)	(0.092)	(0.093)
College Graduate	0.359***	0.349***	0.359***	0.350***
	(0.079)	(0.080)	(0.079)	(0.080)
Female	1.166***	1.192***	1.170***	1.195***
	(0.067)	(0.068)	(0.067)	(0.068)
Children (Ref: 0)				
1	-0.231	-0.242	-0.229	-0.240
	(0.234)	(0.234)	(0.234)	(0.234)
2	-0.031	-0.047	-0.023	-0.040
	(0.200)	(0.201)	(0.200)	(0.201)
3	-0.013	-0.030	-0.010	-0.026
	(0.200)	(0.200)	(0.200)	(0.200)
4	0.041	0.029	0.051	0.038
	(0.205)	(0.206)	(0.205)	(0.206)
5+	-0.022	-0.033	-0.020	-0.031
	(0.205)	(0.205)	(0.205)	(0.205)
Employment (Ref: Employed)	0.068	0.070	0.066	0.068
	(0.074)	(0.074)	(0.074)	(0.074)
Income	0.003***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-0.034+	-0.261	-0.389+	-0.269
	(0.205)	(0.208)	(0.205)	(0.208)

Note: + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. N=4,713

Table 5: Logistic Regressions Predicting Loneliness

	b/se	b/se	b/se	b/se
Has ADL Difficulty (Ref: No)	0.643*** (0.161)	0.406* (0.169)		
ADL Count (Ref: 0)				
1			0.679*** (0.191)	0.497* (0.199)
2			0.564 (0.357)	0.119 (0.386)
3+			0.573 (0.413)	0.321 (0.430)
Trouble Paying Bills		0.312** (0.119)		0.316** (0.119)
Anger Index		0.131* (0.014)		0.031* (0.014)
Anxiety Index		0.047*** (0.008)		0.048*** (0.008)
Marital Status (Ref: Married)				
Widowed, Divorced, Separated	0.289* (0.122)	0.305* (0.126)	0.288* (0.122)	0.303* (0.126)
Never Married	0.615 (0.415)	0.566 (0.422)	0.609 (0.416)	0.543 (0.423)
Education (Ref: High School Grad.)				
Some College/Assoc. Degree	-0.283+ (0.159)	-0.285+ (0.163)	-0.284+ (0.159)	-0.287+ (0.163)
College Graduate	-0.129 (0.127)	-0.075 (0.130)	-0.129 (0.127)	-0.075 (0.130)
Female	0.541*** (0.115)	0.493*** (0.118)	0.542*** (0.115)	0.496*** (0.118)
Children (Ref: 0)				
1	0.514 (0.394)	0.508 (0.403)	0.509 (0.394)	0.492 (0.404)
2	0.224 (0.341)	0.248 (0.347)	0.221 (0.341)	0.235 (0.347)
3	0.348 (0.339)	0.401 (0.344)	0.345 (0.339)	0.389 (0.345)
4	0.132 (0.349)	0.150 (0.355)	0.130 (0.349)	0.141 (0.356)
5+	0.295 (0.348)	0.321 (0.355)	0.290 (0.349)	0.306 (0.355)
Employment (Ref: Employed)	0.113 (0.117)	0.074 (0.120)	0.113 (0.117)	0.073 (0.120)
Income	-0.002 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.001 (0.001)
Constant	-1.904*** (0.354)	-2.437*** (0.366)	-1.902*** (0.354)	-2.430*** (0.366)

Note: + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. N=2,299

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