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KYUNG WON CHOI

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Abstract

Social relationships play a crucial role in shaping the health and well-being of older adults. Despite extensive research on the benefits of social connectedness, changing social and demographic trends require a reassessment of how we measure and understand these relationships. Utilizing data from the National Social Life, Health, and Aging Project (NSHAP), this dissertation explores potential changes in social connectedness to provide a nuanced understanding of their implications for older adults' well-being. The first study examines the distinct role of in-person contact in maintaining healthy behaviors during the COVID-19 pandemic. The findings reveal that decreases in in-person interactions are associated with worsening health behaviors, even with the increased use of remote modes of contact, underscoring the unique importance of in-person interactions for older adults' health and well-being. The second study investigates the links between marital history and the availability and stability of parent-child ties. The results show that remarried older adults generally have more unstable ties with their children compared to those who are continuously married or widowed. The study highlights that cumulative marital transitions can disrupt intergenerational network ties, potentially leading to social disconnectedness from children. The final study explores cohort differences in social connectedness and their association with mental health outcomes among Baby Boomers. Baby Boomers reported lower support from family and friends and higher family strain compared to the Silent Generation. Social relationship quality partially accounted for Baby Boomers' poorer mental health, suggesting that a decline in social connectedness in terms of relationship quality may contribute to such mental health issues. In sum, these studies show the evolving nature of social relationships among older adults and emphasize that understanding how

social connectedness varies over time and across different contexts is essential for promoting health and well-being in later life.

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CHAPTER 1

Introduction

An extensive body of research has established that social relationships play a significant role in older adults' health and well-being. Individuals who are more socially connected to their family, friends, and community experience better health outcomes (Kawachi and Berkman 2001; Thoits 2011; Y. C. Yang et al. 2016) and increased longevity (Holt-Lunstad, Smith, and Layton 2010) compared to their socially isolated counterparts. Given its importance, researchers have striven to accurately measure social relationships and assess social connectedness.

Some studies focus on the structural or quantitative aspects of social relationships, such as the number of significant social ties, the frequency of contact with these ties, and participation in social activities, such as attending group meetings, and involvement in social institutions, such as marriage (B. Cornwell et al. 2021). The general idea is that those with larger social networks and more frequent involvement with others are better socially connected. At the same time, other research incorporates the quality of social relationships in examining social connectedness, as the presence or the number of social ties does not necessarily guarantee feelings of social support or the exchange of social resources (E. Y. Cornwell and Waite 2012). Feelings of social support and emotional closeness without experiencing social strain from social ties indicate better social connectedness.

Using these various measures, social gerontologists describe older adults' social relationships as constantly changing yet maintaining overall stability. Older adults are exposed to life events that can potentially lead to social isolation, such as retirement and the loss of a spouse. However, research shows that older adults' networks do not continuously diminish but instead older adults replenish lost ties (B. Cornwell and Laumann 2018; B. Cornwell, Goldman,

and Laumann 2021; Offer and Fischer 2022). Notably, this "rebalancing" is also observed in older adults' involvement with social activities (Cornwell et al. 2021). Additionally, regarding the quality of relationships, research documents that perceptions of support tend to increase with age (Schnittker 2007), possibly because older adults prioritize emotionally fulfilling relationships over casual, peripheral ties (English and Carstensen 2014).

Existing research on social connectedness and well-being in later life provides a comprehensive understanding of how social relationships are linked to well-being. However, social relationships are dynamic, constantly shaped by evolving social and demographic trends. This means that the ways they develop and impact well-being can differ over time and across different contexts (Waite et al. 2021). The dynamic nature of social relationships raises two key considerations for research. First, research needs to examine whether social connectedness itself is changing. For instance, increasing divorce rates and diverse family forms may have weakened traditional bonds, potentially leading to a decline in social connectedness with family but stronger connectedness with friends (Fiori et al., 2020). Second, well-established measures of social connectedness may need reassessment. Existing measures might not be suitable in changing contexts, and new conceptualizations could offer fresh insights into the link between social connectedness and well-being.

This dissertation aims to address these two key considerations—potential changes in social connectedness and the need to reassess existing measures of social connectedness—and how they relate to older adults' well-being. To achieve this, three empirical studies are carried out using data from the National Social Life, Health, and Aging Project (NSHAP), a nationally representative, longitudinal dataset that enables an in-depth exploration of various dimensions of social connectedness and well-being among older adults.

The first two papers (Chapters 2 and 3) are more closely related to the reassessment of existing measures. The first paper separates in-person social contact from other remote modes of social contact and examines how in-person contact is linked to health behaviors during the COVID-19 pandemic. The second paper investigates intergenerational relationships by analyzing the parent-child social network tie within the parent's network and how this tie may be shaped by the parent's marital history. The last paper (Chapter 4) addresses the changing nature of social connectedness, exploring whether the poorer mental health of Baby Boomers compared to the previous generation can be attributed to cohort differences in social support and strain. Below, I detail the objectives and focus of each chapter.

My first paper (Chapter 2) questions the well-established contact frequency measure in the context of COVID-19. Contact frequency refers to the frequency of social interactions with others. It is considered an objective measure of social connectedness, as opposed to measures that involve individuals' personal assessment, such as perceived social support (Shor and Roelfs 2015). The underlying idea is that those who are in more frequent contact with emotionally close others are better socially connected. More frequent contact fosters greater affection, resulting in stronger bonds and increased potential for social support (Berkman et al., 2000). Conversely, individuals who are rarely in contact with others may be isolated, experience feelings of loneliness, and lack access to informal support and care (E. Y. Cornwell and Waite 2009).

Prior to COVID-19, the mode of contact was not differentiated when measuring contact frequency. This was the case for nationally representative studies of older adults, including the National Social Life, Health, and Aging Project (NSHAP) and the Health and Retirement Study (HRS). In NSHAP, contact frequency was measured separately for each social network member, while in HRS, it was measured by relationship type (e.g., family and friends). However, the

measure aggregated all modes of contact—whether in person, by phone, text, or email—into a single measure. The focus was on the frequency of contact, not the mode of communication.

With the outbreak of COVID-19, people were advised to stay at home to contain the spread of the virus. This greatly impacted in-person interactions but not other modes of contact. In this context, my first paper examines whether in-person contact is associated with older adults' health behaviors during the pandemic. The paper specifically focuses on in-person contact while accounting for increases in other modes of contact (e.g., phone, email, Skype) to determine if the lack of and/or decreases in in-person interactions are associated with older adults' health behaviors. This analysis was possible as national surveys such as NSHAP, recognizing the gravity of the situation, collected data on older adults' experiences during the pandemic, including frequency of contact measures separated by mode of contact. Combining this newly collected data with previous data collected in 2015, the paper differentiates between a decrease in in-person contact and infrequent in-person contact to assess their respective impacts on health behaviors.

The second paper (Chapter 3) explores the interplay between different forms of social connectedness. Specifically, it examines how older adults' marital history contributes to the availability and stability of the parent-child tie in the parent's social network in later life. Traditionally, being married is conceptualized as being socially integrated, but older adults today have increasingly diverse marital histories due to higher rates of divorce and repartnering (Brown and Lin 2012; Brown et al., 2018). The question here is: how do transitions in and out of marriage over the life course—events that likely disrupt social connections not only to the spouse but also to others—relate to an individual's connection to a key person in their life, their own child?

Research often recognizes social connectedness as a driver of health and well-being, linking marital history to various physical and mental health outcomes. However, social connectedness itself can also be considered a dimension of social health and well-being (Waite 2018; Waite, Duvoisin, and Kotwal 2021). The focus on the parent-child network tie is crucial for two reasons. First, adult children are an important source of informal support for parents as they age. Second, despite this importance, parent-adult child network ties have received little attention because the parent-child bond is often taken for granted. It is rarely assessed in terms of availability and stability. Instead, it is primarily examined in terms of the quality of the relationship and exchanges of support.

This examination of parent-child ties is linked to the growing interest in kinlessness, which refers to aging without a spouse or child. Research projects an increase in kinless older adults due to the growing aging population, with significant increases expected among those who never married or had children (Verdery and Margolis 2017). As older adults who lack kin are more likely to have worse health outcomes and have fewer economic resources, emerging studies have examined this growing population with various conceptualizations of kinlessness. For example, Patterson and Margolis describe "disconnected" older adults as those who do not report kin in their social network or do not report the residence of a child or a partner. Brown et al. (2022) estimated the prevalence of older adults without family of origin (i.e., biological parents and siblings) kin. Roofeh et al. (2020) used the term "elder orphan" to describe older adults who are physically or socially isolated without a caregiver.

Building on this prior work, this chapter asks if cumulative marital transitions over the life course leave some older adults *socially* childless. The paper aims to identify older adults who may be at risk of experiencing childlessness due to a lack of stable connections with their

children. It considers not listing any child in social networks and the high turnover of child network ties as a form of childlessness. Consistently mentioning children as social network members whom parents can talk to about important matters likely coincides with the availability and stability of support they can expect from their children.

The last paper (Chapter 4) explores cohort differences in social connectedness and how these differences may be associated with the mental health of Baby Boomers. This chapter departs from the previous chapters in that it is not about the measurement of social connectedness but about the changes in social connectedness across cohorts. The paper situates itself at the intersection of two ongoing literatures: the literature on the decline of social connectedness and the literature on the worsening health of older adults in the US. It aims to bridge these two lines of research and better understand the links between social connectedness and health among Baby Boomers.

The decline in social connectedness has been a subject of debate for a long time. Some argue that there is a decline in social connectedness, pointing to a decrease in the number of significant social ties (i.e., social networks) and informal and formal social participation (McPherson, Smith-Lovin, and Brashears 2006; Kannan and Veazie 2023; Putnam 2000). This debate is further complicated by demographic trends such as the rise in the never-married, smaller families, and individuals living alone, which have raised concerns about increased social isolation (I.-Fen Lin and Brown 2012; US Census Bureau 2023). Conversely, other research suggests that social connectedness has not declined and has remained stable (Ang 2019; Fischer 2011). However, the existing literature predominantly examines the structural features of social connectedness, often overlooking the qualitative aspects of social relationships. To address this gap, the fourth chapter focuses on social support and strain from family and friends, investigating

whether Baby Boomers experience more or less support and strain compared to the Silent Generation.

This focus on social support and strain from family and friends is particularly important in light of the worsening health trends among US adults. Studies have documented an increase in morbidity and mortality, especially among White individuals, including a rise in mental health issues such as depressive symptoms (Bishop et al., 2022; Case and Deaton 2015; Zheng and Echave 2021). The reasons behind the growing prevalence of mental health issues remain less known. Given the well-established link between mental health and the quality of relationships, this chapter's goal is to highlight the social factors that may be shaping Baby Boomers' mental health and explore whether the poorer mental health of Baby Boomers could be explained by cohort differences in social support and strain.

In sum, this dissertation aims to advance our understanding of social connectedness and its implications for older adults' well-being. By addressing both the potential changes in social connectedness and the need to reassess existing measures, this research explores the evolving nature of social relationships. The first paper refines the measure of contact frequency by differentiating between in-person and remote interactions, highlighting the impact of these distinctions on health behaviors during the COVID-19 pandemic. The second paper investigates the influence of marital history on the availability and stability of parent-child ties, shedding light on the unexplored dimension of social childlessness. The final paper bridges the literature on declining social connectedness and worsening health among older adults, focusing on cohort differences in social support and strain to explain the mental health issues faced by Baby Boomers. Collectively, these studies underscore the importance of considering both the structural

and qualitative aspects of social relationships to better understand their role in promoting health and well-being in later life.

CHAPTER 2

Social Isolation and Worsening Health Behaviors among Older Adults during the COVID-19 Pandemic[1]

Social isolation, the lack of sufficient close ties to others, can be detrimental to health and longevity, especially for older adults (Holt-Lunstad et al. 2015; Y. C. Yang et al. 2016). Social isolation may affect health and length of life in part by increasing risks of loneliness, anxiety and depression (Santini et al. 2020), which, in turn, damage health behaviors, such as physical activity (K. E. J. Philip et al. 2020; Schrempft et al. 2019), alcohol consumption (R. K. McHugh and Weiss 2019), smoking (Fluharty et al. 2017; K. E. Philip et al. 2022), and sleep (Benson et al. 2021; Yu et al. 2018).

The novel coronavirus disease 19 (COVID-19) pandemic profoundly altered social lives, physically isolating many individuals from family and friends outside their household. This led to dramatic declines in face-to-face – in-person – contact, leaving remote modes unaffected. These declines in in-person contact have been linked to poorer psychological well-being among older adults (Hawkley et al. 2021; Litwin and Levinsky 2021), but how in-person contact may be related to older adults' health behaviors during COVID-19 is less explored. Here we examine the association of social isolation during COVID-19 with worsening health behaviors, which play an important role in maintaining health (DiPietro 2001; Robbins et al. 2021; Rogers et al. 2005; Thun et al. 1997) and the potential mediating role played by emotional well-being in this process. We focus especially on declines in in-person social contact and compare contact with family members outside the household to contact with friends.

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The present study focuses on older adults as they have been at heightened risk of serious consequences of contracting COVID-19 and of the social isolation from efforts to reduce this risk. Using data from the National Social Life Health and Aging Study and the NSHAP COVID-19 substudy conducted in 2019/20, we addressed the overarching question: Did the declines in in-person contact with family and friends that accompanied the COVID-19 pandemic put older adults at risk of poor and worsening health behaviors? Did loneliness, anxiety, and depression mediate this relationship? In doing so, this study extends prior research by highlighting a specific form of social contact – in-person contact – and by exploring how limited in-person contact may have shaped older adults' health and well-being during the pandemic.

BACKGROUND

Social Isolation and Health Behaviors

Social isolation is a well-known risk factor for morbidity and mortality (Holt-Lunstad et al. 2015; Y. C. Yang et al. 2016) and health behaviors may be a potential pathway that links social isolation and health outcomes. According to Berkman et al. (2000)'s model of *Social Integration to Health,* health behaviors are the channels through which macro, mezzo, and micro mechanisms may affect health, including physical health and mortality. This model points to exercise, alcohol consumption, and smoking as important health behaviors. Regular physical activity has been shown to improve health and functioning (DiPietro 2001), whereas heavy alcohol consumption (Thun et al. 1997) and smoking (Rogers et al. 2005) damage health and increase risk of mortality. Poor quality sleep has recently come to the fore as an important negative health behavior, associated with increased morbidity and mortality (Robbins et al. 2021). Recent research finds that social isolation increases risks that people show reduced

objective physical activity (Schrempft et al. 2019), increase alcohol consumption (Ferrante et al. 2020), take up or continue smoking (Ikeda et al. 2021), and have poor sleep quality (McLay et al. 2021).

Several mechanisms are theorized to explain the association between social isolation and health behaviors. Socially isolated individuals are more likely than the well connected to lack social contacts that directly and indirectly promote healthy behaviors and inhibit harmful behaviors (Kobayashi and Steptoe 2018; Schrempft et al. 2019; Shankar et al. 2011). Specifically, socially isolated individuals may lack close contacts who can discourage risky health behaviors and encourage better ones through social control (Umberson 1992; Umberson, Crosnoe, and Reczek 2010). Isolated individuals may also have less access to resources from others, such as information and social support, which facilitate healthy behaviors (E. Y. Cornwell and Waite 2012; Goldman and Cornwell 2015). In addition, social connections can generate a sense of belonging and commitment to others, which in turn, can motivate individuals to avoid risky health behaviors (Berkman et al. 2000; Thoits 2011).

Emotional well-being is another important potential mediating factor that links social isolation to health behaviors and, importantly, functions as a pathway through which other mediators operate (Umberson, Crosnoe, and Reczek 2010). In community-dwelling species such as humans, being isolated from one's group is dangerous and can generate feelings of loneliness, anxiety, and depression (Robb et al. 2020; Santini et al. 2020). Such feelings can diminish one's motivation and energy to engage in healthy behaviors such as exercising and contribute to psychological distress which is associated with health-risk behaviors including heavy drinking and smoking (Jokela et al. 2020; Megherbi-Moulay et al. 2022). Poor emotional well-being can also generate stress which in turn, disrupts sleep quality (J. E. McHugh and Lawlor 2013).

Furthermore, feelings of loneliness, anxiety, and depression may arise from the lack of close contacts who can provide social support or sense of belonging, which are themselves mediators of the social isolation – health behaviors association. Thus, loneliness, anxiety, and depressive feelings may mediate the relationship between social isolation and health behaviors, in a process in which lack of social contact increases loneliness, anxiety and depressive symptoms, which then interfere with healthy behaviors. Indeed, these indicators of poor emotional well-being are associated with reductions in exercise (Hawkley, Thisted, and Cacioppo 2009), increases in alcohol use (R. K. McHugh and Weiss 2019), smoking (Fluharty et al. 2017) and greater risks of poor sleep (Benson et al. 2021).

Social isolation during COVID-19 appears to have had an adverse impact on older adults' emotional well-being (E. Y. Choi et al. 2021; Kim and Jung 2021). Relatedly, a recent literature points to changes in health behaviors during COVID-19 that may have resulted from increased social isolation. Physical activity seems to have declined among older adults early in the pandemic era (Hoffman et al. 2022; Lefferts et al. 2022), and one study in Japanese older adults (Otaki et al. 2022) found links between reduced in-person social contact and decreased physical activity. There is some evidence that U.S. older adults' frequency of drinking alcohol increased through the early months of the pandemic (Nordeck et al. 2022). Longitudinal assessments of smoking behavior and sleep during the pandemic are rare, but findings among U.K. older adults revealed an increase in the proportion of smokers as a consequence of the pandemic (Gaggero 2023), and subjective sleep quality declined among Brazilian older adults from pre- to post-pandemic—especially for those compliant with stay-at-home orders (Taporoski et al. 2022). While recent research has linked social isolation to emotional well-being and, separately, to health behaviors, studies have not examined emotional well-being as a potential mediator that

may explain the relationship between social isolation and changes in health behaviors during the pandemic.

In-Person Contact and Health Behaviors during COVID-19

The outbreak of COVID-19 significantly increased older adults' social isolation, particularly affecting in-person contact. Limited contact with others is a central indicator of social isolation and is closely associated with poor health and mortality (Shankar et al. 2011; Shor and Roelfs 2015). Berkman et al. (2000)'s model of *Social Integration to Health* describes in-person contact as a characteristic of network ties at the mezzo level. Mandates for social distancing — a shock at the macro-, sociostructural level of the model—resulted in changes in in-person social contact (mezzo level) for individuals during the pandemic. These changes in turn may have affected downstream health behaviors both directly and indirectly through the pathways mentioned above. For example, it is likely more difficult to monitor health behaviors such as regular physical activity or heavy drinking via remote contact than in-person. Also, older adults may be less motivated to follow norms about health behaviors since it is difficult to compare and match one's health behaviors to behaviors of similar others in reference groups when they cannot meet each other (Thoits 2011). However, previous research rarely distinguished between the various modes of contact, instead frequently aggregating in-person contact with remote modes like phone calls, text messages or video chats (E. Y. Cornwell and Waite 2009). We argue here that seeing others in person may carry benefits that are not replaced by remote forms of contact. Recent evidence shows that decreased in-person contact and increased remote modes of contact during COVID-19 are associated with worse emotional well-

being (N. G. Choi et al. 2022; Litwin and Erlich 2023). However, whether in-person contact is associated with health behaviors during the pandemic remains largely unexplored.

Social isolation in the form of limited in-person contact during the current pandemic could be experienced as rare in-person contact or as a decrease in in-person contact. Older adults with infrequent in-person contact likely have limited access to social ties that might provide direct support. They likely lack the companionship, instrumental or emotional support to maintain healthy behaviors. On the other hand, older adults who experience a decrease in in-person contact since the pandemic started may feel a sense of loss and may experience a disruption in their regular sources of social support and exchange. This may be particularly relevant to those who perceive this decrease. Feeling that there is a decrease in in-person visits during COVID-19 reflects an individual's self-assessment of disruption brought on by the pandemic. Importantly, decrease in in-person contact may be unrelated to infrequent in-person contact. That is, older adults who report a decrease in in-person contact may still be regularly meeting with their social ties. The difference in an individual's frequency of in-person visits before and during the pandemic might be small, but to the extent that these visits were an important part of their social life, the decrease may generate feelings of dissatisfaction and a sense of disconnection. Such feelings may be associated with health-compromising behaviors.

The COVID-19 disrupted many older adults' in-person interactions with their family and friends, who are central to older adults' social lives. Rarely seeing family and friends in-person and seeing family and friends in-person less often during the pandemic may adversely impact health behaviors, but different mechanisms may be involved for family and friends. Family members are more likely to provide instrumental support, as family relationships are characterized by norms and obligations (Silverstein, Gans, and Yang 2006). Resident and non-

resident family members, particularly adult children, indirectly affect health and health behaviors of older adults by providing help such as transportation and household work and resources such as information and emotional support (Choi et al., 2015; Schoeni et al., 2022). Family members may also directly regulate older adults' health by discouraging risky behaviors and encouraging beneficial ones (Umberson 1992). Friendships, on the other hand, are grounded on reciprocity and companionship, and maintained through shared activities and mutual interests (Pinquart and Sörensen 2000). While friends can facilitate health risk behaviors, such as heavy drinking (Vogelsang and Lariscy 2020) and smoking (Blok et al. 2017) to the extent these behaviors are 'social' activities, friend networks are also associated with health promoting behaviors, such as physical activity (Watt et al. 2014) and sleep quality (Mesas et al. 2020). Notably, the companionship and shared activities such as exercise classes or walks that characterize friendships were probably both restricted by pandemic lockdowns. Not being able to socialize with friends like they used to before the pandemic may have contributed to older adults' poor emotional well-being, which, in turn, may have increased the likelihood of engaging in health risk behaviors.

The Present Study

This study examines the role of in-person contact for poor and perceived worsening of health behaviors during the COVID-19 pandemic. Based on prior research and Berkman et al. (2000)'s model of *Social Integration to Health*, we hypothesized that 1) those who report that they rarely had in-person contact with family and/or friends will be more likely to engage in poor health behaviors net of previous levels; 2) Those who had less in-person contact with family and /or friends during the pandemic will be more likely to perceive that their health behaviors have

gotten worse during the pandemic; and 3) loneliness, anxiety and depressive symptoms will mediate some of the relationship between in-person contact and health behaviors during the pandemic.

METHODS

Data and Sample

This study uses data from the National Social Life, Health, and Aging Project (NSHAP) (Waite et al. 2021). NSHAP is a nationally representative, longitudinal study of community-dwelling older adults interviewed in person in 2005, 2010, and 2015 (O'Muircheartaigh et al. 2021). NSHAP focuses on the links between social well-being and other dimensions of health among older adults. Questions on social contact were asked in each round of the survey, as were questions on physical activity, alcohol consumption, smoking, and sleep. In response to the COVID pandemic, NSHAP designed a questionnaire that was administered via the web, phone or paper and pencil as respondents preferred. This NSHAP COVID-19 Substudy surveyed 2,672 older adults among 4,777 NSHAP respondents surveyed in 2015 (Round 3) between September 14, 2020, and January 27, 2021 (Response rate: 58.1%). The survey questionnaire for the NSHAP COVID study is available in NIH Disaster Research Response Resources (National Institutes of Health, 2020). Our analytic sample includes respondents born between 1920-1965 (age range: 55 – 99) who participated in both Round 3 NSHAP and the NSHAP COVID-19 substudy (N=2,549). Due to different levels of missingness across the dependent variables, the number of cases in the analysis varied across outcomes.

Measures

Dependent Variables

Poor Health Behaviors During the Pandemic. This study examines four health behaviors: physical activity, drinks per week, smoking status, and sleep quality. The first three health behaviors were measured nearly identically in Round 3 and in the COVID-19 substudy. Sleep quality was measured differently across the two time points, as we describe below.

Low physical activity. Respondents were asked: "On average during the past month, how often have you participated in vigorous physical activity or exercise?" The NSHAP Round 3 used the last 12 months as the time referent. Responses range from 'never' (=1) to '5 or more times per week' (=6), but we reverse-coded so that a higher value indicates lower levels of physical activity.

Drinks per week. We measured drinks per week by multiplying the responses for number of days per week during the past month the respondents had any alcohol and the number of drinks on the days that they had any alcohol. NSHAP Round 3 used the last 3 months as the time referent.

Current smoker. Respondents were asked how many cigarettes, cigars, pipes, or electronic cigarettes they smoked per day during the past month. NSHAP Round 3 asked whether the respondents smoked cigarettes, cigars, or a pipe at the time of the survey. We used these items to identify currents smokers at each time point.

Poor sleep. Sleep quality in the NSHAP COVID-19 substudy was assessed with the question "How often do you feel really rested when you wake up in the morning?" Responses range from 'never' (=1) to 'most of the time' (=4), but we reverse-coded so that a higher value indicates worse sleep quality.

Corresponding measures of physical activity, alcohol consumption, and smoking behavior from Round 3 are included in all models as baseline measures. Sleep quality at baseline was measured by asking respondents to rate the statement "my sleep was restless" on a 4-point scale ranging from 'rarely or none of the time' (=1) to 'most of the time' (=4).

Perceived Worsening of Health Behaviors Since the Pandemic Started. In the NSHAP COVID-19 substudy, after respondents reported frequency of physical activity, alcohol consumption, smoking, and feeling rested, they were asked whether this was "more", "less", or "about the same" (reference) as before the pandemic.

Independent Variables

Infrequent in-person contact in 2020. Respondents were asked how often they had in-person contact with non-household (1) family and, separately, (2) friends during a typical week since the pandemic started. Responses range from 'at least daily' (=1) to 'never' (=5). Older adults who meet family/friends in person less than once a week are considered as having infrequent in-person contact. We define infrequent in-person contact with family/friends as less than once a week.

Decreased in-person contact since the pandemic started. Follow-up questions asked whether in-person contact frequency with family/ friends represented an increase, decrease, or no change compared with pre-pandemic. We compare older adults who reported a decrease to those who reported otherwise.

Mediators

Loneliness. We use the 3-item UCLA loneliness scale that asked respondents how often they felt (1) left out, (2) isolated from others, and (3) lonely during the past month on a 4-point Likert scale ranging from 'never' (=0) to 'often' (=3). Total scores ranged from 0 to 9 with higher score indicating greater loneliness (Payne et al. 2014).

Anxiety. Anxiety was measured using the Generalized Anxiety Disorder scale-2 (GAD-2). Respondents were asked how often they have been bothered by (1) feeling nervous, anxious, or on edge and (2) not being able to stop or control worrying during the past month on a 4-point Likert scale ranging from 'not at all' (=0) to 'nearly every day' (=3). Total score ranged from 0 to 6, with higher score indicating greater anxiety.

Depressive feelings. Respondents were asked how often they felt depressed during the past month on a 4-point Likert scale ranging from 'rarely or none of the time' (=1) to 'most of the time' (=4).

Covariates

Sociodemographic factors included in the study are gender, age, race/ethnicity, educational attainment, and marital/partner status. All sociodemographic factors come from the COVID-19 substudy except educational attainment, which is taken from the NSHAP Round 3.

We control for increase in remote modes of contact by using six measures that asked respondents whether they experienced changes in contact frequency friends via (a) phone (b) messages (email, text, and social media) (c) video calls (e.g., Zoom and FaceTime) with nonresident (1) family and (2) friends. Respondents who reported an increase in contact are compared to those who report no change or a decrease.

We also adjust for COVID-19-related factors – financial situation during the pandemic (better off, same as before, worse off) and concern about COVID-19 (0-10) – which have been associated with poor emotional well-being (Abrams, Finlay, and Kobayashi 2022; J. Zheng et al. 2021) and health risk behaviors (K. Lee et al. 2023; Sampson et al. 2021). Additionally, we control for comorbidities (0-11), functional limitations (0-6), change in household size from 2015 to 2020 (decrease, no change, increase), interview month (September 2020, October 2020, November 2020, December 2020, and January 2021), and survey mode (web, phone, paper and pencil). Comorbidities and functional limitations are reported at baseline. Comorbidity scores (0-11) are based on the modified Charlson Comorbidity Index (CCI), adapted for NSHAP (Vasilopoulos et al. 2014). Functional limitations (0-6) are measured by summing the number of difficulties in performing the following six Activities of Daily Living (ADL): walking across a room; dressing; bathing; eating; getting in or out of bed; and using the toilet (Huisingh-Scheetz et al. 2014).

Analytic Plan

We first fit a series of generalized linear models predicting each self-reported health behavior during the pandemic (Table 2). For each health behavior, a baseline model presents the effect of infrequent in-person contact with family and friends, adjusting for corresponding baseline health behavior and other covariates. The subsequent model incorporates emotional well-being measures. By including the baseline health behavior, our models capture whether infrequent in-person contact affects health behaviors during COVID-19 holding constant the level of health behaviors in 2015. We use ordered logistic regressions for physical activity and poor sleep, negative binomial regression for drinks per week, and logistic regression for smoking

status. Next, we fit a series of multinomial logistic regression models predicting the risk of perceiving worsening of health behavior and perceiving improvement of health behavior, where the reference category is perceiving no change in health behavior (Table 3). The main independent variables are decrease in in-person contact with family and friends since the pandemic. The models proceed in the same stepwise fashion, adjusting for the same set of covariates as before. Finally, we use the Karlson/Holm/Breen (KHB) (Breen, Karlson, and Holm 2013) method to test the hypothesis that emotional well-being during the pandemic mediates the association between social isolation and health behaviors.

To account for attrition from Round 3 to the NSHAP COVID-19 substudy, we apply inverse probability weights to our sample. We first use a logit regression to predict respondents' probability of retention using age, gender, race, education, marital status, self-reported physical health, and household size. Then, the inverse of this probability is multiplied by existing NSHAP weights that adjust for nonresponse. Missing data were accounted for with multiple imputation with chained equations (m = 20). Because the KHB method only permits estimating the overall mediation effect with imputed data, mediation analyses are carried out using non-imputed data to quantify and compare the contribution of each mediator – loneliness, anxiety, and depressive feelings – to the association between social isolation and health behaviors. All models also use the NSHAP sample clustering and stratification to account for sample selection (O'Muircheartaigh et al. 2021). All analyses are conducted using Stata 16.0.

RESULTS

Sample Characteristics

Table 1 presents weighted descriptive statistics for all study variables. The average age of the respondents was 69. The sample was slightly more female than male (54%). A majority of respondents were White (76%), had some college or higher level of education (64%), and were partnered (64%).

Approximately two-thirds of the sample reported seeing family (62%) and friends (69%) less than once a week or never during a typical week since the pandemic started. The correlation between low in-person contact with family and low in-person contact with friends was 0.3. About four in ten respondents experienced a decline in in-person contact with family (37%) and friends (38%), with the two correlated at 0.45, suggesting that those who reduced contact with family also reduced contact with friends.

Around 23% of the sample reported doing physical activity less than once a month or never. Respondents reported that they consume 3.7 drinks on average per week. Current smokers accounted for 11% of the sample. More than half of the sample (57%) reported that they sometimes, rarely, or never feel rested in the morning. Decrease in physical activity was the most common worsening health behavior. About one in four people perceived a decrease in physical activity since the pandemic started (26%). This was followed by 16% of the sample reporting increased alcohol consumption, 15% reporting feeling less rested after sleep, and 12% reporting increased smoking.

Table 1: Weighted Descriptive Statistics

	Mean (SD) or %	n
Health behaviors in 2020		
Physical activity		2,496
Never	13.4%	
Less than 1 time per month	10%	
1-3 times per month	15.8%	
1-2 times per week	18.7%	
3 or 4 times per week	21.8%	
5 or more times per week	20.3%	
Drinks in week	3.7 (12.8)	2,396
Smoking	11.4%	2,405
Feeling rested in the morning		2,453
Never	5.2%	
Rarely	18.9%	
Sometimes	33%	
Most of the time	42.9%	
Perceived changes in health behavior since the pandemic		
Physical activity		2,487
Decreased	26.3%	
About the same	62.3%	
Increased	11.4%	
Alcohol consumption		1,316
Decreased	13.6%	
About the same	70.9%	
Increased	15.6%	
Smoking		318
Decreased	13.4%	
About the same	74.9%	
Increased	11.8%	
Feeling rested		2,447
Decreased	14.8%	
About the same	79.3%	
Increased	5.9%	
Social isolation during COVID-19		
Infrequent in-person contact with family	61.7%	2,523
Infrequent in-person contact with friends	69.2%	2,518
Decreased in-person contact with family	36.8%	2,490
Decreased in-person contact with friends	38.4%	2,487
Emotional well-being during COVID-19		
Loneliness (0-9)	3.1(2.6)	2,473
Anxiety (0-6)	1.3(1.5)	2,499
Depressive feelings (1-4)	1.7(.9)	2,519
Increase in remote modes of contact since the pandemic started		
Phone calls with family	24.5%	2,509
Messages with family	25.2%	2,474
Video calls with family	22.4%	2,434
Phone calls with friends	16%	2,522
Messages with friends	19.9%	2,480

Table 1 *(continued)*

Video calls with friends	16.3%	2,444
Sociodemographic and control variables		
Age	68.7 (9.5)	2,549
Female	54.1%	2,549
Race-ethnicity		2,549
White	75.8%	
Black	12.0%	
non-Black Hispanic	8.4%	
Other	3.8%	
Education		2,549
<High school	11.4%	
High school	24.3%	
Some college	35.2%	
College degree or higher	29.2%	
Partnered	64.3%	2,512
Functional health: ADLs (0-6)	.46 (1.2)	2,549
Comorbidities (0-11)	.94 (1.3)	2,549
Concern about COVID-19 (1-10)	7.5(2.7)	2,447
Financial situation during COVID-19		2,518
Better off	4.7%	
About the same	73.8%	
Worse off	21.5%	
Interview mode		
Web	52.1%	2,549
Phone	10.2%	
Paper	37.7%	
Interview month		2,521
September	41.1%	
October	16.3%	
November	25%	
December	9.1%	
January	8.5%	
Change in household size		2,520
Decrease	23.9	
No change	63.9	
Increase	12.2	
Baseline health behaviors in 2015 (Round 3)		2,548
Physical activity		
Never	15.8%	
Less than 1 time per month	8.9%	
1-3 times per month	10.1%	
1-2 times per week	16.8%	
3 or 4 times per week	22.6%	
5 or more times per week	25.8%	
Drinks in week	3.2(6.8)	2,543
Smoking	15.1%	2,549
Restless sleep		2,543
Rarely or none of the time	35.1%	
Some of the time	34.4%	
Occasionally	16%	

Most of the time	14.6%

Note: Descriptive statistics reported here are calculated before multiple imputation. Our regression models account for missing data using multiple imputation.

Poor Health Behaviors During COVID-19

Table 2 presents odds ratios predicting low physical activity levels (Models 1 & 2), current smoking status (Models 5 & 6), and poor sleep quality (Models 7 & 8), and incident rate ratios predicting drinks per week (Models 3 & 4) in 2020 net of these health behaviors in 2015. This table shows estimates only for measures of social isolation, increase in remote modes of contact, and emotional well-being but the models include all the covariates described previously (See Appendix A.1).

Results show no evidence of an association between social isolation and poor health behaviors during COVID-19. We also find little evidence that increases in remote modes of contact during COVID-19 are associated with poor health behaviors. Increases in video call contact is the only measure that shows some association with poor health behaviors – current smoking status and poor sleep quality, specifically. However, the positive or negative association depends on whether the contact was made with friends or family. Older adults who reported an increase in video call contact with friends had lower odds of being a current smoker (OR = 0.25, $p<.05$) and being in a worse sleep quality category (OR = 0.75, $p<.05$). On the other hand, increase in video call contact with family was associated with worse quality sleep (OR = 1.33, $p<.05$). These associations remained the same after including emotional well-being measures.

Emotional well-being during the pandemic was not related to low physical activity or number of drinks but was associated with current smoking status and poor sleep quality. Those who reported higher loneliness had lower odds of smoking during the pandemic (OR = 0.85, $p<.05$). All three emotional well-being measures— loneliness (OR=1.11, $p<.001$), anxiety

(OR=1.35, $p<.001$), and depressive feelings (OR=1.29, $p<.001$) — were associated with higher odds of poor sleep. In all cases, previous levels of the behavior strongly predicted the same behaviors during the pandemic. These results provide no evidence for our first hypothesis that those who rarely had in-person contact with family and with friends will be more likely to engage in poor health behaviors net of previous levels.

Additionally, we find associations between COVID-19-related factors – concern about COVID-19 and financial situation since COVID-19 – and poor health behaviors (see Appendix A.1). Unexpectedly, higher concern about COVID-19 was associated with fewer number of drinks per week and lower odds of being in a worse poor sleep quality category, suggesting that perhaps those with higher concern about COVID-19 are trying to maintain a healthy lifestyle. At the same time, it could also be that those who engage in healthy behaviors are more likely to be concerned about COVID-19. Respondents who are financially better off since COVID-19 reported fewer drinks per week and were at lower odds of being in a lower physical activity level compared with respondents reporting no change.

Table 2: Social Isolation and Emotional Well-Being during COVID-19 for Predicting Poor Health Behaviors

	Low physical activity (6= "never")		Drinks in week		Current smoker		Feeling rested (4= "never")	
	Model 1 OR (95%CI)	Model 2 OR (95%CI)	Model 3 IRR (95% CI)	Model 4 IRR (95% CI)	Model 5 OR (95%CI)	Model 6 OR (95%CI)	Model 7 OR (95%CI)	Model 8 OR (95%CI)
Physical activity in 2015 (1-6)	1.43*** [1.35, 1.51]	1.42*** [1.35, 1.50]						
Drinks per week in 2015			1.22*** [1.19,1.25]	1.22*** [1.19,1.25]				
Smoker in 2015					126.04*** [71.4,222.4]	139.02*** [76.3,253.2]		
Restless sleep in 2015 (1-4)							1.50*** [1.38,1.63]	1.38*** [1.27,1.51]
Social Isolation								
Infrequent in-person family contact during COVID-19	1.01 [0.87,1.17]	0.99 [0.86,1.15]	1.13 [0.87,1.45]	1.09 [0.86,1.38]	1.50 [0.84,2.69]	1.48 [0.85,2.59]	1.10 [0.89,1.35]	1.05 [0.84,1.31]
Infrequent in-person friend contact during COVID-19	1.23 [0.99,1.54]	1.22 [0.98,1.52]	0.83 [0.64,1.07]	0.82 [0.63,1.06]	0.61 [0.31,1.23]	0.67 [0.34,1.31]	0.98 [0.78,1.22]	0.91 [0.73,1.13]
Emotional Well-being During COVID-19								
Loneliness (0-9)		1.02 [0.98,1.08]		1.05 [0.99,1.10]		0.85* [0.75,0.98]		1.11*** [1.05,1.17]
Anxiety (0-6)		1.08 [1.00,1.18]		1.02 [0.92,1.14]		1.17 [0.88,1.56]		1.35*** [1.25,1.46]
Felt depressed (1-4)		1.11 [0.96,1.27]		1.06 [0.88,1.27]		1.12 [0.76,1.66]		1.29*** [1.13,1.47]
Increase in Remote Modes of Contact since COVID-19								
Increased phone family contact	0.87 [0.68,1.12]	0.87 [0.68,1.12]	0.83 [0.63,1.10]	0.82 [0.63,1.08]	1.18 [0.52,2.64]	1.23 [0.54,2.85]	0.89 [0.69,1.14]	0.88 [0.69,1.13]

Increased messaging family contact	1.10 [0.87,1.38]	1.11 [0.87,1.40]	1.15 [0.87,1.51]	1.14 [0.87,1.49]	0.93 [0.48,1.82]	0.88 [0.44,1.76]	0.87 [0.65,1.15]	0.86 [0.65,1.14]
Increased video call family contact	0.98 [0.76,1.27]	0.98 [0.75,1.28]	1.13 [0.84,1.53]	1.13 [0.84,1.52]	1.24 [0.49,3.14]	1.30 [0.51,3.28]	1.33* [1.05,1.69]	1.34* [1.05,1.69]
Increased phone friend contact	1.05 [0.80,1.37]	1.05 [0.80,1.37]	0.99 [0.74,1.32]	1.01 [0.75,1.37]	0.76 [0.37,1.59]	0.81 [0.37,1.79]	1.25 [0.89,1.76]	1.24 [0.86,1.78]
Increased messaging friend contact	1.00 [0.78,1.29]	0.95 [0.73,1.23]	0.88 [0.68,1.14]	0.82 [0.62,1.08]	0.65 [0.22,1.88]	0.67 [0.22,2.02]	1.08 [0.79,1.48]	0.92 [0.68,1.23]
Increased video call friend contact	0.91 [0.68,1.21]	0.90 [0.68,1.21]	1.16 [0.82,1.66]	1.21 [0.85,1.72]	0.25* [0.09,0.70]	0.24** [0.08,0.66]	0.75* [0.57,0.98]	0.72* [0.54,0.94]
Constant			1.87 [0.48,7.38]	1.57 [0.40,6.09]	0.38 [0.03,4.51]	0.46 [0.04,5.48]		
N	2,496		2,396		2,405		2,453	

Notes: OR = Odds Ratio. IRR = Incident Rate Ratio. CI = Confidence Interval. We use ordered logistic regressions for physical activity and poor sleep, negative binomial regression for drinks per week, and logistic regression for smoking status. Regressions also control for age, gender, race/ethnicity, marital status, education at round three, ADL problems at round three, comorbidities at round three, financial situation during COVID-19, concern about COVID-19, change in household size, interview month and survey mode. *P** < .05; *p* ** < .01 *p* *** < .001 (two-tailed tests).

Perceived Worsening of Health Behaviors Since the Pandemic Started

Table 3 presents results from multinomial logistic regression models predicting perceived changes in health behaviors since the start of the pandemic. Perceived worsening and improvement of health behaviors are compared to perceiving no change, the reference category. Declines in in-person contact during COVID-19 were not associated with perceived improvement in any health behaviors, so we report only perceived worsening of health behaviors here. The full results are shown in Appendix A.2and A.3. In general, reduction in in-person contact since the pandemic was associated with worsening of all health behaviors except smoking. These results are consistent and appear for decreases in contact both with family and with friends. The single exception is that we see no association between decreases in contact with family and poor sleep. Increase in remote modes of contact was generally not associated with worsening health behaviors.

Table 3, Models 1-4 show that decreases in in-person contact since COVID-19 are associated with perceptions of reduced physical activity and increased drinking. Older adults who reported a decrease in in-person contact with family (RRR=1.88, $p<.001$) and friends (RRR=1.71, $p<.001$) were at higher risk of perceiving a decrease in physical activity versus perceiving no change (Model 1). Similarly, there was a significant association between decrease in in-person contact with family (RRR=1.52, $p<.05$) and friends (RRR=2.04, $p<.01$) and perceived increase in drinking (Model 3). These findings remained robust after loneliness, anxiety, and depressive feelings were included in Model 2 for physical activity and Model 4 for drinking. Anxiety and depressive feelings showed no effect, but higher levels of loneliness are associated with perceiving a decrease in physical activity (RRR=1.20, $p<.001$) and increase in drinking (RRR=1.20, $p<.01$). While remote modes of contact were not associated with increased

drinking, increase in phone contact with friends was associated with perceiving a decrease in physical activity (RRR=1.76, $p<.01$).

Models 5 and 6 of Table 3 report the results for increased smoking. We find no significant associations between decrease in in-person contact and increased smoking. As shown in Model 6, emotional well-being was also not associated with increased smoking.

Models 7 and 8 of Table 3 show the analysis of perceived worsening sleep quality. Both decrease in in-person contact with family (RRR=1.51, $p<.05$) and friends (RRR=1.86, $p<.01$) were associated with a higher risk of reporting feeling less rested relative to perceiving no change (Model 7). However, decrease in in-person contact with family was no longer significant when emotional well-being measures were included (Model 8). Loneliness (RRR=1.27, $p<.001$) and depressive feelings (RRR=1.34, $p<.01$) were found to have a positive association with feeling less rested since the pandemic. Older adults who increased video contact with family were also at a higher risk of feeling less rested relative to perceiving no change (RRR=1.82, $p<.01$).

These results provide partial support for our second hypothesis, that those who reported a decline in in-person contact with family and with friends would be more likely to perceive that their health behaviors had gotten worse. We see no evidence of this for increased smoking but strong support for decreases in in-person contact with both family and friends for physical activity, drinking, and sleep quality.

COVID-19-related factors are also associated with perceived worsening of some health behaviors (see Appendix A.2 and A.3). Higher concern about COVID-19 was associated with higher risks of perceiving decreased physical activity. Compared to respondents who reported no

change, respondents who reported that they were financially worse off since the pandemic were at higher risks of perceiving increased smoking and decreased sleep quality.

Table 3: Multinomial Logistic Models Predicting Perceived Worsening of Health Behaviors Since COVID-19 Began (Relative Risk Ratios, 95% Confidence Intervals)

	Physical activity Less vs. about the same		Drinking More vs. about the same		Smoking More vs. about the same		Feeling rested Less vs. about the same	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Social Isolation								
Decrease in in-person family contact since COVID-19	1.88*** [1.42,2.48]	1.77*** [1.32,2.37]	1.52* [1.07,2.16]	1.47* [1.03,2.09]	1.81 [0.43,7.51]	2.03 [0.51,8.13]	1.51* [1.04,2.20]	1.45 [0.99,2.14]
Decrease in in-person friend contact since COVID-19	1.71*** [1.31,2.24]	1.52** [1.17,1.98]	2.04** [1.34,3.12]	1.66* [1.07,2.59]	1.07 [0.33,3.51]	0.91 [0.29,2.85]	1.86** [1.33,2.75]	1.60* [1.07,2.39]
Emotional Well-being During COVID-19								
Loneliness (0-9)		1.20*** [1.13,1.28]		1.20** [1.07,1.36]		1.01 [0.80,1.29]		1.27*** [1.18,1.37]
Anxiety (0-6)		1.07 [0.96,1.20]		1.20 [1.00,1.46]		1.15 [0.78,1.69]		1.12 [0.99,1.27]
Felt depressed (1-4)		0.91 [0.76,1.10]		1.16 [0.83,1.62]		1.22 [0.55,2.70]		1.34** [1.08,1.66]
Increase in Remote Modes of Contact since COVID-19								
Increased phone family contact	1.00 [0.70,1.43]	0.96 [0.66,1.39]	1.06 [0.59,1.91]	1.14 [0.62,2.11]	1.90 [0.50,7.27]	1.97 [0.55,7.11]	0.95 [0.65,1.37]	0.94 [0.66,1.35]
Increased messaging family contact	1.12 [0.81,1.54]	1.16 [0.84,1.60]	1.14 [0.65,1.99]	1.07 [0.59,1.93]	0.50 [0.11,2.35]	0.54 [0.12,2.42]	1.01 [0.71,1.42]	1.07 [0.73,1.57]
Increased video call family contact	0.96 [0.68,1.36]	0.96 [0.68,1.37]	1.12 [0.61,2.05]	1.15 [0.62,2.12]	1.87 [0.38,9.08]	2.11 [0.39,11.43]	1.64** [1.13,2.39]	1.82** [1.24,2.69]
Increased phone friend contact	1.75** [1.24,2.48]	1.76** [1.24,2.49]	1.63 [0.86,3.08]	1.62 [0.80,3.26]	0.53 [0.11,2.60]	0.39 [0.07,2.29]	1.31 [0.78,2.20]	1.39 [0.79,2.46]
Increased messaging friend contact	1.26 [0.90,1.76]	1.16 [0.83,1.62]	1.22 [0.72,2.07]	1.16 [0.67,2.02]	5.10 [0.93,28.04]	4.72 [0.84,26.46]	1.72* [1.05,2.82]	1.50 [0.90,2.51]

Increased video call friend contact	0.93 [0.66,1.33]	0.96 [0.67,1.38]	1.10 [0.57,2.12]	1.13 [0.57,2.24]	0.49 [0.06,4.17]	0.47 [0.06,3.87]	0.71 [0.43,1.15]	0.70 [0.42,1.17]
Constant	0.29 [0.08,1.05]	0.18 [0.05,0.65]	0.67 [0.07,6.41]	0.22 [0.02,2.07]	12.75 [0.12,1376.4]	8.97 [0.05,1475.6]	0.24 [0.06,1.01]	0.06*** [0.01,0.26]
N	2,487		1,316		318		2,447	

Notes: Regressions also control for age, gender, race/ethnicity, marital status, education at round three, ADL problems at round three, comorbidities at round three, increase in remote modes of contact, financial situation during COVID-19, concern about COVID-19, change in household size, interview month and survey mode. Models predicting perceived improvement of health behaviors (i.e., more physical activity, less drinking, less smoking, and feeling more rested) relative to perceiving no change are shown in Supplementary Table 2 and 3. $p^* < .05$; $p^{**} < .01$ $p^{***} < .001$ (two-tailed tests).

Mediation Effects

Table 4 presents the results from the KHB mediation analyses, which test our third hypothesis, that emotional well-being mediates the relationship between social isolation and health behaviors. “Indirect effects” show how much of the relationship between social isolation and health behaviors, adjusted for covariates, is explained by emotional well-being. We only test the mediating role of emotional well-being when social isolation was a significant predictor of the outcome measure in the main analysis. When more than one social isolation measure was statistically significant, we included all significant measures in the mediation analysis as the KHB method allows the decomposition of multiple key variables simultaneously. Results reveal that emotional well-being partially mediates the effect of decrease in in-person contact on perceived worsening of health behaviors. We also find that the degree of mediation is larger for loneliness than for anxiety and depressive feelings.

Specifically, emotional well-being accounts for 11.8% of the effect of decrease in in-person family contact on decrease in physical activity (Path A) and 29.4% of the effect of decrease in in-person friend contact on decrease in physical activity (Path B). Loneliness contributes heavily, as it explains 11.5% out of the 11.8% of the mediation effect for Path A and 28% out of the 29.4% of the mediation effect for Path B. Emotional well-being does not mediate the association between decrease in in-person family contact and increase in drinking (Path C), but it explains 33.9% (21.9% via loneliness, 7.2% via anxiety, and 4.8% via depressive feelings, respectively) of the effect of decrease in in-person friend contact and increase in drinking (Path D). Finally, while we see no evidence of mediation in the association of decreased in-person contact with family and decrease in sleep quality (Path E), emotional well-being explains about

33.8% (26.8% via loneliness, 3.8% via anxiety, and 3.2% via depressive feelings, respectively) of the effect of decrease in in-person friend contact on decrease in sleep quality (Path F). These results provide strong partial support for our third hypothesis, that emotional well-being mediates the association between in-person contact and health behaviors. We find evidence of this for decrease in-person contact with friends and perceived worsening of health behaviors, with loneliness playing a prominent role.

Table 4: KHB Mediation Analysis Results by Emotional Well-Being

Decrease in Physical Activity	A. Decrease in in-person family contact → Emotional well-being → Decrease in physical activity			B. Decrease in in-person friend contact → Emotional well-being → Decrease in physical activity		
	Coefficient	Z	% Explained	Coefficient	Z	% Explained
Total effect	0.666***	3.66		0.502**	3.10	
Direct effect	0.588**	3.20	88.2	0.354*	2.23	70.6
Indirect effect	0.079*	2.00	11.8	0.148**	3.31	29.4
via loneliness			11.5			28.0
via anxiety			0.9			2.0
via depressive feelings			-0.6			-0.6
Increase in Drinking	C. Decrease in in-person family contact → Emotional well-being → Increase in drinking			D. Decrease in in-person friend contact → Emotional well-being → Increase in drinking		
	Coefficient	Z	% Explained	Coefficient	Z	% Explained
Total effect	0.542*	2.59		0.790**	3.33	
Direct effect	0.464*	2.24	85.7	0.522*	2.18	66.1
Indirect effect	0.078	0.96	14.3	0.268**	2.89	33.9
via loneliness						21.9
via anxiety						7.2
via depressive feelings						4.8
Feeling less rested	E. Decrease in in-person family contact → Emotional well-being → Feeling less rested			F. Decrease in in-person friend contact → Emotional well-being → Feeling less rested		
	Coefficient	Z	% Explained	Coefficient	Z	% Explained
Total effect	0.506*	2.42		0.695***	3.54	
Direct effect	0.372	1.79	73.5	0.460*	2.32	66.2
Indirect effect	0.134	1.76	26.5	0.235**	2.93	33.8
via loneliness						26.8
via anxiety						3.8

via depressive feelings		3.2

Notes: All models adjust for covariates included in Table 3. Analyses were carried out using non-imputed data. *p** < .05; *p* ** < .01 *p* *** < .001 (two-tailed tests).

DISCUSSION

This study addressed the overarching question: Did the social isolation that accompanied the COVID-19 pandemic put older adults at risk of poor and worsening of health behaviors? Specifically, we examined whether social isolation as assessed by low levels of in-person contact and by decreases in in-person contact during the pandemic is associated with self-reported poor health behaviors during the pandemic and perceived worsening of health behaviors since the pandemic began. We focused on four health behaviors: physical activity; alcohol consumption; smoking; and sleep quality. We also examined the role of loneliness, anxiety, and depressive symptoms as mediators in the relationship between social isolation and worsening health behaviors. We find partial support for the hypothesis that older adults with decreases in in-person contact with family and/or friends face higher odds of perceived worsening of health behavior. We find strong support for our hypothesis that emotional well-being mediates this relationship for in-person contact with friends, less support for family.

This study makes three key contributions to the growing knowledge of older adults' experience during the pandemic. First, our results and the findings of others about the pandemic highlight the importance of in-person social contact. Decrease in in-person contact was associated with worsening health behaviors, even after adjusting for increased use of remote modes of contact. Notably, increase in remote modes of contact for the most part did not show an association with health behaviors. Furthermore, remote modes that were associated with health behaviors showed conflicting results. These results suggest that older adults who are seeing

family and friends in-person less often during the pandemic are at a greater risk of worsening health behaviors and that increase in remote modes of contact does not make up for the decreased in-person contact. Our findings are consistent with recent studies that showed in-person contact has benefits for emotional well-being not duplicated by remote contact, even if "face-to-face" via technological means (Hawkley et al. 2021; Litwin and Levinsky 2021). Identifying what is particular to in-person contact compared with other remote modes is beyond the scope of this paper, but we speculate that social support and social control, which are mechanisms that link social ties to health behavior, might operate differently in-person. Social support can be exchanged via remote modes of contact, but there may be needs for various types of support that go unnoticed unless family or friends make an in-person visit. Similarly, social control involves family and friends taking deliberate actions to change a person's health behavior. We speculate that social control is likely most effective when family and friends can intervene in-person than by remote contact. Future research should explore why and how in-person contact differs from other remote modes of contact in shaping older adults' health and health behaviors.

Second, our findings point to the importance of change during the pandemic, with declines in in-person social contact linked to perceptions that health behaviors have gotten worse. As we hypothesized, those who reported a decline in their frequency of in-person contact were significantly more likely to report a decline in their health behaviors. This was the case for both in-person contact with family and for in-person contact with friends, for decreased physical activity and increased drinking. Decreased sleep quality was associated with in-person contact with friends, but not family. Increased smoking was not associated with in-person contact.

These self-reported changes in in-person contact and health behaviors capture older adults' perceptions of change. The structure of the NSHAP COVID-19 substudy questions about changes in social and health behaviors captures each respondent's *subjective evaluation* of the changes. We argue that this approach and the information it captures is fundamentally different in important ways from the usual approach of simply asking people how often a behavior currently occurs. Two respondents may report the same current frequency of in-person contact with family during the pandemic, but the two may differ in whether this frequency is enough to meet their wants and needs, or whether this is less than they were accustomed to pre-pandemic—key considerations that may have implications for their health behaviors.

The answers to questions that ask people how much things have changed reflect at least in part how the individual *feels* about the change. Thus, our measurement of the number of drinks during the pandemic reflects the amount and allows us to measure changes in number of drinks, whereas the respondent's self-assessment of whether this was more, about the same, or less may also capture the accompanying sense of loss or gain. The same evaluation could affect responses on how in-person contact has changed, with those who very much miss the contact rating even an objectively small decline in contact frequency as "less."

Self-perceived changes may be more important than self-reported levels in capturing older adults' well-being during the pandemic as they reflect the disruption caused by COVID-19. Our finding corresponds to prior research that show measures that reflect perceptions such as self-rated health (Idler and Benyamini 1997) and perceived social support (Thoits 2011) are correlated with health and mortality at least as strongly as more objective measures. In the context of COVID-19, older adults may be integrating their experience of disruptive change when they report self-perceived changes.

Third, our study provides a potential underlying mechanism – emotional well-being– linking decrease in in-person contact and worsening health behaviors. Extant research has documented changes in health behaviors during COVID-19, but studies rarely examined why these changes might be occurring. We hypothesized that emotional well-being would mediate some of the relationship between in-person contact and health behaviors during the pandemic and find some support for this. Our findings are in line with recent studies suggesting that decreases in-person contact increase depressive feelings and loneliness (N. G. Choi et al. 2022; Teo et al. 2015). Such feelings stemming from decreased in-person contact may, in turn, lead to worsening of health behaviors, as documented by previous research (Benson et al. 2021; Hawkley, Thisted, and Cacioppo 2009). Notably, our results from the mediation analysis show mediation by emotional well-being is stronger for decreases in in-person contact with friends than for family. This difference may in part be due to the different functions and support provided by family and friends (Huxhold, Miche, and Schüz 2014; Wellman and Wortley 1990). Friendships are based on reciprocity, and they tend to provide companionship. Spending less time with friends in-person during the pandemic is likely associated with loneliness as friends are maintained through socializing with each other. Indeed, our findings showed that loneliness explained most of the mediation effect among the three emotional well-being indicators. On the other hand, worsening health behaviors owing to seeing family members less often during the pandemic likely also involves other mediators such as material and instrumental support and social control, which our study did not test. For example, both family and friends can directly discourage negative health behaviors through social control, but, unlike family ties, friendship might dissolve if one feels the intervention to be overbearing or that the recipient of the attempts at control is unresponsive (Offer and Fischer 2018).

Our study has some limitations. First, our study did not account for relationship quality. Declines in contact with close friends and family may have effects that more distant ties do not. Second, we only look at nonresident family ties in our model. Though we speculate that the impact of the pandemic on older adults' relationship to resident family ties is smaller compared to the impact on non-resident family ties, measures that assess both resident and nonresident family ties would provide more insight into family relationships during COVID-19. Third, we cannot determine causality as most of the covariates are measured at only one point in time. Despite these shortcomings, our study is one of the few that tested the association between in-person contact and health behaviors while adjusting for other modes of contact. Studies prior to COVID-19 mostly measured social contact without this differentiation. Our study also includes baseline health behaviors in 2015, which allowed us to look at changes in health behaviors over time.

In conclusion, our results point to the unique role for in-person interaction for social well-being. Even before the outbreak of COVID-19, social isolation among older adults has been recognized as a serious public health concern that is associated with morbidity and mortality. While remote modes of contact such as the phone or the Internet seem promising in facilitating social interactions, our study shows that in-person contact may play a distinct role in shaping older adults' health behaviors and well-being, not compensated by remote modes of contact. The pandemic has offered an unusual opportunity to assess the role of in-person contact for many areas of life, which could result in major advances in our understanding of human behavior. Future research should further investigate the disruption in in-person contact by the COVID-19 pandemic and its long-term implications for older adults' social integration and well-being.

CHAPTER 3

Marital History and the Parent-Child Network Tie in Later Life

Many studies have shown that older adults generally maintain stable personal networks in terms of size and structure (B. Cornwell, Goldman, and Laumann 2021; Weiss, Lawton, and Fischer 2022). Children, in particular, are traditionally viewed as lifelong connections in parents' networks over the life course (Fischer and Offer 2020). Still, significant variation exists in the dynamics of parent-child relationships among families in later life (Blake 2017; Goldman and Cornwell 2018), suggesting that children may not be permanent fixtures in older adults' networks. Understanding the factors that influence the availability and stability of parent-child network ties and identifying older adults at risk of being socially disconnected from their children are crucial, considering that social support from and positive relationship with adult children have significant implications for older adults' health and well-being (Chen and Feeley 2014; H. J. Lee and Szinovacz 2016).

Marital transitions, such as divorce or the death of a spouse, are major life events that significantly alter one's social networks (Wrzus et al. 2013). Existing research examines the overall change in personal networks after a marital transition (Terhell, Broese van Groenou, and van Tilburg 2004; Zettel and Rook 2004), but these studies rarely concentrate on the parent-child network tie. Moreover, there is limited understanding of how cumulative marital history may shape the parent-child tie in older adults' social networks. Studies on the qualitative aspect of intergenerational relationships, on the other hand, show that changes in the parent's marital status influence their relationships with their children, sometimes strengthening the bond and other times weakening it (Ha 2008; I-Fen Lin, Brown, and Mellencamp 2022). These studies

tend to assess the strength of the intergenerational bond following a marital transition in terms of social support exchange or emotional closeness. The position of a child in the parents' social network is an unexplored aspect of intergenerational relationships in later life.

Drawing on the life course perspective, the present study examines the extent to which a parent's current marital status, the number of marital dissolutions, and the duration of marital dissolution are associated with the presence and (in)stability of children in older parents' social networks. Throughout the life course, both parent and child experience the parent's marital transitions, with each change prompting adjustments to new roles and relationships. Such marital transitions, often involving stress and conflict for both the parent and the child, may hinder the stability of their relationship. This may be reflected in the child's position in the parent's discussion network later in life. Children may be entirely absent from the network, or, if present, parents who have experienced multiple dissolutions may encounter greater instability in maintaining a consistent parent-child network tie compared to parents without such transitions.

Using marital history data and social network roster data from the National Social Life, Health, & Aging Project (NSHAP), this paper first examines whether older adults' marital history is associated with naming any children as members of their personal discussion networks. Next, using longitudinal data spanning five years, the study explores the association between marital history and network change over time, specifically focusing on the additions and losses of child network ties.

BACKGROUND

A Life Course Perspective - Marital History & Linked Lives Between Parents and Children

The life course perspective considers human development as a lifelong process, where events and changes experienced in early life stages have lasting effects on future decisions and events (Elder, Johnson, and Crosnoe 2003). Two of its principles –human agency and linked lives – are particularly relevant for understanding how marital history may influence parent-child relationships in later life. According to the principle of human agency, individuals have the capacity to shape their own life paths within the constraints and opportunities presented by historical and social contexts (Elder 1994). Individuals' marital transitions across the life course – their marital history – can also be conceptualized based on this principle. While social norms and values governing marriage and family life can constrain decisions about less common life events such as divorce and remarriage, individuals still exercise agency in shaping their marital history through choices to enter and exit marriages. Though some events, like widowhood, occur beyond personal control, individuals' actions ultimately form a unique set of marital transitions.

Individuals' decisions in constructing their marital history not only affect their own lives but also have implications for their offspring. The principle of linked lives indicates that parents and children's lives are inextricably linked throughout the life course (Elder 1994). From this perspective, parents' marital transitions affect not only the parent's experience and development but also the experience and development of their children. Seen this way, marital transitions are "family transitions" (Amato and Sobolewski 2001) to which the parent and the child must adjust and navigate to maintain their relationship. For instance, a parent's divorce that occurs when the

children are young often results in the non-resident parent being less involved in the children ‘s lives (Stewart 2010). Even when children are adults, children often feel caught in the middle and may experience loyalty conflicts (Ahrons 2007; Amato and Afifi 2006), which make it difficult to get everyone involved in special family occasions such as graduations and weddings. Similarly, the death of a spouse signifies the loss of a parent for the child, an event that can have profound negative impacts on the child's health, especially if they are younger (Rostila and Saarela 2011). Furthermore, remarriage of the parent places the child into a blended family, where relationships with step-kin are typically less close than those with biological kin (Sanner et al. 2018). Each of these transitions can give rise to a wide range of emotions and experiences that influence how the child connects with the parent, both immediately following the event and many years later. Unless estrangement occurs— which is rare, especially between mothers and children (Reczek, Stacey, and Thomeer 2023)— these cumulated marital changes likely contribute to the position of the child in the parents’ social network in later life.

Children As Network Ties in Older Parents’ Social Networks

Parents and children play integral roles in each other’s lives providing material, emotional, and instrumental support. While parent-child relationships are primarily characterized by the downward transfer of support from the parents to the children, the increase in life expectancy has led more children to have surviving parents well into their adulthood (Bengtson 2001; Seltzer and Bianchi 2013), making it possible for the support exchange to flow in both directions. For parents, connections to children become particularly important with age as they are more likely to experience transitions such as health declines and widowhood that may limit them from accessing everyday support and help.

While numerous studies have examined the quantitative (e.g., frequency of contact) or qualitative (e.g., emotional closeness) aspects of the parent-child relationship, the presence and stability of parent-child network ties in parents' core discussion networks remain less explored. Studies on social networks rarely focus on specific network ties, such as those between parents and children. Moreover, when research does examine parent-child network dynamics, it tends to solely focus on the (in)stability of the tie rather than its presence (Fischer and Offer 2020; Goldman and Cornwell 2018). However, some research conducted in European countries suggests that children are not always present in older parents' networks. Structural factors, such as greater geographic distance between the parent and child, may be barriers to maintaining child network ties (Schafer and Sun 2022; Schnettler and Wöhler 2016). The presence of children in older parent's networks is an important aspect of parent-child relationships that warrants more attention, as those without children in their personal network may have worse health than those with children as network members. For example, a recent study showed that older adults who do not include their partner or any children in their social network – referred to as "disconnected" older adults" – had poorer mental health and were less socially active than their "connected" counterparts (Patterson and Margolis 2023). These findings highlight the potential health implications of lacking close family ties in personal networks, especially concerning both partners and children.

Research shows that personal networks often experience significant turnover – the loss and addition of network contacts over time –, following marital transitions. Marriage is linked to both loss and gain in network ties (Weiss, Lawton, and Fischer 2022), whereas divorce often results in the loss of ties (Wrzus et al. 2013). The effects of widowhood on network ties are mixed, with some studies noting a loss of ties (Wrzus et al. 2013) and others observing the

reactivation of dormant ties (Offer and Fischer 2022). To my knowledge, no study has addressed marital experiences over the life course and their association with parent-child network dynamics. Existing research on the stability of parent-child network ties has primarily examined whether the parent loses or gains any child ties over time (Goldman and Cornwell 2018; Schafer and Upenieks 2021). Goldman and Cornwell (2018) found that over one-third of older U.S. adults lose a previously mentioned child network tie in the span of 5 years. They also showed that the loss was more likely for racial-ethnic minority older adults and older adults with little education. Schafer and Upenieks (2020), on the other hand, did not find evidence of disability onset or progression being linked to the loss or gain of a child network tie. While these studies provide important insights into the parent-child network dynamics in later life, these studies examine the loss or addition of a single child network tie, which does not fully capture the overall network change in parent-child ties and the actual degree of parent-child network turnover.

Marital History and Parent-Child Relationships

Older adults today exhibit increasingly diverse marital histories compared to earlier generations that more often stayed in first marriages until the death of the spouse. Deinstitutionalization of marriage (A. J. Cherlin 2004) coupled with a wider acceptance of divorce (Susan L. Brown and Wright 2019) are reflected in many older adults' marital biographies as many go through divorce and remarriage, with some experiencing multiple marital dissolutions and marriages. Current marital status, the number of marital dissolutions, and the duration of marital dissolution likely all come together to shape the older parent-child network tie.

Divorce and widowhood

The dynamics of parent-child network ties likely vary between older adults who were previously married and those who are currently married. Among the previously married, the nature of the intergenerational relationship is also influenced by whether the marriage ended through divorce or the death of a spouse (I-Fen Lin 2008). Divorce typically undermines the intergenerational bond, often making it challenging for parents to maintain stable relationships with their children. Conflicts between spouses, both prior to and following a divorce, can place children in a difficult position. Feelings of being caught in the middle, or having to choose sides, can strain relationships with parents, even when the children are adults (Ahrons 2007; Amato and Afifi 2006). Studies indicate that divorced parents generally have less contact with their children compared to married parents, regardless of whether the children were minors at the time of divorce (Kalmijn 2007), and they also receive less social support from their children than their married counterparts (Kalmijn 2007; Zhang, Hsieh, and Lai 2023). Research also notes that relationship deterioration following divorce is more pronounced for fathers than for mothers (Amato and Booth 1996; I-Fen Lin, Brown, and Mellencamp 2022).

On the other hand, widowhood tends to strengthen the intergenerational relationship. The death of a spouse is one of the most stressful experiences in life, prompting close family and friends to increase their social support for the bereaved (Iveniuk, Donnelly, and Hawkley 2020). Children, in particular, tend to increase their frequency of contact and provide more emotional support (Ha 2008), with mothers receiving more support than fathers (Kalmijn 2007). Widowed parents are likely to view their children as dependable confidants with whom they can share private matters, which in turn may help facilitate more stable relationships. Still, the widowed

parent's increased reliance on the child may strain their relationship, thereby leading to intergenerational ambivalence (Hogerbrugge and Silverstein 2015). Some research shows that widowed older adults report a lower frequency of contact and social support compared to those who are continuously married (Zhang, Hsieh, and Lai 2023). Similarly, Ward and colleagues (2014) did not find any association between the transition to widowhood and intergenerational contact.

Remarriage

The parent-child relationship likely differs between first marriages and remarriages, with remarried parents facing more challenges in maintaining strong and stable connections with their children in their social network (De Jong Gierveld and Peeters 2003). Upon remarrying, the parent gains a spouse, who often becomes the primary source of support. Other personal ties may be overshadowed, as people in marriage are often expected to prioritize each other (Sarkisian and Gerstel 2016). Family members gained through remarriage can also provide additional support (Curran, McLanahan, and Knab 2003), reducing the parent's reliance on their children. Moreover, a parent's remarriage can disrupt established patterns of interaction with their child, prompting adjustments and renegotiations in their relationship. The effort required from both parties to maintain their bond might render it more unstable than the bonds with children for those in continuous marriages. Recent research has shown that remarried older adults report less contact, lower support, and higher strain from their relationships with children than their continuously married counterparts (Zhang, Hsieh, and Lai 2023).

Multiple dissolutions

Remarriage is more likely to end in divorce than first marriages (Livingston 2014), and as a result, some older adults experience more than one marital dissolution over the life course (Mayol-García, Gurrentz, and Kreider 2021). Individuals who go through multiple dissolutions likely face significant changes in their social networks with each marital loss, resulting in more pronounced network turnover compared to those in stable marriages. Turnover can be detrimental when it results in the loss of key ties that provide social support. Previous research has shown that parents' multiple marital transitions have an adverse impact on children's psychological well-being by undermining the intergenerational bond (Amato and Sobolewski 2001). It is possible that the child is also part of this network turnover. Social networks are hierarchically organized, with spouses typically placed in the innermost circle, followed by children (Cantor 1979). A child may be close to the parent when the parent is single but may experience a reduction in overall interaction and support when the parent finds an alternative source of support through repartnering. When this process is repeated, it can potentially hinder the stability of the parent-child network tie.

Time since most recent dissolution

The impact of marital transitions on the parent-child relationship likely subsides with time. Research examining the health consequences of marital transitions generally shows that the detrimental impact of marital loss is temporary, with individuals' health eventually returning to pre-transition levels (Kalmijn 2017; I-Fen Lin et al. 2019). A similar pattern might be observed in social relationships following marital transitions. As individuals gradually adapt to their new marital statuses, whether single or remarried, the quantitative and qualitative aspects of the social interactions between them and their close contacts will likely revert to the levels observed prior

to the transition. Studies have shown that recently widowed parents receive more frequent contact and support from their children compared to those who have been widowed for a longer period (Ha 2008; Zhang, Hsieh, and Lai 2023). Young adult children's feelings of being caught between their divorced parents were also shown to diminish over time (Amato and Afifi 2006).

The Role of Gender

Gender of the parent plays an important role in the intergenerational bond following a marital transition. Research consistently shows that both transitions out of a marriage (i.e., divorce and widowhood) and entering a new marriage have a more pronounced negative impact on the father-child relationship than on the mother-child relationship (I-Fen Lin, Brown, and Mellencamp 2022). Children are much more likely to live with their mothers than fathers following divorce (Anderson, Hemez, and Kreider 2022). Because mothers, as "kin keepers," generally take on the role of facilitating interactions between other family members, divorced fathers tend to grow distant from their children (Rosenthal 1985). This is particularly the case when the children are young (Furstenberg, Hoffman, and Shrestha 1995). Remarriage also has a more adverse impact on the father-child relationships than mother-child relationships. Prior studies have shown that fathers tend to "swap families" following a remarriage, assuming paternal responsibilities for the new family while paying less attention to the previous one (Furstenberg, Hoffman, and Shrestha 1995; Manning and Smock 2000).

The Present Study

The primary objective of this study is to examine how marital experiences over the life course are associated with (1) the presence of a child as a network member in older parents'

personal networks and (2) the stability of existing parent-child network ties over time. Research on social networks highlights substantial changes in personal networks following changes in marital status. However, these studies rarely focus on the dynamics of parent-child network ties, possibly because these ties are often viewed as guaranteed. Conversely, literature on marital transitions and the qualitative aspects of parent-child relationships seldom explores the network dimension of the parent-child relationship. This study aims to address these gaps.

A life course perspective suggests that the accumulation of transitions in and out of marital statuses will likely influence the intergenerational relationship in later life. Depending on the type of dissolution, the number of dissolutions, and the duration of dissolution, some older parents may be less likely to have a child as a network member or maintain a stable parent-child network tie.

Regarding the presence of child network ties in older adults' personal networks, I hypothesize that remarried and divorced older adults will be less likely to have at least one child network tie compared to continuously married older adults. Conversely, widowed older adults are expected to be more likely to have at least one child network tie, as they may rely more on their children. The differences in the presence of a child network tie across marital status groups will be partially explained by the number of marital dissolutions and the years since the last dissolution. Given that remarriage and divorce tend to have a more adverse impact on the intergenerational relationship for fathers than for mothers, it is anticipated that the differences in the presence of child network ties across marital statuses will be more pronounced for men than for women.

Among parents with child network ties, I expect that the marital status differences in the stability of parent-child network ties will follow a similar pattern to the marital status differences in the presence of a child network tie. The loss and addition of network ties are contingent on the frequency and intensity of support exchanges (Fischer and Offer 2020; Marin and Hampton 2019; Offer and Fischer 2022). Although this mechanism is not directly tested in the present study, it is posited that marital differences in the patterns of intergenerational support exchange contribute to the stability of the parent-child network tie in later life. For example, a remarried parent with a history of multiple dissolutions may engage in fewer types of exchanges (e.g., socializing, providing/receiving advice, providing/receiving help) and with less frequency compared to continuously married parents. In the face of events or experiences that can negatively impact the stability of the intergenerational bond, such as relocation, this difference in exchange patterns may lead remarried older adults to be more likely to lose touch with their children compared to continuously married older adults.

Taken together, I expect that remarried and divorced older adults will have more unstable ties (i.e., more losses and additions) with their children than continuously married older adults, whereas widowed parents will have more stable ties with their children than continuously married older adults. The number of dissolutions and the time since the last dissolution will partially explain the association between marital experiences and the stability of parent-child network ties. Similar to the presence of a child network tie, the marital status differences in the stability of child-network ties are anticipated to be greater for men than for women.

METHODS

Data

This study utilized data from Rounds 1 and 2 of the National Social Life, Health, and Aging Project. NSHAP Round 1, conducted between 2005 and 2006, utilized a national area probability sample of 3,005 community-residing adults aged 57 to 85. The overall weighted response rate for Round 1 was 75.5 percent. Round 2, carried out in 2010-2011, expanded the study by including the romantic partners of Round 1 respondents, resulting in 3,377 interviews and achieving a response rate of 74 percent. Rounds 1 and 2 are particularly relevant to the current study as they include rich marital history data and allow researchers to compare changes in social networks over time.

This study has three analytic samples. The presence of a child network tie is examined with a sample of 2,526 respondents with at least one child. The changes in child network ties are based on respondents who participated in both rounds. Changes in child ties—loss or addition—between the rounds depend on the number of ties at Round 1. This study examines the loss of ties based on 1,402 respondents who reported a child network tie in Round 1, given that those who did not report a child tie at Round 1 cannot lose a child tie at Round 2. The addition of ties, on the other hand, is unlikely for older adults who listed all their children as network members at Round 1. Hence, the addition of child ties is assessed based on 1,357 respondents who participated in both rounds, excluding those who reported all of their children as social network members. While it is possible for respondents to gain new children between rounds and report them as child network ties (e.g., through remarriage), less than 1% of those who reported all of their children as network members gained a new child tie.

Measures

Outcome variables

Presence of a child network alter. During each round's in-home interview, NSHAP respondents were asked to name up to seven individuals (i.e., network alters/ties) with whom they had discussed important matters in the past 12 months. While this "important matters" name generator may not capture the respondent's entire list of close contacts, it is widely recognized as a reliable instrument for assessing the respondent's social connectedness and the availability of social support (B. Cornwell, Laumann, and Schumm 2008; Paik and Sanchagrin 2013). The NSHAP social network roster consists of three different types of rosters: Roster A, B, and C. Respondents were initially asked to list up to five names, which comprises Roster A. If a married/partnered respondent did not list their partner, the partner was included in Roster B. One additional network member whom the respondent was especially close to was listed in Roster C. After listing the names, respondents were asked to identify their relationship with each alter ((e.g., spouse, child, friend). Limiting the sample to those who have children, respondents who named at least one child in the social network roster were coded as having a child tie.

Net loss and net gain in the number of child network ties between Rounds 1 and 2. After returning respondents completed the Round 2 social network module, interviewers showed them the list of network members they had named in Round 1 to confirm newly added, dropped, and maintained ties between the two rounds. Overall difference in the number of child ties between the rounds can be categorized as net loss, no change, and net gain. Net loss refers to reporting child alter loss without additions or reporting more losses than additions. No change indicates respondents reported the same number of child network ties between the rounds. Net gain refers

to reporting child alter addition without any loss or reporting more additions than losses. Given that the samples used to examine losses and additions are different, this study compares those who experienced net loss to those who did not (i.e., no change or net gain) among respondents with at least one child tie at Round 1. For additions, it compares those who experienced net gain to those who did not (i.e., no change or net loss) among respondents who did not report all of their children as network ties at Round 1.

Number of child network alter additions and losses between Rounds 1 and 2. Overall difference in the number of child ties is a summary measure of network change. The measure, however, cannot distinguish respondents who experience the same number of additions and losses of child ties (e.g., report 2 losses and 2 additions) from respondents whose list of child ties remains completely unchanged (Goldman, York Cornwell, and Cornwell 2023). Hence, the present study also examines losses and additions separately by modeling (1) the number of child alter additions between Rounds 1 and 2 and (2) the number of child alter losses between Rounds 1 and 2.

Independent variables

Marital status at Round 1 categorizes older adults into four mutually exclusive dummy categories: continuously married, remarried, divorced, and widowed. Older adults who are cohabiting at Round 1 with no prior history of divorce or widowhood are categorized as continuously married (n = 3). The rest are included in the remarried group.

Marital history-related factors

In addition to current marital status, the analysis includes the years following one's most recent marital dissolution and whether the respondent experienced multiple marital dissolutions. The number of years since the most recent marital dissolution is included to examine if the impact of a marital transition diminishes over time. For continuously married respondents, this measure equals zero. Experiencing multiple dissolutions is measured as a binary variable indicating whether the respondent experienced two or more marital dissolutions.

Covariates

Age (in years), gender (1=female), race-ethnicity (White, Black, Latino, other), education (less than high school, high school, some college, BA or more), self-rated health (1=poor; 5=excellent), current employment status (1=yes), co-residence with a child, proportion of daughters among offspring, and the number of living children are included in all analyses. Following Goldman and Cornwell (2018), the remaining analyses (i.e., overall difference in the number of child ties between Rounds 1 and 2, the number of child alter additions between Rounds 1 and 2, and the number of child alter losses between Rounds 1 and 2) also included network size (1-6), proportion of kin in the network, and the number of child ties. To account for life course events occurring between Rounds 1 and 2, the analyses also incorporate whether the respondent became widowed, partnered, retired, or moved between the rounds.

Analytic Approach

The analyses proceed in two stages. First, I use logistic regression for the analysis of naming any child ties. Three models are estimated. The first model includes current marital

status and covariates. The second model includes years since the last marital loss and multiple dissolutions to examine whether duration and the number of dissolutions can explain the association between marital status and the likelihood of naming a child network tie. Lastly, interaction terms between gender and marital status are included to assess if there are gender differences in the association between marital status and the presence of a child network tie. The analytic sample for the analysis of naming any child ties is 2,526. Starting from 3,005 participants in the baseline sample in Round 1, I excluded those without children (n=219) and those missing information on whether they have children (n=97). Out of the 31 never-married respondents with children in the baseline sample, 23 reported having a child alter. Analyses including this group showed no association between being never married and the presence of child network alter. Among never married older adults with a child alter, 15 participated in Round 2. Due to the small sample size, models estimating network changes returned empty cells for never married respondents. Hence, never-married respondents were excluded from the analysis. Among the reduced sample of 2,658, missing data in terms of item nonresponse are modest, ranging from 0.8% (self-rated health) to 3.7% (number of children).

The second stage of the analysis is based on a smaller sample that comprises respondents who participated in both rounds. Logistic regression is used for the analysis of net loss and net gain in the number of child ties between Rounds 1 and 2. In the case of net loss, the analysis generates odds ratios of reporting a net loss in child ties relative to the reference group, which includes those who reported no change in the number of child ties or a net gain. In the case of net gain, the reference group includes those who reported no change or a net loss. Poisson regression is used to analyze the number of child ties lost and added between the rounds. This modeling strategy is appropriate because the outcomes are counts of child ties. Poisson regression models

predicting child alter losses include the number of child network ties at Round 1 as the exposure variable. For models predicting child alter additions, the number of children at Round 1 subtracted by the number of child network ties at Round 1 is used as the exposure variable. All analyses proceed in the same stepwise fashion as the analysis for naming any child ties. Of the 1,845 Round 1 respondents who reported at least one child alter, 410 did not participate in Round 2. To address the possible selection bias due to attrition, I apply inverse-probability-of-attrition (IPA) weights. First, I estimate logistic regression models to obtain the predicted probability that a respondent will return in Round 2. Following Schafer & Upenicks (2021), demographic and health data available at baseline were used as predictors, including age, age squared, gender, race-ethnicity, education, partnership status, housing type (owns single-family home vs. all else), depressive symptoms, number of comorbidities, self-rated physical and mental health, whether respondent refused to report household assets, ADL difficulty, and an interviewer-rated difficulty of obtaining an interview with the respondent. Then, the inverse of this probability was multiplied by the NSHAP Round 1 respondent-level weights. All models also use the NSHAP sample clustering and stratification to account for sample selection at Round 1.

RESULTS

Descriptive Statistics

Table 5 summarizes the estimated means and proportions of all variables for respondents, comparing those with at least one child network alter to those with none. Approximately 73% of the sample reports having at least one child alter. Notably, only 2.7% of all child ties listed by the sample are ties with stepchildren (results not shown). Although this study does not distinguish between biological and stepchildren, the small proportion of stepchildren ties

indicates that parent-child network ties are predominantly formed within biological families in our sample.

Older adults with a child alter had a lower proportion of remarriage and a higher proportion of widowhood compared to older adults without a child alter. Additionally, older adults with a child alter were older, more likely to be female, and less likely to be Black. A smaller proportion of them was currently working compared to those without a child alter. Regarding marital history, older adults with a child alter were less likely to have experienced multiple marital dissolutions. The number of years passed since the last marital loss was comparable between the two groups.

Table 5: Weighted Means and Proportions by Presence of a Child Network Tie (N=2,526)

	Has at least one child alter (n= 1,845)	No child alter (n=681)	
Variable			
Marital status at R1			
Continuously married	48.8%	49.4%	***
Remarried	20.9%	30.9%	
Divorced	11%	9.7%	
Widowed	19.3%	10.1%	
Age	68.5 (7.7)	66.9 (7.06)	***
Female	57%	38%	***
Education			
Less than high school	18.3%	17.2%	
High school	27.7%	25.8%	
Some college	29.8%	32.1%	
BA or more	24.3%	24.9%	
Race-ethnicity			
White	81.9%	80%	**
Black	8.1%	12.1%	
Latino	7.2%	7%	
Other	2.9%	1.4%	
Self-rated health	3.3 (1.1)	3.3 (1.1)	
Number of children	3.2 (1.8)	3.1 (2)	
Currently working	33.6%	39.3%	*

Living with a child	16%	15.6%	
Proportion of daughter	51.8%	45.1%	***
Two or more marital dissolutions	13.6%	17.4%	*
Years since last dissolution			
Remarried	27.2 (12.9)	27 (11.6)	
Divorced	20.8 (12.1)	21 (14)	
Widowed	11.4 (11.9)_	13.5 (13.6)	

*$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). Differences in the mean values were tested using *t*-tests, and differences in proportions were tested using chi-square tests.

Presence of a Child Network Tie

Table 6 presents the estimated odds ratios of having any child network ties at Round 1, based on logistic regression models. Model 1 includes current marital status and covariates. Compared to continuously married older adults, remarried older adults have lower odds of naming any child alter, while widowed older adults have higher odds. Model 2, which adjusts for the years since the last marital loss and multiple dissolutions, shows that the odds for remarried older adults are reduced to non-significance. The odds for widowed older adults, on the other hand, slightly increase in Model 2. Divorce is also associated with higher odds of having a child alter, but this finding has marginal significance (p = 0.054). These findings suggest that absence of a partner may be associated with a greater likelihood of having a child network tie. Regarding marital history, older adults who experienced multiple dissolutions are less likely to name a child network alter than those who experienced one dissolution or none. A longer duration since the last marital loss is linked to lower odds of naming a child network alter, with marginal significance (p = 0.053). Interaction terms between gender and marital status in Model 3 show no significant gender difference.

Table 6: Odds Ratios from Logistic Regression Models Predicting the Presence of a Child Network Tie (N=2,526)

	Model 1	Model 2	Model 3
Marital status			
Continuously married (ref.)			
Remarried	0.68 [0.48,0.96]*	1.11 [0.63,1.95]	0.99 [0.53,1.83]
Divorced	1.09 [0.70,1.70]	1.72 [0.99,2.98]#	1.94 [1.07,3.51]*
Widowed	1.39 [1.00,1.92]*	1.78 [1.21,2.62]**	1.77 [0.93,3.38
Multiple dissolutions		0.63 [0.47,0.85]**	0.62 [0.46,0.84]**
Years since last marital loss		0.99 [0.97,1.00]	0.99 [0.97,1.00]
Marital status x gender			
Remarried x female			1.40 [0.86,2.28]
Divorced x female			0.83 [0.42,1.63]
Widowed x female			1.04 [0.52,2.06]
Age	1.02 [1.00,1.04]	1.02 [1.00,1.04]*	1.02 [1.00,1.04]*
Female	2.01 [1.60,2.53]***	2.06 [1.63,2.61]***	1.91 [1.36,2.70]***
Education (ref. less than high school)			
High school	1.05 [0.69,1.58]	1.04 [0.69,1.55]	1.05 [0.70,1.57]
Some college	0.99 [0.69,1.43]	1.00 [0.69,1.44]	1.01 [0.70,1.45]
BA or more	1.19 [0.76,1.88]	1.18 [0.75,1.84]	1.19 [0.76,1.86]
Race-ethnicity (ref. White)			
Black	0.59 [0.41,0.84]**	0.58 [0.40,0.84]**	0.58 [0.40,0.83]**
Latino	0.99 [0.64,1.53]	0.96 [0.62,1.51]	0.96 [0.62,1.50]
Other	2.01 [1.00,4.05]	2.02 [0.99,4.13]	2.03 [0.99,4.18]
Self-rated health	1.04 [0.94,1.16]	1.03 [0.93,1.15]	1.03 [0.93,1.15]
Currently working	0.97 [0.76,1.24]	0.97 [0.76,1.24]	0.98 [0.77,1.24]
Number of children	1.07 [0.99,1.15]	1.07 [0.99,1.15]	1.07 [0.99,1.15]
Coresding with children	1.00 [0.70,1.42]	1.00 [0.70,1.42]	1.01 [0.71,1.45]
Proportion of daughters	1.99 [1.42,2.78]***	2.01 [1.43,2.82]***	2.01 [1.43,2.83]***

#$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). 95% Confidence Intervals are reported in brackets.

Network Change over Time: Overall Difference in The Number of Child Ties, and The Number of Child Tie Additions and Losses Between Rounds 1 and 2

Table 7 presents descriptive statistics for the sample of older adults who participated in both Rounds 1 and 2. As described earlier, different analytic samples are used to examine losses (i.e., net loss and the number of losses) and additions (i.e., net gain and the number of additions) of child ties between Rounds 1 and 2. The left column shows means and proportions for variables from respondents with at least one child tie (N=1,402), which is the basis for examining the loss of child ties. About 29% reported a net loss, with an average loss of 0.53 child ties. Descriptive statistics shown in the right column come from a sample excluding those who reported all children as network ties at Round 1 (N=1,357). This sample is used to examine the addition of child ties. About 42% reported a net gain and an average addition of 0.66 child ties.

Table 7: Sociodemographic Characteristics of Respondents Who Participated in Both Rounds 1 and 2

	Respondents with at least one child tie at Round 1	Respondents who did not report all children as network ties at Round 1
	Weighted means/% (SD)	
Overall difference in the number of child ties		
Net loss	29%	
Net gain		42%
Number of child ties lost (0-5)	0.53 (.83)	
Number of child ties added (0-5)		0.66 (.97)
Marital status at R1		
Continuously married	48.5%	46.2%
Remarried	20.8%	26.6%
Divorced	11.7%	11.2%
Widowed	18.9%	15.9%
Age	68.5 (7.9)	67.9 (7.8)

Female	56.5%	49.4%
Education		
Less than high school	19.1%	21.4%
High school	27.6%	26.1%
Some college	29.2%	29.6%
BA or more	24.2%	23%
Race-ethnicity		
White	81.9%	77.7%
Black	7.9%	10.6%
Latino	7.3%	8.7%
Other	2.8%	3%
Self-rated health	3.3 (1.1)	3.2 (1.1)
Number of children	3.3 (1.8)	3.7 (2)
Living with a child	14.8%	16.5%
Proportion of daughter	52%	48.2%
Network size (1-6)	4.5 (1.4)	3.9 (1.6)
Proportion of kin in network	75%	66.4%
Number of child ties at R1	1.86 (.98)	1 (1.1)
Widowed between rounds	8%	7%
Partnered between rounds	2%	1.6%
Retired between rounds	18.9%	21.8%
Moved between rounds	13.8%	13.4%
Two or more marital dissolutions	14%	16.6%
Years since the last dissolution		
Remarried	27 (13.8)	26.5 (13.3)
Divorced	21.4 (12.2)	21.1 (12.9)
Widowed	10.5 (10.3)	10.8 (10.2)
N	1,402	1,357

Table 8 presents odds ratios from logistic regressions predicting a net loss relative to no change or a net gain in the number of child ties between Rounds 1 and 2. Model 1 shows that compared to continuously married older adults, remarried older adults have higher odds of experiencing a net loss than no change or a net gain compared to continuously married and widowed older adults. Once marital history factors are included in Model 2, remarriage is no longer statistically associated with experiencing a net loss in child ties. The higher risks of experiencing a net loss for remarried older adults compared to widowed older adults remain in

Model 2. Interaction terms between gender and marital status in Model 3 show no significant gender difference.

Table 8: Odds Ratios from Logistic Regression Models Predicting Net Loss of Child Ties (N=1,402)

	Model 1	Model 2	Model 3
Marital status			
Continuously married (ref.)			
Remarried	1.54 [1.09,2.17][a]*	1.61 [0.84,3.10][a]	1.67 [0.82,3.42]
Divorced	1.03 [0.63,1.67]	1.08 [0.55,2.13]	1.68 [0.69,4.07]
Widowed	0.71 [0.45,1.12][a]	0.73 [0.42,1.28][a]	0.86 [0.35,2.06]
Multiple dissolutions		0.91 [0.58,1.42]	0.91 [0.58,1.44]
Years since last marital loss		1.00 [0.98,1.02]	1.00 [0.98,1.02]
Marital status x gender			
Remarried x female			0.84 [0.37,1.93]
Divorced x female			0.47 [0.18,1.21]
Widowed x female			0.74 [0.32,1.68]
Age	0.98 [0.96,1.00]	0.98 [0.96,1.00]	0.98 [0.96,1.00]
Female	0.83 [0.59,1.18]	0.84 [0.58,1.20]	0.98 [0.63,1.52]
Education (ref. less than high school)			
High school	0.75 [0.47,1.20]	0.75 [0.47,1.19]	0.75 [0.47,1.18]
Some college	0.56 [0.35,0.90]*	0.56 [0.35,0.90]*	0.55 [0.34,0.88]*
BA or more	0.68 [0.41,1.15]	0.68 [0.41,1.14]	0.67 [0.40,1.12]
Race-ethnicity (ref. White)			
Black	1.58 [0.98,2.54]	1.57 [0.97,2.55]	1.59 [1.00,2.53]*
Latino	1.26 [0.65,2.45]	1.25 [0.63,2.45]	1.27 [0.65,2.48]
Other	1.22 [0.60,2.47]	1.23 [0.61,2.47]	1.24 [0.60,2.58]
Self-rated health	1.11 [0.95,1.29]	1.11 [0.95,1.29]	1.11 [0.95,1.29]
Number of children	0.93 [0.85,1.01]	0.93 [0.84,1.02]	0.92 [0.84,1.01]
Coresding with children	0.84 [0.58,1.21]	0.84 [0.59,1.21]	0.84 [0.59,1.21]
Proportion of daughters	0.71 [0.46,1.09]	0.71 [0.46,1.09]	0.70 [0.46,1.07]
Network size	1.08 [0.93,1.25]	1.08 [0.93,1.25]	1.08 [0.94,1.25]
% Kin in network	1.19 [0.54,2.60]	1.19 [0.54,2.61]	1.16 [0.54,2.50]
Number of child ties R1	2.05 [1.59,2.64]***	2.05 [1.59,2.64]***	2.06 [1.60,2.65]***
Widowed between R1 & R2	0.66 [0.38,1.17]	0.66 [0.38,1.16]	0.64 [0.37,1.13]
Repartnered between R1 & R2	1.14 [0.42,3.13]	1.16 [0.44,3.09]	1.11 [0.43,2.87]
Retired between R1& R2	1.16 [0.80,1.69]	1.16 [0.80,1.68]	1.17 [0.80,1.70]

Moved between R1 & R2	0.67 [0.38,1.19]	0.67 [0.38,1.20]	0.68 [0.38,1.21]

#$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). 95% Confidence Intervals are reported in brackets. [a]Remarried respondents significantly different from widowed respondents at $p < .01$

Table 9 shows the results from logistic regressions predicting a net gain relative to no change or a net loss in the number of child ties between Rounds 1 and 2. Model 1 shows that overall change in the number of child ties does not vary by marital status. When marital history factors are adjusted for in Model 2, remarried (p=0.088) and divorced (p=0.077) older adults have lower odds of reporting a net gain than continuously married older adults with marginal significance. Similar to the findings on net loss, marital status differences regarding the net gain of child ties do not vary by gender.

Table 9: Odds Ratios from Logistic Regression Models Predicting Net Gain of Child Ties (N=1,357)

	Model 1	Model 2	Model 3
Marital status			
Continuously married (ref.)			
Remarried	0.88 [0.61,1.26]	0.61 [0.35,1.08]#	0.54 [0.28,1.05]
Divorced	0.80 [0.55,1.17]	0.59 [0.33,1.06]#	0.70 [0.28,1.75]
Widowed	0.78 [0.48,1.27]	0.67 [0.39,1.16]	0.87 [0.36,2.12]
Multiple dissolutions		1.20 [0.77,1.87]	1.17 [0.75,1.82]
Years since last marital loss		1.01 [0.99,1.03]	1.01 [0.99,1.03]
Marital status x gender			
Remarried x female			1.38 [0.69,2.77]
Divorced x female			0.75 [0.25,2.28]
Widowed x female			0.72 [0.31,1.65]
Age	1.03 [1.01,1.05]**	1.02 [1.01,1.04]**	1.03 [1.01,1.04]**
Female	1.22 [0.97,1.54]	1.21 [0.95,1.53]	1.19 [0.80,1.77]
Education (ref. less than high school)			
High school	1.11 [0.64,1.93]	1.10 [0.63,1.93]	1.12 [0.63,1.97]
Some college	1.24 [0.76,2.05]	1.21 [0.73,2.01]	1.22 [0.74,2.02]

BA or more	0.93 [0.52,1.66]	0.92 [0.52,1.66]	0.93 [0.52,1.67]
Race-ethnicity (ref. White)			
Black	0.89 [0.60,1.34]	0.88 [0.59,1.31]	0.88 [0.59,1.31]
Latino	0.89 [0.53,1.50]	0.88 [0.53,1.49]	0.89 [0.54,1.48]
Other	0.76 [0.28,2.05]	0.75 [0.28,2.02]	0.74 [0.28,2.00]
Self-rated health	0.96 [0.85,1.08]	0.96 [0.85,1.09]	0.96 [0.85,1.08]
Number of children	1.05 [0.97,1.13]	1.05 [0.97,1.14]	1.05 [0.97,1.14]
Coresding with children	1.04 [0.76,1.42]	1.04 [0.75,1.43]	1.05 [0.76,1.45]
Proportion of daughters	0.77 [0.54,1.09]	0.77 [0.54,1.09]	0.77 [0.54,1.11]
Network size	0.91 [0.82,1.01]	0.91 [0.82,1.01]	0.91 [0.82,1.01]
% Kin in network	0.78 [0.44,1.37]	0.78 [0.44,1.39]	0.78 [0.44,1.39]
Number of child ties R1	0.69 [0.57,0.84]***	0.70 [0.58,0.85]***	0.69 [0.57,0.84]***
Widowed between R1 & R2	1.65 [0.95,2.84]	1.68 [0.98,2.89]	1.62 [0.93,2.82]
Repartnered between R1 & R2	1.43 [0.65,3.17]	1.39 [0.60,3.24]	1.26 [0.57,2.83]
Retired between R1& R2	0.94 [0.67,1.32]	0.95 [0.67,1.34]	0.96 [0.68,1.35]
Moved between R1 & R2	1.96 [1.24,3.09]**	2.00 [1.26,3.16]**	1.98 [1.25,3.15]**

#$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). 95% Confidence Intervals are reported in brackets.

Table 10 shows the incidence rate ratios from Poisson models predicting the number of child alter losses. Widowed older adults are less likely to lose child ties compared to continuously married older adults (Model 1). Accounting for marital history factors in Model 2, widowed older adults are no longer statistically different from continuously married older adults in losing child ties. Remarried older adults, on the other hand, are more likely to lose child ties than continuously married older adults. They were also more likely to lose child ties than the widowed older adults. As shown in Model 3, the association between marital status and loss of child ties did not vary by gender.

Table 10: Incidence Rate Ratios from Poisson Models Predicting the Number of Child Tie Losses (N= 1,402)

	Model 1		Model 2		Model 3	
Marital status						
Continuously married (ref.)						
Remarried	1.15 [a]	[0.96,1.39]	1.40*[a]	[1.01,1.94]	1.37	[0.99,1.90]
Divorced	1.11	[0.78,1.57]	1.34	[0.91,1.98]	1.39	[0.91,2.14]
Widowed	0.75*[a]	[0.58,0.98]	0.82 [a]	[0.63,1.06]	0.67*	[0.47,0.96]

Multiple dissolutions			0.78	[0.57,1.06]	0.78	[0.57,1.08]
Years since last marital loss			0.99	[0.98,1.01]	0.99	[0.98,1.00]
Marital status x gender						
Remarried x female					1.08	[0.72,1.63]
Divorced x female					0.96	[0.54,1.70]
Widowed x female					1.35	[0.89,2.05]
Age	0.99	[0.98,1.00]	0.99	[0.98,1.01]	0.99	[0.98,1.01]
Female	0.83*	[0.70,0.97]	0.84*	[0.71,0.99]	0.79	[0.62,1.02]
Education (ref. less than high school)						
High school	0.86	[0.65,1.13]	0.86	[0.65,1.13]	0.86	[0.65,1.13]
Some college	0.79	[0.56,1.11]	0.79	[0.56,1.12]	0.79	[0.56,1.12]
BA or more	0.87	[0.65,1.15]	0.85	[0.64,1.14]	0.85	[0.64,1.13]
Race-ethnicity (ref. White)						
Black	1.30*	[1.04,1.61]	1.30*	[1.05,1.61]	1.28*	[1.03,1.59]
Latino	0.87	[0.65,1.16]	0.86	[0.64,1.15]	0.85	[0.64,1.13]
Other	1.49	[0.95,2.32]	1.48	[0.97,2.26]	1.56*	[1.02,2.39]
Self-rated health	0.99	[0.90,1.09]	0.99	[0.90,1.09]	0.99	[0.90,1.09]
Number of children	1.08***	[1.04,1.13]	1.08**	[1.03,1.12]	1.08**	[1.03,1.13]
Living with a child	0.9	[0.74,1.09]	0.9	[0.74,1.10]	0.9	[0.74,1.10]
Proportion of daughters	0.8	[0.61,1.05]	0.8	[0.61,1.05]	0.8	[0.61,1.06]
Network size	1.1	[0.98,1.22]	1.1	[0.98,1.22]	1.09	[0.98,1.22]
% Kin in network	1.19	[0.72,1.97]	1.19	[0.71,2.00]	1.17	[0.69,1.97]
Number of child ties R1	1.05	[0.93,1.18]	1.05	[0.93,1.18]	1.06	[0.93,1.20]
Widowed between R1 & R2	0.67*	[0.47,0.95]	0.66*	[0.47,0.94]	0.67*	[0.47,0.94]
Repartnered between R1 & R2	1.05	[0.53,2.08]	1.11	[0.60,2.06]	1.14	[0.62,2.11]
Retired between R1& R2	1.06	[0.86,1.30]	1.07	[0.88,1.31]	1.07	[0.87,1.31]
Moved between R1 & R2	0.99	[0.78,1.25]	0.99	[0.78,1.25]	0.98	[0.77,1.25]

*$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). 95% Confidence Intervals are reported in brackets.

[a] Remarried respondents significantly different from widowed respondents at $p < .01$

Table 11 presents the incidence rate ratios from Poisson models predicting the number of child alter additions. According to Model 1, child tie additions do not vary by marital status. These null patterns hold when marital history factors are adjusted for in Model 2, and when interaction terms between gender and marital status are included in Model 3. Notably, being

widowed between rounds and moving between rounds were associated with a higher likelihood of adding child ties. This suggests that the addition of ties may be strongly tied to the recency of life course events rather than marital history.

Table 11: Incidence Rate Ratios from Poisson Models Predicting the Number of Child Tie Additions (N=1,357)

	Model 1	Model 2	Model 3
Marital status			
Continuously married (ref.)			
Remarried	0.94 [0.73,1,22]	1.03 [0.71,1,48]	0.91 [0.59,1,40]
Divorced	0.95 [0.74,1.23]	1.04 [0.72,1.49]	1.18 [0.69,2.02]
Widowed	0.88 [0.64,1.20]	0.92 [0.64,1.31]	0.92 [0.48,1.74]
Multiple dissolutions		0.92 [0.67,1.26]	0.91 [0.67,1.24]
Years since last marital loss		1.00 [0.99,1.01]	1.00 [0.99,1.01]
Marital status x gender			
Remarried x female			1.35 [0.86,2.11]
Divorced x female			0.83 [0.43,1.58]
Widowed x female			1.03 [0.60,1.77]
Age	1.02 [1.00,1.03]**	1.02 [1.00,1.03]**	1.02 [1.01,1.03]**
Female	0.99 [0.84,1.16]	0.99 [0.84,1.16]	0.92 [0.70,1.20]
Education (ref. less than high school)			
High school	0.97 [0.71,1.32]	0.98 [0.72,1.32]	0.99 [0.74,1.34]
Some college	1.08 [0.83,1.41]	1.09 [0.83,1.44]	1.10 [0.85,1.44]
BA or more	0.87 [0.63,1.20]	0.87 [0.63,1.20]	0.88 [0.65,1.21]
Race-ethnicity (ref. White)			
Black	0.84 [0.71,1.00]	0.84 [0.71,1.00]	0.84 [0.71,0.99]*
Latino	1.01 [0.78,1.31]	1.01 [0.78,1.30]	1.01 [0.77,1.31]
Other	1.35 [0.89,2.04]	1.36 [0.90,2.06]	1.35 [0.87,2.09]
Self-rated health	0.97 [0.90,1.03]	0.96 [0.90,1.03]	0.96 [0.90,1.03]
Number of children	0.87 [0.83,0.91]***	0.87 [0.83,0.91]***	0.87 [0.83,0.91]***
Coresding with children	1.07 [0.87,1.32]	1.07 [0.87,1.32]	1.08 [0.88,1.33]
Proportion of daughters	0.76 [0.58,0.98]*	0.76 [0.59,0.98]*	0.75 [0.58,0.98]*
Network size	1.10 [1.03,1.17]**	1.10 [1.03,1.17]**	1.10 [1.03,1.17]**
% Kin in network	0.59 [0.41,0.86]**	0.59 [0.41,0.86]**	0.59 [0.41,0.85]**
Number of child ties R1	1.10 [1.00,1.21]*	1.10 [1.00,1.20]*	1.10 [1.00,1.20]*
Widowed between R1 & R2	1.42 [1.10,1.83]**	1.41 [1.10,1.82]**	1.39 [1.07,1.80]**
Repartnered between R1 & R2	1.03 [0.69,1.54]	1.05 [0.69,1.60]	0.99 [0.63,1.56]
Retired between R1& R2	0.93 [0.76,1.15]	0.94 [0.76,1.15]	0.94 [0.76,1.15]

Moved between R1 & R2	1.67 [1.27,2.20]***	1.67 [1.26,2.20]***	1.66 [1.27,2.16]***

#$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). 95% Confidence Intervals are reported in brackets.

Sensitivity Analyses

This study examined whether marital history is associated with the presence of a child network tie to concentrate on older adults who may be at risk of being socially disconnected from their children. However, marital history may also be associated with listing all children as social network members. Table 12 presents odds ratios from logistic regression models predicting listing all children as social network members at Round 1 among older adults with at least one child. As shown in Model 1, remarried older adults are less likely to list all children as network ties compared to continuously married older adults. However, this difference becomes non-significant when multiple dissolutions and years since the last marital loss are accounted for in Model 2. Interaction terms between gender and marital status in Model 3 indicate that the effect of remarriage is associated with a greater likelihood of listing all children as network ties among women but not among men.

Table 12: Odds Ratios from Logistic Regression Models Predicting Listing All Children as Network Ties (N=1,357)

	Model 1	Model 2	Model 3
Marital status			
Continuously married (ref.)			
Remarried	0.66 [0.49,0.89]**	0.84 [0.49,1.43]	0.63 [0.33,1.19]
Divorced	0.86 [0.57,1.30]	1.08 [0.63,1.84]	0.76 [0.38,1.54]
Widowed	1.07 [0.79,1.45]	1.22 [0.81,1.85]	1.59 [0.86,2.94]
Multiple dissolutions		0.69 [0.43,1.10]	0.68 [0.43,1.08]
Years since last marital loss		1.00 [0.98,1.01]	0.99 [0.98,1.01]

Marital status x gender			
Remarried x female			1.90 [1.02, 3.52]*
Divorced x female			1.82 [0.84,3.94]
Widowed x female			0.78 [0.40,1.52]
Age	1.02 [1.00,1.04]*	1.02 [1.00,1.04]*	1.02 [1.00,1.04]*
Female	1.26 [0.98,1.64]	1.27 [0.98,1.65]	1.08 [0.75,1.57]
Education (ref. less than high school)			
High school	1.50 [1.10,2.03]*	1.49 [1.10,2.02]*	1.50 [1.10,2.05]*
Some college	1.33 [0.92,1.92]	1.33 [0.92,1.94]	1.34 [0.91,1.97]
BA or more	1.59 [1.10,2.03]*	1.57 [1.08,1.22]*	1.58 [1.09,2.29]*
Race-ethnicity (ref. White)			
Black	0.58 [0.37,0.91]**	0.57 [0.36,0.90]*	0.55 [0.35,0.88]*
Latino	0.95 [0.57,1.61]	0.94 [0.55,1.59]	0.94 [0.56,1.58]
Other	0.98 [0.47,2.05]	1.00 [0.48,2.08]	0.96 [0.45,2.05]
Self-rated health	1.03 [0.93,1.14]	1.03 [0.93,1.14]	1.02 [0.92,1.13]
Currently working	0.90 [0.68,1.18]	0.90 [0.68,1.18]	0.89 [0.67,1.19]
Number of children	0.45 [0.40,0.50]***	0.45 [0.40,0.50]***	0.45 [0.40,0.50]***
Coresding with children	0.98 [0.64,1.51]	0.98 [0.64,1.51]	0.99 [0.65,1.51]
Proportion of daughters	1.87 [1.46,2.40]***	1.87 [1.46,2.41]***	1.85 [1.44,2.38]***

#$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-sided tests). 95% Confidence Intervals are reported in brackets.

Additionally, the marital status differences in the parent-child network tie change over time may be due to the difference in the types of support and frequency of support exchange (Marin and Hampton, 2019; Offer and Fischer, 2022). To assess whether this is the case, I included average emotional closeness and average frequency of contact with child alter ties, as proxies for potential support exchange, in the models with significant associations between marital status and overall difference in the number of child network ties (Model 2 in Table 8 for net loss) and the number of child tie losses (Model 2 in Table 10 for the number child tie losses). Results, not shown, indicate that emotional closeness and frequency of contact do not explain the marital status differences in the overall change in the number of child network ties. Findings shown in Model 2 in Table 8 remained the same. Regarding the marital status differences in the

number of child tie losses, the remarried older adults' higher likelihood of greater losses in child ties compared to continuously married older adults was reduced to marginal significance with the inclusion of emotional closeness and frequency of contact. However, the remarried older adults' higher likelihood compared to widowed older adults remained statistically significant. Taken together, emotional closeness and frequency of contact did not appreciably explain the association between marital status and parent-child network tie change over time.

DISCUSSION

The doubling of grey divorce among older adults (S. L. Brown and Lin 2012) and increased repartnering through cohabitation and remarriage (Vespa 2012) are reflected in older adults' varied marital histories. Studies have repeatedly shown that marital transitions shape various aspects of parent-child relationships, such as frequency of contact and support exchange, but the association between the parent's marital history and the dynamics of parent-child network ties for families in later life is less clear. In this study, I considered the parent's current marital status, the number of marital dissolutions, and the time since the last dissolution to examine the ways in which these marital factors are related to the presence and stability of child network ties in older parents' personal discussion networks. Findings from the present study show that children are not a fixed presence in their older parents' personal networks. Approximately 25% of older adults in the sample who had children did not name any children as their network members. Furthermore, among those with child network ties, about 30% of the sample reported a net loss of child ties, and a quarter of the sample reported a net gain in the span of five years. These findings suggest that close kin ties that are assumed to be invariable also go through significant changes.

As hypothesized, remarried older adults generally had more unstable network ties with their children compared to those who were continuously married or widowed. Remarried older adults were less likely to have any child network tie in their networks compared to continuously married older adults. This difference was explained by the number of dissolutions and the time since the last dissolution. Among older adults with child network ties, the relatively more unstable nature of remarried older adults' connection to their children, on the other hand, was not accounted for by marital history factors. Specifically, remarried older adults were more likely to report a greater net loss than widowed older adults, and they were more likely to experience a larger number of losses than continuously married and widowed older adults.

One possible explanation for this finding is that remarried older adults may engage in fewer and less frequent support exchanges with their children compared to continuously married and widowed older adults. Studies show that network members who provide emotional, informational, and instrumental support are less likely to be excluded from personal networks (Fischer and Offer, 2020; Marin and Hampton, 2019). Remarriage introduces new roles and relationships for both the parent and the child. This reorganization of roles and relationships may interfere with the parent-child dynamic, preventing full engagement in each other's lives and limiting the exchange of various types of support in later life. Another explanation is that remarried older adults may more readily stop naming their children as network members when the relationship becomes difficult to maintain, as their relationship with their children is less constrained by norms. People generally tend to disengage from demanding relationships, but close kin who are difficult ties often remain in people's networks due to normative constraints (Offer and Fischer, 2018; Fischer and Offer, 2020). The lack of clearly defined familial roles in

remarriages (A. Cherlin 1978) may make it possible for parents and their children to drift apart when faced with events that negatively impact their relationship.

In line with previous research that finds a strengthened bond between widowed parents and their children (Ha 2008), results from the present study showed that widowhood preserves existing child ties and brings in new ones. Widowed older adults were more likely to name at least one child tie than continuously married older adults. Widowhood at Round 1 was not associated with changes in network ties but becoming widowed between Rounds 1 and 2 was linked to a lower likelihood of reporting losses and a higher likelihood of reporting additions of child ties. This finding aligns with prior research indicating that the recency of widowhood is connected to more frequent contact and support from children (Ha 2008; Zhang, Hsieh, and Lai 2023). The more stable and strengthened relationship between widowed parents and their children is likely due to parents' increased need for support following spousal death. Widowhood is one of the most distressing life events, known to have a stronger negative impact on health and well-being than divorce (I-Fen Lin et al. 2019). Older adults likely rely on children following widowhood, while children provide help and support to their bereaved parent. In addition, marriage, as the central relationship in many people's lives, tends to draw focus and resources, which may otherwise be directed toward maintaining other relationships (Sarkisian and Gerstel 2016). Without a partner, widowed older adults are likely more socially integrated with their children, fostering more closer bonds and more stable relationships.

Divorce was not associated with the presence of a child network tie or changes in the parent-child network dynamics. The pattern of the estimates was roughly similar to that of widowed older adults, but these estimates did not reach statistical significance. It can be

speculated that while singlehood (i.e., divorce and widowhood) promotes greater integration with children, divorced older adults may not need their children for informal support and assistance as much as widowed older adults. Furthermore, although this study accounts for the duration of divorce, many other factors contribute to the intergenerational relationship following divorce, such as the standard of living post-divorce and parents' own adjustment to divorce (Amato 2014). Considering the various circumstances that follow divorce would be important in future research to better understand the network dynamics between divorced parents and their children.

The present study also examined the potential influence of prior marital experiences and marital duration by considering whether the older adult experienced multiple dissolutions and the years since the last dissolution. While these factors were mostly not significantly associated with parent-child network dynamics, some marital status differences were explained by the number of dissolutions and the years since the last marital dissolution. Notably, multiple dissolutions were associated with a lower likelihood of naming any child network ties. This finding suggests that prior marital experiences leave a lasting impact on the dynamics of intergenerational relationships and underscores the need to consider marital history for intergenerational processes.

Contrary to what was hypothesized, I found limited evidence for gender differences in the association between marital status and parent-child network outcomes. This finding contrasts with previous research that identifies gender differences in relationships with children across marital status groups (Zhang et al., 2023), highlighting the importance of understanding what it means to be a network confidant (i.e., network tie) in intergenerational relationships. Most previous studies find gender differences in frequency of contact or emotional closeness, with marital loss having a more negative impact on fathers' relationships with their children. It may be

that being a network confidant captures an aspect of intergenerational relationships that is distinct from frequency of contact or emotional closeness.

There are several limitations in the current study. First, this study cannot control for selection into marital status groups. Early life course events may play a role in older adults' transitions in and out of marriage. Second, the NSHAP dataset lacks data on the life course events and transitions of adult children, which could influence the parent-child relationship. For instance, the marital status of adult children might affect their involvement in their parents' lives. Married children may be less involved in their parents' lives compared to divorced or never-married children because marriage, as a "greedy institution," demands that adult children focus on their own marital relationship (Sarkisian and Gerstel 2008). Exploring how the combined marital histories of adult children and older adults shape intergenerational relationships would be an important avenue for future research. Additionally, this study cannot specify why child network ties were dropped or added from parents' networks. Although NSHAP includes information about why a previously mentioned tie in Round 1 is not included in Round 2, about 70% of the respondents reported 'other reasons' for the tie loss, followed by 16% reporting that the network tie had moved. Further investigating the reasons for tie loss and addition would provide valuable insights into changes in parent-child relationships in later life.

Despite these limitations, this study sheds light on an overlooked aspect of the intergenerational relationship: the parent-child network tie, and how these ties vary across parents' marital histories. Remarried older adults tend to have looser connections with their children compared to those in other marital statuses, whereas widowed older adults maintain more stable connections with their children. An absence of a child network tie does not

necessarily mean there is no relationship between the parent and the child. Similarly, the loss of a child tie likely indicates the tie has become “dormant,” with the parent and child still maintaining some degree of connection (Fischer and Offer, 2020). Given that children often serve as a primary source of support for aging parents, it is crucial to further explore the long-term implications of the absence of child ties and the instability of child ties within personal networks on older adults’ health and well-being.

CHAPTER 4

Social Support, Strain, and Mental Health among Baby Boomers

By 2030, the youngest members of the Baby Boom cohort – born between 1946 and 1964 – will reach 65 years old. This group of older adults ages 65 and older will represent 20% of the U.S. population, up from 13% in 2010 before any Baby Boomers had turned 65 (Colby and Ortman 2014). The aging of this cohort has attracted considerable academic interest as their health and well-being have significant implications for the U.S. healthcare system and social services (Gaudette et al. 2015; Knickman and Snell 2002). Among the key areas of concern is the mental health of Baby Boomers. Research indicates that Baby Boomers generally report lower levels of happiness compared to preceding and succeeding generations (Fukuda 2013; Y. Yang 2008), with emerging evidence that suggests Baby Boomers experience more depressive symptoms than previous generations (Abrams and Mehta 2019; Bishop, Haas, and Quiñones 2022; K. H. Yang et al. 2022). The potential increase in the proportion of older adults with poor mental well-being underscores the need to explore the underlying reasons.

Social support and strain have long been recognized as key factors that contribute to people's mental health and well-being (House, Landis, and Umberson 1988; Kawachi and Berkman 2001; Thoits 2011). Social support is typically associated with better mental health, whereas social strain, independent of social support, is related to worse mental health (H. J. Lee and Szinovacz 2016; Rook 1990). Older adults tend to have fewer social ties than younger adults but are known to be embedded in more supportive relationships, as later life is a period in which emotionally meaningful relationships are prioritized over more casual, peripheral ones (Carstensen 1992; Lansford, Sherman, and Antonucci 1998). This is likely associated with why social relationships are viewed in a more positive light with age (Luong, Charles, and Fingerman

2011; Schnittker 2007). However, older adults cannot completely avoid negative social exchanges. Relationships often serve as sources of both support and strain (Chen and Feeley 2014; H. J. Lee and Szinovacz 2016), and the adverse impact of negative social exchanges (i.e., strain) can be more consequential than the positive social exchanges (i.e., support) for mental health outcomes (Newsom et al. 2005).

Cohort differences in social support and strain may help explain why Baby Boomers have poorer mental health. Compared to the previous generations, Baby Boomers have more varied family experiences. More of them never married (I.-Fen Lin and Brown 2012), they are more frequently divorced (Brown and Lin 2012), and they have fewer children (Colby and Ortman 2014). As they enter old age, they are not necessarily unpartnered (Brown and Wright 2016), but their complex family structures may contribute to lower levels of family support. Additionally, Baby Boomers are likely spending more time as the 'sandwich generation,' providing support and care to both their parents and children compared to previous generations (Wiemers and Bianchi 2015). This prolonged caregiving may heighten their sense of family strain. While the growing importance of friendships may promote greater friend support for Baby Boomers (Fiori, Windsor, and Huxhold 2020), how higher friend support, lower family support, and increased family strain together shape their mental health remains unclear.

Using three rounds of data from the National Social Life, Health, and Aging Project (NSHAP), this chapter examines whether Baby Boomers differ from their parents – the Silent Generation – regarding support and strain from family and friends. It also investigates the extent to which support and strain from family and friends contribute to differences in depressive symptoms, anxiety symptoms, and perceived stress between the two cohorts. By doing so, this chapter aims to shed light on the roles social support and strain play in Baby Boomers' mental

health, contributing to a better understanding of the social connectedness and well-being of the large and aging Baby Boomer population.

BACKGROUND

Baby Boomers in Historical Context

Individuals born within the same time period, known as birth cohorts, are exposed to the same historical events and social conditions at similar ages (Elder 1994; 1998, 199; Ryder 1965). While the U.S. has undergone considerable social changes over the past century affecting all individuals, each cohort experienced these changes at different life stages. The timing at which each cohort encountered these major changes contributes to their distinctiveness. Significant macro-level changes that occur in late adolescence or early adulthood leave a lasting imprint on the cohort, shaping every aspect of their lives, including social relationships and health. For example, the widespread use of oral contraceptives in the late 1960s coincides with the increase in age at first marriage and the proportion of women in professional occupations (Goldin 2004; Goldin and Katz 2002). The widespread use of oral contraceptives likely had a greater impact on Baby Boom women who started to reach adulthood in the 1960s than on women from previous generations who may have already married and started a family by that time. Decisions regarding marriage and career have important implications for family life, or more broadly, social relationships and health in later life. These shared experiences result in birth cohorts not only having similar life patterns that distinguish them from other generations but also developing similar dispositions and value orientations that persist into later life (Mannheim 1952; Ryder 1965; Schuman and Scott 1989). Understanding these cohort-specific characteristics helps to contextualize the social relationships and well-being of the aging Baby Boomers.

Mental Health of Baby Boomers

Recent research presents a complex picture of the health status of Baby Boomers. Earlier studies showed that Baby Boomers were healthier than previous generations owing to factors including medical advancements and their higher educational attainment (Freedman, Martin, and Schoeni 2002; Schoeni, Freedman, and Martin 2008). Contrary to these findings, more recent studies indicate that Baby Boomers' health may not have improved compared to previous generations (H. Choi, Schoeni, and Martin 2016) and might have declined in certain aspects. This cohort faces increased limitations in activities of daily living (ADL), higher prevalence of chronic diseases, and lower self-rated health (Bishop, Haas, and Quiñones 2022; H. Choi and Schoeni 2017; King et al. 2013). Specific to midlife adults, recent studies also found a rise in mortality rates, a reversal of a decades-long declining trend (Case and Deaton 2015; Woolf and Schoomaker 2019).

There are also growing concerns about the mental health of the Baby Boom generation. Studies have shown that Baby Boomers are generally less happy compared to both earlier and later generations (Fukuda 2013; Y. Yang 2008), and there has been an increase in depression among older adults (Yang et al., 2022). In their study of cohort differences in multimorbidity, Bishop et al. (2022) showed that the increase in depressive symptoms was one of the key factors that contributed to the higher prevalence of chronic disease among the Baby Boom cohort. Additionally, studies have also shown that midlife adults in more recent birth cohorts are experiencing more depressive symptoms (Abrams and Mehta 2019) and psychological distress, particularly among White individuals (Case and Deaton 2015).

Several factors may contribute to the observed deterioration in Baby Boomers' mental health. On one hand, the perceived worsening of mental health in this cohort could be attributed

to their greater acceptance and improved treatment of mental health issues. According to a Gallup poll in 2015, Baby Boomers reported the highest rates of depression among all adult age groups, but they also reported the highest rates of depression treatment (McCarthy 2015). Additionally, the decline in public stigma against depression (Pescosolido et al. 2021) may have further encouraged Baby Boomers to seek help (Han et al. 2016), who also are more likely to have benefitted from the research and treatment spurred by the National Mental Health Act in 1946 than earlier generations. From this perspective, the worsening mental health in this cohort might not signify an actual decline.

On the other hand, there are factors that may have genuinely exacerbated Baby Boomers' mental health. The Baby Boom cohort has higher substance use and misuse rates (Blow and Barry 2012; Wu and Blazer 2014), which are significantly associated with mental health problems (N. G. Choi, DiNitto, and Marti 2015). Additionally, the relatively large size of the Baby Boom cohort led them to compete with their peers for social and economic resources while earning less than their expectations (Easterlin, Macdonald, and Macunovich 1990). These experiences may have contributed to their lower emotional well-being (Fukuda 2013; Yang 2008), further impacting their mental health. Although prior research provides some insight into why Baby Boomers may have worse mental health than previous generations, further investigation is needed to uncover additional contributing factors. Particularly, the well-established link between social relationships and mental health, combined with concerns about declining social connectedness, underscores the importance of examining how differences in support exchanges with family and friends between Baby Boomers and other cohorts might explain the poorer mental health observed in the Baby Boom generation.

The Association of Social Support and Strain with Mental Health

A substantial body of research has demonstrated the important role of social relationships in mental health (House, Landis, and Umberson 1988; Kawachi and Berkman 2001; Thoits 2011). Social support and strain, in particular, are key qualitative aspects of social relationships that are closely linked to mental well-being. Social support includes emotional (e.g., feeling loved and cared for), informational (e.g., advice), and instrumental (e.g., help with tasks, provision of money, or labor) assistance that is actually received or believed to be received in times of need (Thoits 2011). It has been shown to influence mental health through its stress-buffering function, helping individuals cope with stressful situations and thereby reducing or eliminating the detrimental effects of stressors on mental health (Cohen 2004; Cohen and Wills 1985). However, social support can also affect mental health even in the absence of adversity, serving as one of the pathways through which social ties promote well-being (Berkman et al. 2000).

Not all social relationships are supportive, and even supportive social relationships can sometimes generate social strain, causing distress (Rook 1984; Walen and Lachman 2000). Social strain represents a distinct dimension of social relationships that affects mental health independently of social support (Rook 1990; Lee and Szinovacz 2016). Importantly, the presence of low social support does not necessarily imply high social strain, as seen in ambivalent relationships, which contain both positive (i.e., high support) and negative (i.e. high strain) aspects (Holt-Lunstad and Uchino 2019). Social strain acts directly as a source of psychological distress (Newsom et al. 2005; Offer 2020), and while individuals tend to disengage from difficult or straining relationships, they frequently maintain these connections when constrained by social norms and obligations, particularly with close kin (Offer and Fischer 2018). Research also

indicates that social strain can have a greater impact than social support on negative aspects of mental well-being, such as depressive symptoms or anxiety (Ingersoll-Dayton, Morgan, and Antonucci 1997; Rook 2015), highlighting the importance of examining both social support and strain together and their associations with mental health.

The Decline of Social Connectedness: Quantity, Quality, and Cohort Differences

The question of whether social connectedness in U.S. society is declining has been a topic of debate among scholars for decades. Robert Putnam (2000) argued that Americans have become increasingly disengaged from voluntary associations and informal social gatherings. On the other hand, Claude Fischer (2011) maintained that social connections have remained stable from the 1970s to the 2000s. Other research has also contributed to this discourse with mixed findings across various dimensions of social connectedness. Some reported a shrinking network size over time (McPherson, Smith-Lovin, and Brashears 2006), whereas others found stable network sizes (Paik and Sanchagrin 2013). Research also found steady levels of informal social participation, and an increase in formal participation (Ang 2019).

While these studies provide insight into the changing structural features of social relationships, the qualitative aspects, such as social support and strain, have received less attention. Even if the number of social ties is declining, that does not necessarily indicate that the quality of relationships is deteriorating. Individuals might compensate for fewer ties by fostering more supportive ones. Conversely, the number of social ties might remain the same, but the level of support could decrease, or the strain could increase. Additionally, changes in social support may occur within specific cohorts (i.e., cohort effect) rather than across the entire population (i.e., period effect).

Cohort differences in social support and strain are not well understood. However, changes in marital relationships, family life, and by extension, friendships suggest that Baby Boomers may have lower family support, higher family strain, and greater friend support than their parents. Baby Boomers have faced more unstable marital unions than previous generations. They came of age during the divorce revolution of the 1970s and 1980s and delayed marriage as more women entered the labor market. Less traditional unions, such as cohabitation, became more accepted and widespread (Cherlin 1990). These early adult experiences have persisted into their midlife and later years, resulting in marital biographies characterized by high rates of divorce and remarriage (Agree and Hughes 2012). Baby Boomers have also led the gray divorce revolution, which refers to the doubling of divorce rates among people aged 50 or older (Brown and Lin 2012). Recent evidence indicates that this trend is unique to Baby Boomers, as gray divorce rates among midlife adults aged 50-64 have stalled while increasing for older adults (Brown and Lin 2022).

Family Support and Strain Dynamics Among Baby Boomers

The higher prevalence of divorce among Baby Boomers may contribute to lower family support, which is linked to poorer well-being (Chen and Feeley, 2014; Lee and Szinovacz, 2016). Divorce weakens intergenerational bonds, particularly for fathers (Büyükkeçeci and Leopold 2024; Noël-Miller 2013), which can result in reduced support from children. In addition, divorce often results in growing distant from extended kin on the spouse's side (Ambert 1988; Gürmen, Anderson, and Brown 2021), further decreasing family social support. Although many Baby Boomers repartner, repartnering does not guarantee family support. Remarried individuals in "blended families" tend to engage less in intergenerational support (Wiemers et al. 2019),

indicating that step kin do not necessarily replace the loss of support from biological kin. While some find that remarriage is associated with an increase in family support (Curran, McLanahan, and Knab 2003), divorced older adults are increasingly repartnering through cohabitation rather than remarriage (Brown et al. 2019). It remains unclear whether cohabitation provides the same level of family support as remarriage.

Low family support does not necessarily equate to high family strain. However, increases in life expectancy (Woolfe and Schoomaker, 2019) and the extended transition to adulthood for young adults (Cohn 2020; Kahn, Goldscheider, and García-Manglano 2013) have likely exposed Baby Boomers to more family strain than their parents. Baby Boomers are a “sandwich” generation, providing support to both adult children and aging parents. While every generation experiences a period of being a "sandwich generation," the duration and intensity of these intergenerational demands are particularly prolonged and pronounced for Baby Boomers. One study found that 54% of Baby Boom women had at least one living parent and a child, compared to 43% of women from the previous generation at the same age, indicating a higher proportion of potentially sandwiched Baby Boomers (Wiemers and Bianchi, 2015). Long-term caregiving for older parents is associated with poorer mental health, especially when the care is intensive (Coe and Van Houtven 2009; Zueras and Grundy 2024). Additionally, the number of adult children co-residing with and receiving financial support from their parents has steadily increased over the past decades (Karen L. Fingerman, Huo, and Birditt 2020; Furstenberg 2010), particularly after the recent economic recession and the COVID-19 outbreak (Cohn, 2020; Kahn et al., 2013). While providing support can be rewarding (Thomas 2010), it also has mental health implications for parents when the costs (e.g., financially dependent children) outweigh the benefits (e.g., caregiving support from children) (Bangerter et al. 2015; Caputo and Cagney 2023).

Friend Support and Strain Dynamics Among Baby Boomers

Despite receiving less support from family, Baby Boomers likely experience greater support from friends compared to the Silent Generation. Social and demographic changes have made friendships increasingly important for Baby Boomers. This generation, characterized by more complex family structures than previous ones (K. L. Fingerman et al. 2012), likely often turns to friends for social resources that were once primarily provided through marriage and kin. Research conducted in Europe indicates that older adults from more recent cohorts have a higher proportion of friends or non-kin in their social networks compared to those from earlier cohorts (Huxhold 2019; B. Suanet, van Tilburg, and Broese van Groenou 2013; Bianca Suanet and Antonucci 2016). This trend suggests that Baby Boomers in the US may also be less dependent on traditional extended family ties and have more diverse social networks. Furthermore, the rise in kinlessness—aging without a partner or children (Margolis and Verdery 2017; Verdery and Margolis 2017)—has created opportunities for Baby Boomers to form and rely on meaningful friendships for support (Mair 2019). However, even if Baby Boomers have more friend support than the previous generation, this greater friend support likely plays a smaller role in explaining cohort differences in mental health compared to family support. Family members, particularly close kin such as spouses and children, tend to form the closest social ties in older adults' lives (Antonucci and Akiyama 1987; Cantor 1979). Indeed, research shows that while friend support is positively associated with the mental health of older adults, its associations with mental health are generally weaker than those of family support (Gariépy, Honkaniemi, and Quesnel-Vallée 2016; H. J. Lee and Szinovacz 2016). As such, the greater friend support may not compensate for the lower family support and higher family strain.

Unlike friend support, there is limited evidence to make inferences about cohort differences in friend strain. Friends differ from family in that individuals can more easily withdraw from stressful friendships (Offer and Fischer 2018). Family relationships are often governed by norms and obligations, whereas friendships are more voluntary (Antonucci and Akiyama, 1995). Individuals are not obligated to endure social strain from friends, and as a result, friends who are perceived as "difficult" tend to not remain in older adults' social networks (Offer and Fischer 2018). Even when negative exchanges occur, they may have a lesser impact on mental well-being compared to family strain (Lee and Szinovacz, 2016), as individuals know that they can dissolve the relationship on their own terms. While friend strain is linked to worse mental health, there is no prior research to suggest Baby Boomers are more likely (or less likely) to experience friend strain. As such, the present study does not formulate a hypothesis on the cohort differences in friend strain but includes friend strain as a potential mediator that may explain the cohort differences in mental health.

The Present Study

The main goals of this study are to examine whether and the extent to which social support and strain from family and friends contribute to the cohort differences in depressive symptoms, anxiety symptoms, and perceived stress. Specifically, this study examines the Baby Boom cohort at ages 57-67 and the Silent Generation cohort at the same ages. Baby Boomers' more complex family experiences, along with social and demographic shifts, may have led them to receive or perceive less social support from family while experiencing more family strain compared to their parents. Conversely, the growing importance of friendships and the increase in non-kin social ties suggest that Baby Boomers are likely to receive more support from friends than their parents

did. Based on these considerations, the study proposes the following first hypothesis regarding cohort differences in social support and strain:

Hypothesis 1. Baby Boomers report lower family support, higher family strain, and higher friend support compared to the Silent Generation.

Recent studies examining Baby Boomers' mental health mostly focused on depressive symptoms (Yang et al., 2022; Bishop et al., 2022). This study aims to extend prior research by investigating if the worsening mental health of Baby Boomers is also evident in anxiety symptoms and perceived stress.

Hypothesis 2. Baby Boomers have more depressive symptoms, anxiety symptoms, and perceived stress compared to the Silent Generation.

Extant research has not examined whether cohort differences in mental health could be associated with social support and strain from family and friends. As such, the final hypothesis explores the mediating role of social support and strain in the relationship between cohort membership and mental health outcomes.

Hypothesis 3. Social support and strain from family and, to a lesser extent, social support and strain from friends partially explain the cohort differences in mental health.

DATA AND METHODS

Data

This study utilizes all three rounds of the National Social Health and Aging Project (NSHAP). In 2005-2006, NSHAP conducted its first round of interviews with adults aged between 57-85 years (N = 3,005). Respondents in this cohort all belong to the Silent Generation. The second round, conducted in 2010-2011, re-interviewed the original cohort along with their cohabiting spouses/partners (N = 3,377). In 2015-2016, the third round included returning respondents from previous rounds (N = 2,409) and a new cohort of Baby Boomers and their partners (N = 2,368). Data collection involved in-home interviews and a leave-behind questionnaire (LBQ), which respondents completed and mailed back.

To examine age-matched cohort differences, this study follows the sample selection method from Waite et al. (2021). Data included 3,816 observations from 3,033 respondents who were 57-67 years old at the time of the interview (74.7% with one observation, 24.8% with two observations, and 0.5% with three observations). This sample comprises 1,372 Silent Generation members from Round 1, 917 Silent Generation and 123 Baby Boom members from Round 2, and 27 Silent Generation and 1,377 Baby Boom members from Round 3. Using this sample, this study compares Baby Boomers at ages 57-67 to the Silent Generation at ages 57-67 in 2005-06 (Round 1), 2010-11 (Round 2), and 2015-16 (Round 3). This approach assumes that period effects are small.

The analytic sample for the final analyses varies depending on the extent of missing data across the dependent variables. Two of the three mental health outcomes – anxiety symptoms and perceived stress – were collected through the LBQ in all three rounds. Similarly, social

support and strain measures in Round 3, but not Rounds 1 and 2, were collected through the LBQ. Therefore, respondents who did not return their LBQ lacked mental health, social support, and strain information. Consequently, 3,458, 3,483, 3,430, and 3,421 respondents (out of the final sample of 3,816) are included in the analyses of family support, family strain, friend support, and friend strain, respectively. In terms of mental health outcomes, 3,165, and 3,217 are included in the analyses of anxiety symptoms and perceived stress, respectively. Multiple imputation was employed to address missing data, as detailed below.

Measures

Dependent variables: Depressive symptoms, anxiety symptoms, and perceived stress. This study considers depressive symptoms, anxiety symptoms, and perceived stress as mental health outcomes. These measures come from well-established and widely used short-form scales. The recoding of response categories and item scoring follow the guidelines provided by Payne et al. (2014).

Depressive symptoms were assessed using the 11-item version of the Center for Epidemiologic Studies Depression (CES-D) scale. Respondents were presented with 11 depressive symptoms and reported how frequently they experienced each symptom during the past week. The response options included: "Rarely or none of the time," "Some of the time," "Occasionally," and "Most of the time." Following Payne et al. (2014), these categories were recoded as follows: 0 = "Rarely or none of the time," 1 = "Some of the time," and 2 = "Much or most of the time." The scores for each of the 11 items were added together to create a total score ranging from 0 to 22. Higher scores indicate a greater number of depressive symptoms.

Anxiety symptoms were identified using the 7-item Hospital Anxiety and Depression Scale's Anxiety Subscale (HADS-A). Respondents rated how often they experienced anxiety symptoms during the past week on a 4-point scale ranging from 0 ("Rarely or none of the time") to 3 ("Most of the time"). Summing the scores of the 7 items produces a total score ranging from 0 to 21, with higher scores indicating greater anxiety.

Perceived stress was measured using the 4-item version of the Perceived Stress Scale (PSS). Respondents rated the frequency of perceived stress symptoms in the past week using the following categories: "Rarely or none of the time," "Some of the time," "Occasionally," and "Most of the time." Following Payne et al. (2014), "Occasionally" and "Most of the time" were combined so that each item ranged from a score of 0 ("Rarely or none of the time") to 2 ("Much or most of the time"). The final score was calculated by summing all items, resulting in a total score ranging from 0 to 8. Higher scores indicate greater perceived stress.

Focal independent variables. The focal independent variables of this study are cohort membership and social support and strain from family and friends. Cohort membership is a binary indicator (Baby Boom = 1; Silent Generation = 0), with the Silent Generation as the reference group in the analysis. Social support was measured by asking how often respondents could "open up to" and "rely on" family members or friends. Social strain was assessed by asking how often respondents' family members or friends would "make too many demands" and "criticize" them. Each item was asked separately for family members and friends, with responses ranging from 1 ("Never/Hardly ever") to 3 ("Often"). Responses were averaged separately for family and friends to create four measures: (1) family support, (2) family strain, (3) friend support, and (4) friend strain. Each measure ranged from 1 to 3. The Cronbach's alphas for these measures were 0.67, 0.5, 0.71, and 0.5, respectively.

Demographic characteristics Gender (female=1), age (in years from 57to 67), marital status (married/partnered=1), race and ethnicity (White, Black, Latino, Other), and education (less than high school, high school, some college, BA or more) are included as demographic characteristics.

Health-related factors. The analyses adjust for health status and health behaviors. Health status includes the number of comorbidities and Activities of Daily Living (ADLs). Building on previous research (Vasilopoulos et al. 2014), the number of conditions respondents reported having been diagnosed with by a doctor was summed to create a comorbidity score. The conditions considered were: congestive heart failure (1), heart attack (1), coronary procedure (1), stroke (1), diabetes (1), arthritis (1), chronic pulmonary disease (1), dementia (1), non-metastatic cancer excluding skin cancer (2), and metastatic cancer other than skin cancer (6). Assigned points for each condition are shown in parentheses. The total score ranged from 0 to 16. Activities of Daily Living (ADLs) were assessed using six items: walking across a room, dressing, bathing, eating, getting in and out of bed, and toileting. A respondent was considered to have difficulty with a task if they reported experiencing at least "some difficulty." The responses were then summed to create a score ranging from 0 to 6. Health behaviors include whether the respondent is a current smoker (yes = 1), physically active (exercise 3 or more times per week = 1), and a current heavy drinker (yes = 1). Heavy drinking was defined according to the guidelines provided by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). For men, heavy drinking is consuming five or more drinks on any day or 15 or more drinks per week. For women, it is consuming four or more drinks on any day or eight or more drinks per week.

Social participation. Informal social participation was measured using a question that asked respondents how frequently they got together socially with friends or relatives in the past year. Response categories range from 0 (“Never”) to 6 (“Several times a week”). Formal social participation combined three items that asked respondents how frequently they (1) volunteered and attended (2) religious services and (3) group meetings (e.g., a choir, a committee or board, a support group, a sports or exercise group) in the past year. For each item, response options were on a 6-point Likert scale ranging from 0 (“Never”) to 6 (“Several times a week”). Following the guidelines from Waite et al. (2021), items were recoded and summed to produce a total score that ranged from 0 to 6.

Analytic Strategy

The analyses are conducted in four stages. First, means and proportions for all variables used in the analysis are presented separately for the Silent Generation and the Baby Boom cohort. Bivariate comparisons are made with 2-tailed *t*-tests for continuous variables and $\chi 2$ tests for categorical variables. Next, ordinary least squares regression is used to examine cohort differences in family support and strain, as well as friend support and strain. Cohort membership, demographic characteristics, health-related factors, and social participation measures are included in the analysis. Findings remained consistent when ordered logistic regression was used instead of ordinary least squares regression.

Then, ordinary least squares regression is used to analyze depressive symptoms, anxiety symptoms, and perceived stress. For each mental health outcome, four models are fitted to investigate whether mental health varies between the two cohorts and to assess the role of social support and strain in explaining cohort differences in mental health. Model 1 includes cohort

membership and all control variables. Model 2 incorporates social support and strain from family members. Model 3 replaces family support and strain with social support and strain from friends. Model 4 includes social support and strain measures from both family and friends.

Finally, the Karlson/Holm/Breen (KHB) (Breen, Karlson, and Holm 2013) method is used to test hypothesis 3, which proposes that cohort differences in mental health are partially explained by social support and strain. The KHB method is suitable for testing hypothesis 3 as it allows for the decomposition of the total effects of cohort membership into direct and indirect effects. A significant indirect effect indicates that social support and strain from family or friends serve as pathways through which cohort membership is associated with mental health outcomes.

NSHAP consists of an in-person questionnaire and a leave-behind questionnaire (LBQ). Most missing data for the present study comes from measures included in the LBQ, such as anxiety symptoms, perceived stress, social support and strain, and formal and informal social participation. To address this, multiple imputation (M = 10) with chained equations was employed. All measures used in the analysis were included in the imputation model, but analyses were restricted to only those cases with observed values on the dependent variable. For instance, non-imputed social support and strain measures were used when they were dependent variables, but imputed cases were included when they served as mediators in the regression models.

Imputed data are used to decompose the total effect of cohort membership into direct and indirect effects. However, disentangling the effects of each mediator is not possible using imputed data. Thus, I use non-imputed data to quantify and compare the contribution of each mediator to the cohort differences in mental health. All models also use the NSHAP sample clustering and stratification to account for sample selection (O'Muircheartaigh et al. 2021). All analyses are conducted using Stata 18.0.

RESULTS

Descriptive Statistics

Table 13 presents means and distributions of all variables included in the study by cohort. Baby Boomers had worse mental health than the Silent Generation across all mental health outcome measures; Baby Boomers reported higher depressive symptoms, anxiety symptoms, and perceived stress. Baby Boomers also showed poorer relationship quality compared to the Silent Generation cohort. Baby Boomers reported lower family and friend support and higher family strain than the Silent Generation. In terms of demographic characteristics, compared to the Silent Generation, a greater proportion of Baby boomers were women than men, younger, and reported higher education. No significant differences were found between the two cohorts in the proportion of those who are married and distributions of race-ethnicity groups. Concerning health-related factors, Baby Boomers reported fewer comorbidities and ADLs, but were less physically active than the Silent Generation. In addition, Baby Boomers were comparable to the Silent Generation in terms of informal social participation but were less engaged in formal social participation.

Table 13: Descriptive Statistics: Means and Proportions by Cohort

Variables	Silent Generation	Baby Boom	*p*-value	n
Mental health				
Depression (0-22)	4.5 (4.4)	5.3 (4.7)	0.001	3781
Anxiety (0-21)	4 (3.6)	4.4 (3.6)	0.019	3165
Stress (0-8)	2.1 (2.2)	2.3 (2.2)	0.022	3217
Social support and strain				
Family support (1-3)	2.5 (.6)	2.4 (.6)	0.027	3458
Family strain (1-3)	1.3 (.5)	1.4 (.5)	0.000	3483
Friend support (1-3)	2.21 (.6)	2.15 (.7)	0.046	3430
Friend strain (1-3)	1.13 (.3)	1.15 (.3)	0.287	3421

Female	49%	58%	0.006	3816
Age (57-67)	63 (2.9)	61.7 (3.1)	0.000	3816
Partnered	74.4%	72.2%	0.268	3816
Race-ethnicity			0.477	3805
White	79.1%	75.9%		
Black	10.1%	12.5%		
Latino	7.8%	7.8%		
Other	3%	3.8%		
Education			0.008	3816
<High school	13.2%	9.1%		
High school	23.7%	20.9%		
Some college	31.8%	40.9%		
Bachelor's or more	31.3%	29.1%		
Comorbidities (0-9)	1.2 (1.4)	1.1 (1.3)	0.002	3816
Activities of Daily Living (ADLs) (0-6)	.5 (1.2)	.4 (1.1)	0.292	3816
Current smoker	19.6%	19.7%	0.961	3816
Physically active (Exercise 3 or more times a week)	55.6%	47.4%	0.000	3814
Heavy drinker	23.8%	21.7%	0.202	2268
Informal social participation (0-6)	4.4 (1.2)	4.4 (1.2)	0.461	3167
Formal social participation (0-6)	2 (1.8)	1.8 (1.7)	0.019	3139

Note. Descriptive statistics are calculated before the imputation. Comparisons are made with 2-tailed *t*-tests for continuous variables and $\chi 2$ tests for categorical variables.

Cohort Differences in Support and Strain

Before examining the cohort differences in mental health and whether support and strain explain the difference, the present study first sought to assess whether there are cohort differences in support and strain. Table 14 displays results from ordinary least squares regression predicting cohort differences in social support and strain. Adjusting for demographic characteristics, health-related factors, and social participation, Baby Boomers reported lower family support (β: -0.09, $p < .001$) and friend support (β: -0.09, $p < .01$) than the Silent Generation. Baby Boomers also reported higher levels of family strain (β:-0.05, $p < .01$), but no

significant difference was observed in friend strain between the two cohorts, supporting hypothesis 1.

Table 14: Coefficients from Ordinary Least Squares Regression Models Predicting Family and Friend Support and Strain

	Family support		Family strain		Friend support		Friend strain	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Baby Boom	-0.086***	(0.023)	0.053**	(0.019)	-0.091**	(0.031)	0.016	(0.014)
Female	0.273***	(0.028)	0.117***	(0.016)	0.249***	(0.030)	-0.031*	(0.013)
Age	-0.002	(0.005)	-0.016***	(0.003)	-0.013**	(0.004)	-0.008***	(0.002)
Partnered	0.057	(0.034)	-0.039*	(0.018)	-0.064*	(0.028)	-0.084***	(0.017)
Race/ethnicity (ref. White)								
Black	-0.018	(0.034)	0.117***	(0.034)	-0.154***	(0.038)	0.073***	(0.020)
Latino	-0.073*	(0.034)	0.112**	(0.040)	-0.319***	(0.045)	0.062*	(0.027)
Other	-0.124*	(0.061)	0.117	(0.067)	-0.222**	(0.066)	0.137*	(0.063)
Education (ref. less than high school)								
HS or equivalent	0.083*	(0.035)	0.014	(0.038)	0.016	(0.049)	-0.008	(0.024)
Some college	0.036	(0.039)	0.001	(0.037)	0.008	(0.038)	-0.022	(0.023)
BA or above	0.003	(0.048)	0.01	(0.041)	0.053	(0.039)	-0.047*	(0.024)
Comorbidities	0.004	(0.010)	0.016*	(0.008)	-0.012	(0.008)	0.013*	(0.006)
ADLs	-0.003	(0.015)	0.025**	(0.008)	-0.004	(0.011)	0.014**	(0.005)
Current smoker	-0.046	(0.040)	0.043	(0.028)	-0.02	(0.040)	0.023	(0.016)
Physically active	0.006	(0.022)	0.018	(0.020)	-0.001	(0.028)	0.033*	(0.013)
Heavy drinker	0.041	(0.033)	0.009	(0.027)	0.024	(0.037)	0.02	(0.019)
Informal social participation	0.069***	(0.011)	-0.002	(0.009)	0.089***	(0.013)	-0.009	(0.006)
Formal social participation	0.021**	(0.008)	0.011	(0.006)	0.035***	(0.009)	0.008*	(0.004)
Constant	2.040***	(0.294)	2.170***	(0.208)	2.564***	(0.283)	1.713***	(0.149)
N	3458		3483		3430		3421	

Note: *: $p < .05$, **: $p < .01$, ***: $p < .001$.

Cohort Differences in Mental Health

Tables 15, 16, and 17 present results from ordinary least squares regression models predicting depressive symptoms, anxiety symptoms, and perceived stress, respectively. Model 1 in Table 15 shows that Baby boomers report more depressive symptoms than the Silent Generation cohort (β:0.66, $p < .01$). Even after accounting for family support and strain in Model 2, Baby Boomers still show higher depressive symptoms, though the difference decreases (β:0.52, $p < .01$). As expected, family support is inversely related to depressive symptoms (β:-0.64, $p < .001$), whereas family strain shows a positive relationship (β:1.76, $p < .01$). In Model 3, where family support and strain are replaced with friend support and strain, Baby Boomers continue to show more depressive symptoms than the Silent Generation (β:0.59, $p < .01$), but the coefficient is larger than in Model 2. Similar to family support and strain, friend support is linked to fewer depressive symptoms (β:-0.52, $p < .001$) while friend strain is linked to more depressive symptoms (β:2.06, $p < .001$). The final model, which includes all support and strain measures, shows that the difference in depressive symptoms between the cohorts is further reduced but remains significant (β:0.49, $p < .05$). Both family and friend support are negatively associated with depressive symptoms (β:-0.54, $p < .01$ for family support; (β:-0.36, $p < .01$ for friend support), while both strain measures are positively associated (β:1.51, $p < .001$ for family strain; (β:1.34, $p < .001$ for friend strain).

Table 15: Coefficients from Ordinary Least Squares Regression Models Predicting Depressive Symptoms (N =3,781)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Baby Boom	0.661**	(0.197)	0.523**	(0.194)	0.588**	(0.191)	0.494*	(0.191)
Female	0.499**	(0.179)	0.457**	(0.164)	0.693***	(0.185)	0.592***	(0.173)
Age	-0.101***	(0.022)	-0.075***	(0.022)	-0.090***	(0.021)	-0.072**	(0.022)
Partnered	-1.643***	(0.188)	-1.538***	(0.186)	-1.510***	(0.184)	-1.468***	(0.184)
Race/ethnicity (ref. White)								
Black	0.167	(0.328)	-0.042	(0.338)	-0.052	(0.328)	-0.158	(0.335)
Latino	-0.028	(0.340)	-0.275	(0.319)	-0.328	(0.325)	-0.441	(0.315)
Other	0.617	(0.460)	0.298	(0.497)	0.205	(0.508)	0.073	(0.530)
Education (ref. less than high school)								
HS or equivalent	-0.578	(0.311)	-0.549	(0.308)	-0.538	(0.310)	-0.528	(0.309)
Some college	-0.561*	(0.275)	-0.552*	(0.269)	-0.514	(0.269)	-0.523	(0.266)
BA or above	-1.171***	(0.291)	-1.195***	(0.285)	-1.035***	(0.289)	-1.102***	(0.287)
Comorbidities	0.337***	(0.064)	0.314***	(0.063)	0.302***	(0.062)	0.294***	(0.062)
ADLs	0.869***	(0.085)	0.819***	(0.079)	0.839***	(0.083)	0.807***	(0.079)
Current smoker	0.538*	(0.265)	0.421	(0.254)	0.469	(0.266)	0.392	(0.257)
Physically active	-0.653***	(0.166)	-0.676***	(0.159)	-0.716***	(0.158)	-0.715***	(0.156)
Heavy drinker	0.486*	(0.234)	0.484	(0.244)	0.45	(0.235)	0.461	(0.245)
Informal social participation	-0.386***	(0.077)	-0.335***	(0.075)	-0.323***	(0.080)	-0.301***	(0.078)
Formal social participation	-0.08	(0.055)	-0.085	(0.052)	-0.077	(0.053)	-0.082	(0.051)
Family support			-0.641***	(0.161)			-0.539**	(0.167)
Family strain			1.762***	(0.240)			1.508***	(0.234)
Friend support					-0.520***	(0.137)	-0.360*	(0.142)
Friend strain					2.057***	(0.357)	1.338***	(0.340)
Constant	13.620***	(1.442)	11.104***	(1.626)	11.362***	(1.489)	10.036***	(1.670)

Note: *: p < .05, **: p < .01, ***: p < .001.

Table 16 presents the results for anxiety symptoms. Model 1 reveals that the Baby Boom cohort reports more anxiety symptoms than the Silent Generation (β:0.38, $p < .05$). This difference disappears when family support and strain are included in Model 2, with family support negatively (β:-0.27, $p < .05$) and strain positively (β:1.63, $p < .001$) related to anxiety symptoms. When friend support and strain are introduced in place of family measures in Model 3, Baby Boomers' greater anxiety symptoms reappear (β:0.33, $p < .05$). Friend support is associated with fewer anxiety symptoms (β: -0.35, $p < .01$) while friend strain is linked to more anxiety symptoms (β:1.87, $p < .001$). When all the measures are included in Model 4, there is no significant difference in anxiety symptoms between the cohorts. Both strain measures are associated with greater anxiety symptoms (β:1.4, $p < .001$ for family strain; (β:1.24, $p < .001$ for friend strain), but only friend support is linked to fewer anxiety symptoms (β:-0.26, $p < .05$).

Table 16: Coefficients from Ordinary Least Squares Regression Models Predicting Anxiety Symptoms (N=3,165)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Baby Boom	0.379*	(0.160)	0.273	(0.160)	0.333*	(0.156)	0.258	(0.158)
Female	0.506**	(0.157)	0.396*	(0.161)	0.658***	(0.159)	0.511**	(0.165)
Age	-0.025	(0.019)	-0.001	(0.019)	-0.013	(0.020)	0.003	(0.020)
Partnered	0.293	(0.188)	0.380*	(0.184)	0.427*	(0.189)	0.453*	(0.188)
Race/ethnicity (ref. White)								
Black	0.107	(0.253)	-0.075	(0.271)	-0.105	(0.256)	-0.193	(0.267)
Latino	-0.098	(0.283)	-0.287	(0.252)	-0.313	(0.277)	-0.409	(0.252)
Other	-0.21	(0.311)	-0.447	(0.308)	-0.561	(0.314)	-0.648*	(0.322)
Education (ref. less than high school)								
HS or equivalent	-0.57	(0.370)	-0.559	(0.346)	-0.546	(0.371)	-0.546	(0.351)
Some college	-0.557	(0.304)	-0.569	(0.290)	-0.527	(0.306)	-0.548	(0.295)
BA or above	-0.760*	(0.320)	-0.780*	(0.308)	-0.657*	(0.324)	-0.708*	(0.314)
Comorbidities	0.174**	(0.055)	0.151**	(0.051)	0.142**	(0.054)	0.133*	(0.051)
ADLs	0.353***	(0.067)	0.298***	(0.063)	0.323***	(0.065)	0.286***	(0.062)
Current smoker	0.326	(0.203)	0.246	(0.182)	0.274	(0.191)	0.223	(0.177)
Physically active	-0.278	(0.149)	-0.302*	(0.147)	-0.323*	(0.152)	-0.328*	(0.150)
Heavy drinker	0.568*	(0.268)	0.558	(0.270)	0.527	(0.266)	0.531	(0.271)
Informal social participation	-0.244***	(0.061)	-0.221***	(0.062)	-0.204**	(0.067)	-0.197**	(0.066)
Formal social participation	-0.03	(0.050)	-0.04	(0.049)	-0.031	(0.049)	-0.039	(0.048)
Family support			-0.274*	(0.123)			-0.203	(0.124)
Family strain			1.625***	(0.226)			1.397***	(0.232)
Friend support					-0.350**	(0.111)	-0.260*	(0.112)
Friend strain					1.872***	(0.347)	1.241***	(0.343)
Constant	6.422***	(1.340)	3.472*	(1.320)	4.059**	(1.478)	2.325	(1.443)

Note: *: p < .05, **: p < .01, ***: p < .001.

As shown in Table 17, the patterns in the results for perceived stress are similar to those observed for depressive symptoms. Across all models, regardless of which social support and strain measures are included, Baby Boomers exhibit significantly higher perceived stress than the Silent Generation. The cohort difference is largest in Model 1 (β:0.30, $p < .01$) when no support or strain measures are included, and smallest when all measures are included (β:0.246, $p < .05$). The reduction in the cohort difference is greater when family support and strain are included in Model 2 (β:0.25, $p < .05$) compared to when friend support and strain are included in Model 3 (β:0.26, $p < .05$). Both family and friend strain are consistently positively associated with perceived stress. Similarly, family support is consistently negatively associated with perceived stress. Friend support does not show a significant relationship with perceived stress in any of the models.

Table 17: Coefficients from Ordinary Least Squares Regression Models Predicting Perceived Stress (N =3,217)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Baby Boom	0.302**	(0.106)	0.250*	(0.105)	0.282**	(0.100)	0.246*	(0.100)
Female	0.218	(0.113)	0.202	(0.108)	0.283*	(0.120)	0.248*	(0.114)
Age	0.035**	(0.011)	0.044***	(0.011)	0.041***	(0.011)	0.047***	(0.011)
Partnered	-0.082	(0.093)	-0.04	(0.092)	-0.019	(0.092)	-0.002	(0.093)
Race/ethnicity (ref. White)								
Black	0.236	(0.153)	0.148	(0.161)	0.139	(0.155)	0.101	(0.162)
Latino	0.362	(0.188)	0.264	(0.181)	0.264	(0.171)	0.221	(0.165)
Other	0.418	(0.220)	0.294	(0.243)	0.254	(0.253)	0.207	(0.264)
Education (ref. less than high school)								
HS or equivalent	-0.481*	(0.205)	-0.465*	(0.202)	-0.472*	(0.205)	-0.460*	(0.203)
Some college	-0.559**	(0.170)	-0.558**	(0.167)	-0.542**	(0.170)	-0.545**	(0.167)
BA or above	-0.745***	(0.170)	-0.753***	(0.170)	-0.697***	(0.173)	-0.721***	(0.174)
Comorbidities	0.014	(0.035)	0.005	(0.034)	-0.001	(0.033)	-0.003	(0.033)
ADLs	0.225***	(0.033)	0.201***	(0.033)	0.211***	(0.033)	0.196***	(0.033)
Current smoker	0.056	(0.140)	0.01	(0.134)	0.028	(0.135)	-0.001	(0.132)
Physically active	-0.277**	(0.096)	-0.284**	(0.095)	-0.301**	(0.097)	-0.299**	(0.096)
Heavy drinker	0.079	(0.146)	0.079	(0.152)	0.063	(0.152)	0.069	(0.155)
Informal social participation	-0.177***	(0.038)	-0.159***	(0.039)	-0.160***	(0.041)	-0.151***	(0.041)
Formal social participation	-0.054	(0.028)	-0.056*	(0.028)	-0.057*	(0.028)	-0.058*	(0.028)
Family support			-0.248**	(0.087)			-0.233*	(0.093)
Family strain			0.727***	(0.122)			0.609***	(0.117)
Friend support					-0.122	(0.089)	-0.051	(0.095)
Friend strain					0.916***	(0.183)	0.619***	(0.168)
Constant	1.182	(0.743)	0.17	(0.763)	-0.062	(0.794)	-0.532	(0.782)

Note: *: $p < .05$, **: $p < .01$, ***: $p < .001$.

KHB Analysis

Whether support and strain play a mediating role in cohort differences in mental health are formally tested using the KHB method (Breen et al., 2013), as shown in Table 18. The KHB method decomposes the effect of cohort (total effect) on mental health outcomes into direct and indirect effects. The indirect effect here represents the portion of cohort differences in mental health attributable to support and strain. These tests are conducted based on the final model (Model 4 for Tables 15, 16, and 17) for each mental health outcome. The cohort differences mediated by family support and strain are depicted in Paths A, C, and E on the left panel, and by friend support and strain are shown in Paths B, D, and F on the right panel.

The results indicate that friend support and strain do not significantly mediate the cohort differences in mental health outcomes. In contrast, family support and strain serve as pathways through which Baby Boomers are linked to worse mental health outcomes. Specifically, as shown in Paths B, D, and F (right panel), none of the indirect effects are statistically significant. Conversely, Paths A, C, and E (left panel) reveal that family support and strain partially mediate the cohort differences in depressive symptoms, anxiety symptoms, and perceived stress, respectively.

Table 18: KHB Analysis Results by Family and Friend Support and Strain

Mediating role of family support and strain			Mediating role of friend support and strain		
A. Cohort → Family support and strain → Depression			B. Cohort → Friend support and strain → Depression		
	Coef.	*p*		Coef.	*p*
Total effect	.588	**	Total effect	.523	**
Direct effect	.494	**	Direct effect	.494	**
Indirect effect	.094	**	Indirect effect	.029	-
C. Cohort → Family support and strain → Anxiety symptoms			D. Cohort → Friend support and strain → Anxiety symptoms		
	Coef.	*p*		Coef.	*p*
Total effect	.333	*	Total effect	.273	-
Direct effect	.258	-	Direct effect	.258	-
Indirect effect	.075	*	Indirect effect	.029	-
E. Cohort → Family support and strain → Perceived stress			F. Cohort → Friend support and strain → Perceived stress		
	Coef.	*p*		Coef.	*p*
Total effect	.282	**	Total effect	.250	*
Direct effect	.246	*	Direct effect	.246	*
Indirect effect	.036	*	Indirect effect	.004	-

Note: *: p < .05, **: p < .01, ***: p < .001.

Family support and strain together partly explain why Baby Boomers may have worse mental health, but which factor contributes more? Table 19 displays the separate contributions of family support and strain. It should be noted that these results derive from unimputed data, as the KHB method does not allow for disentangling each mediator using imputed data. Consequently, the coefficients differ from those in the regression models, but the substantive findings remain consistent. As shown in Table 19, the proportion of the cohort difference in mental health outcomes explained by family support and strain ranges from 15.8% (perceived stress) to 24.2% (anxiety symptoms). The majority of the mediated effect is through family strain rather than family support. Specifically, for depressive symptoms, 13.5% of the 20.7% overall mediated proportion is contributed by family strain. In the case of anxiety symptoms, family strain accounts for 20.5% of the 24.2% overall mediated proportion. For perceived stress, 10% of the 15.8% overall mediated proportion is contributed by family strain.

Table 19: Breakdown of the Indirect Effect: Contribution of Family Support and Strain

Cohort → Family support and strain → Depressive symptoms		
	Coef.	% explained
Total effect	.512**	
Direct effect	.406*	
Indirect effect	.106**	20.7%
via family support		7.2%
via family strain		13.5%
Cohort → Family support and strain → Anxiety symptoms		
	Coef.	% explained
Total effect	.350*	
Direct effect	.265	
Indirect effect	.085*	24.2%
via family support		3.7%
via family strain		20.5%
Cohort → Family support and strain → Perceived stress		
	Coef.	% explained
Total effect	.278**	

Direct effect	.234*	
Indirect effect	.044**	15.8%
via family support		5.8%
via family strain		10%

Note: *: p < .05, **: p < .01, ***: p < .001. Results derive from unimputed data.

DISCUSSION

Baby Boomers experienced young adulthood amid profound social, economic, and political changes, and these changes set the course for the trajectories of social relationships and health over their life course. This study examined Baby Boomers' social support and strain from family and friends and whether these factors play a role in explaining their mental health outcomes. The results from this study showed that Baby Boomers have lower family and friend support and higher family strain than the previous generation, the Silent Generation, suggesting they are in poorer quality social relationships. Additionally, the findings showed that the Baby Boom cohort experiences more depressive symptoms, anxiety symptoms, and perceived stress compared to the Silent Generation. Support and strain from family, but not from friends, partially accounted for the poorer mental health of Baby Boomers.

Findings from the study suggest that Baby Boomers are in poorer quality relationships with their family and friends than their parents' generation. As hypothesized, Baby Boomers had lower family support and higher family strain than the Silent Generation. While this study does not directly test why this might be the case, the more heterogeneous and complex family experiences (Fingerman, 2012), the rise in kinlessness (Margolis and Verdery, 2017; Verdery and Margolis, 2017), and the prolonged period spent as a sandwich generation providing for both parents and children (Wiemers and Bianchi, 2015) may be associated with Baby Boomers' weaker bonds with family. Contrary to expectations, however, Baby boomers also reported lower

friend support. This finding is at odds with European studies that noted the growing salience of friends in older adults' social networks (Huxhold, 2019; Suanet and Antonucci, 2016). More importantly, these findings call attention to the potential decline in social connectedness. Previous research mostly focused on the decline of the structural aspects of people's social lives, such as network size and social participation, and has often suggested that social connectedness is not declining. Findings from this study demonstrate the need for future research to examine changes in the qualitative aspects of social relationships over time.

As hypothesized, Baby Boomers had more depressive symptoms, anxiety symptoms, and perceived stress than the Silent Generation. This finding aligns with previous research finding a rise in depressive symptoms among more recent cohorts of older adults (Bishop et al., 2022; Yang et al., 2022) and suggests that Baby Boomers may be at risk for a range of mental health conditions beyond depressive symptoms. Prior studies have noted increasing levels of perceived stress (Case and Deaton, 2015) and anxiety symptoms (H. Zheng and Echave 2021) among White individuals. This study specifically focuses on older Baby Boomers and highlights the importance of addressing a broad spectrum of mental health issues within this cohort. Examining these issues is crucial for gaining a comprehensive understanding of the mental health of today's older adults and for developing strategies to improve their overall well-being.

Baby Boomers' poorer mental health was partially explained by family support and strain, but not by friend support and strain, supporting hypothesis 3. This pattern was consistent across all three mental health outcomes. While including support and strain from family and friends reduced the cohort difference in mental health outcomes in the regression analyses, KHB analyses revealed that only support and strain from family significantly mediated the association between cohort membership and mental health. This finding suggests that family members play a

more prominent role in older adults' mental well-being than friends (Antonucci and Akiyama 1987; Cantor 1979). It also underscores the importance of considering various sources of support and strain when examining older adults' social relationships and their impact on mental health (Chen and Feeley 2014; Pierce and Quiroz 2019). Notably, family strain explained Baby Boomers' poorer mental health more than family support did. This could be due to the stronger association of negative aspects of relationships with negative dimensions of well-being (Ingersoll-Dayton et al., 1997). Future research should also explore the positive dimensions of well-being, such as subjective well-being and life satisfaction.

Several limitations of this study should be noted. First, the present study cannot establish a temporal order between support and strain and mental health outcomes. While this study conceptualized support and strain from family and friends as contributing to mental health, it is also possible that older adults who maintain better mental well-being foster more supportive relationships (Pierce and Quiroz 2019). Future research will need additional rounds of the NSHAP data to establish a causal relationship. Second, support and strain were each measured using only two items, which limits the depth of the analysis. For instance, social support includes emotional, informational, and instrumental support. The current measures do not allow for more fine-grained analyses that explore if Baby Boomers are receiving less of a specific type of support or social support in general. Understanding which types of support are lacking will be important for future research. Last, age-matched cohort differences can only be examined with two cohorts, Baby Boomers and the Silent Generation, using NSHAP. Recent studies show that the health decline is not particular to Baby Boomers, but a trend observed for Baby Boomers and later cohorts (H. Zheng et al. 2023; H. Zheng and Echave 2021). Further investigation is needed to confirm if later cohorts are also in less supportive and more difficult relationships.

Despite these limitations, this study highlights the quality of Baby Boomers' relationships with family and friends and their implications for mental health. The weak bonds with family and friends observed among Baby Boomers call for further research into whether Baby Boomers are receiving social support from alternative sources. Understanding the social support networks available to Baby Boomers is a crucial step toward improving their health and well-being as they age.

CHAPTER 5

Conclusion

The overarching goal of this dissertation was to reassess existing measures of social connectedness and explore potential changes in social connectedness, thereby advancing our understanding of its links to older adults' well-being. As social relationships and their impact on well-being evolve over time and across different contexts, it is essential to develop new ways to understand social connectedness. Utilizing data from the National Social Life, Health, and Aging Project (NSHAP), a nationally representative, longitudinal survey of older adults, this dissertation presented three empirical analyses. These analyses focused on: (1) differentiating between in-person and remote modes of contact to highlight how decreases in in-person contact impacted health behaviors during the COVID-19 pandemic, (2) investigating the association between marital history and the stability and availability of parent-child ties to explore a potential aspect of social childlessness, and (3) examining cohort differences in social support and strain to explain the mental health challenges faced by Baby Boomers. In this section, I provide a brief summary of the findings and detail the contributions of each chapter to the existing literature on social connectedness and well-being.

Chapter 2 highlights the role of in-person contact in maintaining healthy behaviors for older adults during the pandemic. Despite increases in other remote modes of contact, decreases in in-person contact were associated with worsening health behaviors. This chapter contributes to existing literature in two significant ways.

First, it underscores the distinct importance of in-person contact. Prior studies often aggregated different modes of contact into a single measure of contact frequency. The finding that remote contact could not compensate for the loss of in-person interactions emphasizes the

unique value of in-person contact for older adults' well-being. This is particularly relevant given the optimism about using technology to keep older adults socially connected (Antonucci, Ajrouch, and Manalel 2017). While not dismissing the potential of technological advancements, this chapter, along with other studies (Hawkley et al. 2021; Teo et al. 2015), highlights the importance of making sure that older adults have opportunities for physical in-person interactions with close others.

Second, by differentiating between low levels of in-person contact and decreases in in-person contact, this chapter showed that research should move beyond setting a fixed threshold to define social connectedness. The finding that low levels of in-person contact were not associated with health behaviors, while decreases in in-person contact were, indicates that the impact on well-being may not be about meeting a specific number of interactions but rather about the change over time. This highlights the importance of longitudinal data and the need to consider the changes in social connectedness in understanding their effects on older adults' health.

Chapter 3 showed that the availability and stability of parent-child social network ties for older adults are contingent on the parent's current marital status and prior marital transitions. Specifically, the absence of a partner was associated with a greater likelihood of having a child network tie. On the other hand, remarried older adults were more likely to lose child network ties over a span of five years compared to widowed and, to a lesser extent, continuously married older adults.

This chapter contributes to the literature by highlighting the dynamic nature of parent-child relationships in later life. Recent longitudinal studies on older adults' social networks have noted that while the overall size and composition of these networks remain stable, individual ties

are frequently lost and new ones are formed (Cornwell et al. 2021). The finding that about one-third of the older adults in the sample lost child ties within five years indicates that parent-child ties are also subject to this continuous churn. This challenges the assumption that parent-child bonds are always present and stable, raising important questions about the implications of such changes.

Additionally, Chapter 3 brings attention to how remarriage contributes to parent-child network ties. Remarried older adults generally had more unstable ties with their children compared to those who were continuously married or widowed. This finding suggests that while remarried older adults may benefit from the support of a spouse, they are at a disadvantage in their connectedness to children, which may limit their receipt of informal social support from them. Whether having a spouse can compensate for the potential instability in parent-child ties could be an avenue for future research.

Chapter 4 highlighted the poorer relationship quality Baby Boomers have with their family and friends compared to the Silent Generation and how this cohort difference may contribute to Baby Boomers' worse mental health. Compared to the Silent Generation, Baby Boomers reported lower support from family and friends, higher family strain, and greater levels of depressive symptoms, anxiety, and perceived stress. The support and strain from family, but not from friends, partially accounted for the poorer mental health of Baby Boomers.

This chapter contributes to the literature by indicating a potential decline in social connectedness in terms of relationship quality. Extant research has mostly focused on structural aspects of social connectedness, such as social network size and social participation, without addressing the quality of interpersonal relationships. The observed decline in relationship quality, alongside suggestive evidence of declining marital quality (Wright, Brown, and Manning

2023), is concerning as these findings suggest that Baby Boomers may lack adequate support networks. These findings underscore the need for future research to investigate the underlying causes and to explore whether older adults have other sources of support they can rely on.

This chapter also emphasizes the importance of social connectedness– specifically, lower support and higher strain – in examining the deteriorating health of Americans. While overall population health has improved in terms of morbidity and mortality, the Baby Boomer cohort has exhibited an increase in both morbidity and mortality (Case and Deaton 2015; Bishop, Haas, and Quiñones 2022; H. Zheng and Echave 2021; H. Zheng et al. 2023). This chapter demonstrates that relationship quality may significantly impact the mental health of Baby Boomers, suggesting further investigation into whether relationship quality also affects other areas of health.

The three empirical studies are not without limitations. Here, I discuss three common limitations and propose directions for future research to address them. First, the studies cannot establish causal relationships; therefore, the results should be interpreted as associations. In Chapters 2 and 4, there is a possibility of reverse causation. For instance, worsening health behaviors, such as exercising less and drinking more, might lead older adults to see less of their family and friends in person. Although adjustments were made for health behaviors reported in 2015, this is insufficient to establish temporal order. Similarly, poor mental health might prevent older adults from maintaining positive social relationships (Chapter 4). In Chapter 3, while parents' marital history precedes the social network data, establishing causality is challenging due to potential selection issues. Characteristics that lead to multiple marital dissolutions may also influence older adults' relationships with their children. Moving forward, additional rounds of NSHAP data would be beneficial in addressing these limitations.

Another limitation is that these chapters did not explore how the findings might differ across socioeconomic status and race/ethnicity groups. Social connectedness is not equally distributed across the population. For example, geographic proximity to kin varies by income and race/ethnicity, with high-income White individuals living farther from their kin compared to their socially disadvantaged counterparts (H. Choi et al. 2020; Spring et al. 2023). This suggests that not being able to see close family in-person during the pandemic may have had less of an impact on those with high socioeconomic backgrounds or White individuals (Chapter 2). Similarly, Black and less-educated older adults were more likely to report a loss of a child network tie over time than White and more-educated older adults, despite having more frequent contact with children at baseline (Goldman and Cornwell, 2018). Given that Black individuals and those with low socioeconomic status also have higher rates of marital instability than their socially advantaged counterparts (Schweizer 2019), the stability of their intergenerational network ties could be at greater risk (Chapter 3). Additionally, the overall increase in morbidity and mortality among middle-aged and older Americans is particularly pronounced among less-educated White individuals (Case and Deaton 2015). Studies have found that there are racial/ethnic differences in the causes of this increase (Zheng and Echave 2021). Future research should consider how the associations shown in this dissertation vary across socioeconomic status and race/ethnicity groups to better promote social connectedness for everyone. Finally, while not a limitation per se, the findings from this dissertation invite future studies to explore how the well-being and health outcomes used in each chapter may relate to other areas of health. Chapter 2 linked decreases in in-person contact to health behaviors. Relatedly, recent research shows that physical touch, such as hugging and patting on the back, is associated with better health and well-being, particularly when exchanged among people with positive relationships (J. E. Lee and

Cichy 2020; Thomas and Kim 2021). Future research should investigate how in-person contact and aspects of in-person contact, such as physical touch, relate to other health outcomes. Similarly, Chapter 3 conceptualized the availability and stability of parent-child network ties as a dimension of social well-being, but these ties likely have implications for other areas of health. For example, mothers who were estranged from their children reported worse self-reported health compared to those who had socially close or even socially distant relationships with their children (Reczek, Thomeer, and Bijou 2024). Although Chapter 3 does not view instability in parent-child network ties as estrangement, it is important to closely follow older adults who consistently lack children in their social networks or experience high turnover, to examine whether these factors adversely impact their physical and mental health. Chapter 4 focused on mental health, but the decline in population health is observed across various areas such as physiological dysregulation (Zheng and Echave 2021), cognitive functioning (H. Zheng 2021), and multimorbidity (Bishop et al., 2022). Further investigation is needed to examine whether the quality of social relationships is linked to these other health outcomes.

In sum, this dissertation examined social connectedness during COVID-19, across marital histories, and between cohorts, exploring its relationship to well-being. As time progresses and circumstances change, the ways in which social connectedness is defined, measured, and understood will inevitably evolve. Future research should continue to examine social connectedness in ways that reflect the changing realities of our society to promote the health and well-being of older adults.

Appendix A: Appendix of Chapter 2

Table A.1 Regression on Low Physical Activity, Drinks in Week, Current Smoking Status, and Feeling Rested.

	Low physical activity (6= "never")		Drinks in week		Current smoker		Feeling rested (4= "never")	
	Model 1 OR (95%CI)	Model 2 OR (95%CI)	Model 3 IRR (95% CI)	Model 4 IRR (95% CI)	Model 5 OR (95%CI)	Model 6 OR (95%CI)	Model 7 OR (95%CI)	Model 8 OR (95%CI)
Physical activity in 2015 (1-6)	1.43*** [1.35, 1.51]	1.42*** [1.35, 1.50]						
Drinks per week in 2015			1.22*** [1.19,1.25]	1.22*** [1.19,1.25]				
Smoker in 2015					126.04*** [71.4,222.4]	139.02*** [76.3,253.2]		
Restless sleep in 2015 (1-4)							1.50 *** [1.38,1.63]	1.38*** [1.27,1.51]
Social Isolation								
Infrequent in-person family contact during COVID	1.01 [0.87,1.17]	0.99 [0.86,1.15]	1.13 [0.87,1.45]	1.09 [0.86,1.38]	1.50 [0.84,2.69]	1.48 [0.85,2.59]	1.10 [0.89,1.35]	1.05 [0.84,1.31]
Infrequent in-person friend contact during COVID	1.23 [0.99,1.54]	1.22 [0.98,1.52]	0.83 [0.64,1.07]	0.82 [0.63,1.06]	0.61 [0.31,1.23]	0.67 [0.34,1.31]	0.98 [0.78,1.22]	0.91 [0.73,1.13]
Emotional Well-being During COVID								
Loneliness (0-9)		1.02 [0.98,1.08]		1.05 [0.99,1.10]		0.85* [0.75,0.98]		1.11*** [1.05,1.17]
Anxiety (0-6)		1.08 [1.00,1.18]		1.02 [0.92,1.14]		1.17 [0.88,1.56]		1.35*** [1.25,1.46]
Felt depressed (1-4)		1.11 [0.96,1.27]		1.06 [0.88,1.27]		1.12 [0.76,1.66]		1.29*** [1.13,1.47]
Covariates								
Female	1.00 [0.85,1.18]	0.96 [0.82,1.13]	0.99 [0.74,1.32]	0.96 [0.73,1.26]	0.70 [0.44,1.12]	0.63 [0.38,1.05]	1.08 [0.90,1.30]	0.96 [0.80,1.16]
Age	1.01 [1.00,1.02]	1.01* [1.00,1.03]	1.00 [0.98,1.02]	1.00 [0.98,1.02]	0.97 [0.94,1.00]	0.97 [0.93,1.00]	0.97*** [0.96,0.98]	0.97*** [0.96,0.98]
Race/ethnicity (ref. White)								
Black	1.04 [0.82,1.32]	1.10 [0.87,1.38]	1.18 [0.68,2.03]	1.25 [0.72,2.17]	1.41 [0.62,3.22]	1.35 [0.58,3.15]	0.79 [0.59,1.05]	0.90 [0.67,1.21]

Hispanic	0.83 [0.57,1.22]	0.88 [0.60,1.28]	0.52* [0.31,0.88]	0.54* [0.32,0.89]	0.92 [0.30,2.85]	0.91 [0.29,2.85]	0.82 [0.56,1.20]	0.94 [0.64,1.37]
Other	0.90 [0.55,1.48]	0.91 [0.55,1.49]	1.17 [0.57,2.40]	1.19 [0.59,2.41]	1.06 [0.41,2.69]	1.04 [0.39,2.74]	0.99 [0.58,1.68]	0.95 [0.53,1.70]
Education (ref. High school)								
Less than high school	0.73 [0.49,1.09]	0.74 [0.49,1.11]	1.41 [0.73,2.73]	1.33 [0.71,2.47]	0.63 [0.24,1.67]	0.60 [0.23,1.55]	1.09 [0.70,1.68]	1.10 [0.72,1.70]
Some college	0.70** [0.54,0.91]	0.69** [0.53,0.90]	0.83 [0.55,1.24]	0.81 [0.54,1.20]	0.92 [0.49,1.73]	0.96 [0.49,1.88]	1.03 [0.79,1.35]	1.01 [0.72,1.35]
BA or more	0.56*** [0.41,0.75]	0.55*** [0.41,0.74]	1.09 [0.75,1.59]	1.05 [0.72,1.53]	0.40* [0.19,0.84]	0.43* [0.20,0.93]	0.90 [0.67,1.21]	0.86 [0.63,1.16]
Partnered	0.84 [0.69,1.01]	0.88 [0.73,1.06]	1.15 [0.90,1.46]	1.27* [1.02,1.59]	0.40** [0.22,0.72]	0.33** [0.18,0.63]	0.94 [0.75,1.17]	1.15 [0.91,1.46]
Functional limitations	1.16** [1.05,1.27]	1.13** [1.03,1.23]	0.97 [0.83,1.13]	0.95 [0.82,1.11]	0.78* [0.62,0.99]	0.77* [0.60,0.99]	1.14* [1.02,1.28]	1.09 [0.98,1.21]
Comorbidities	1.13** [1.04,1.21]	1.12** [1.04,1.21]	1.07 [0.94,1.22]	1.07 [0.94,1.22]	1.02 [0.85,1.23]	1.04 [0.86,1.27]	1.09* [1.01,1.18]	1.08 [1.00,1.17]
Finances since COVID-19 (ref. no change)								
Worse off	1.32* [1.03,1.69]	1.19 [0.92,1.54]	0.85 [0.61,1.18]	0.78 [0.56,1.07]	1.73 [0.87,3.43]	1.84 [0.87,3.89]	1.78*** [1.39,2.28]	1.25 [0.97,1.61]
Better off	0.65* [0.44,0.97]	0.65* [0.44,0.96]	0.59* [0.38,0.91]	0.59* [0.38,0.91]	1.19 [0.42,3.42]	1.39 [0.54,3.61]	1.06 [0.67,1.70]	1.03 [0.65,1.62]
Concern about COVID-19	1.04* [1.01,1.08]	1.03 [0.99,1.06]	0.93* [0.88,0.99]	0.92** [0.86,0.98]	1.01 [0.92,1.12]	1.02 [0.91,1.15]	1.01 [0.97,1.06]	0.95* [0.91,0.99]
Increased phone family contact	0.87 [0.68,1.12]	0.87 [0.68,1.12]	0.83 [0.63,1.10]	0.82 [0.63,1.08]	1.18 [0.52,2.64]	1.23 [0.54,2.85]	0.89 [0.69,1.14]	0.88 [0.69,1.13]
Increased messaging family contact	1.10 [0.87,1.38]	1.11 [0.87,1.40]	1.15 [0.87,1.51]	1.14 [0.87,1.49]	0.93 [0.48,1.82]	0.88 [0.44,1.76]	0.87 [0.65,1.15]	0.86 [0.65,1.14]
Increased video call family contact	0.98 [0.76,1.27]	0.98 [0.75,1.28]	1.13 [0.84,1.53]	1.13 [0.84,1.52]	1.24 [0.49,3.14]	1.30 [0.51,3.28]	1.33* [1.05,1.69]	1.34* [1.05,1.69]
Increased phone friend contact	1.05 [0.80,1.37]	1.05 [0.80,1.37]	0.99 [0.74,1.32]	1.01 [0.75,1.37]	0.76 [0.37,1.59]	0.81 [0.37,1.79]	1.25 [0.89,1.76]	1.24 [0.86,1.78]

Increased messaging friend contact	1.00 [0.78,1.29]	0.95 [0.73,1.23]	0.88 [0.68,1.14]	0.82 [0.62,1.08]	0.65 [0.22,1.88]	0.67 [0.22,2.02]	1.08 [0.79,1.48]	0.92 [0.68,1.23]
Increased video call friend contact	0.91 [0.68,1.21]	0.90 [0.68,1.21]	1.16 [0.82,1.66]	1.21 [0.85,1.72]	0.25* [0.09,0.70]	0.24** [0.08,0.66]	0.75* [0.57,0.98]	0.72* [0.54,0.94]
Change in household size (ref. no change)								
Decrease	1.00 [0.80,1.24]	1.02 [0.81,1.24]	1.78** [1.25,2.53]	1.71** [1.23,2.38]	1.22 [0.69,2.14]	1.24 [0.69,2.24]	0.90 [0.72,1.13]	0.91 [0.72,1.15]
Increase	1.34* [1.04,1.73]	1.40** [1.09,1.81]	1.78* [1.04,3.04]	1.90* [1.09,3.33]	1.18 [0.49,2.85]	1.21 [0.50,2.90]	1.21 [0.92,1.59]	1.40* [1.07,1.85]
Month of interview (ref. Sep 2020)								
Oct 2020	0.76 [0.57,1.01]	0.74* [0.56,0.99]	0.82 [0.60,1.13]	0.83 [0.61,1.14]	1.17 [0.50,2.72]	1.23 [0.53,2.85]	0.97 [0.75,1.27]	0.91 [0.70,1.19]
Nov 2020	0.87 [0.66,1.14]	0.83 [0.63,1.10]	0.75 [0.49,1.16]	0.74 [0.48,1.14]	0.79 [0.30,2.06]	0.77 [0.29,2.07]	0.94 [0.68,1.32]	0.84 [0.59,1.20]
Dec 2020	1.05 [0.77,1.45]	1.02 [0.75,1.40]	1.09 [0.68,1.75]	1.09 [0.67,1.80]	0.74 [0.21,2.58]	0.65 [0.17,2.49]	0.77 [0.48,1.21]	0.65 [0.42,1.00]
Jan 2021	1.28 [0.84,1.95]	1.24 [0.81,1.90]	0.94 [0.42,2.07]	0.97 [0.44,2.13]	1.60 [0.47,5.44]	1.49 [0.41,5.44]	1.06 [0.61,1.85]	0.93 [0.53,1.62]
Interview mode (ref. Web)								
Phone	0.69* [0.48,0.99]	0.73 [0.50,1.06]	0.50** [0.32,0.79]	0.52** [0.33,0.81]	1.61 [0.62,4.19]	1.65 [0.63,4.35]	1.07 [0.70,1.65]	1.20 [0.78,1.85]
PAPI	1.37* [1.04,1.79]	1.40* [1.07,1.84]	0.67 [0.42,1.08]	0.66 [0.41,1.08]	0.73 [0.30,1.82]	0.76 [0.30,1.93]	0.97 [0.69,1.36]	1.01 [0.73,1.41]
Constant			1.87 [0.48,7.38]	1.57 [0.40,6.09]	0.38 [0.03,4.51]	0.46 [0.04,5.48]		
N	2,496		2,396		2,405		2,453	

Notes: p* < .05; p ** < .01 p *** < .001 (two-tailed tests). We use ordered logistic regressions for physical activity and poor sleep, negative binomial regression for drinks per week, and logistic regression for smoking status.

Table A.2 Multinomial Logistic Regression on Changes in Physical Activity and Drinking Behavior since COVID-19 Began (Relative Risk Ratios, 95% Confidence Intervals)

	Physical activity				Drinking			
	Baseline		+ Emotional well-being		Baseline		+ Emotional well-being	
	Less vs. About the same	More vs. About the same	Less vs. About the same	More vs. About the same	Less vs. About the same	More vs. About the same	Less vs. About the same	More vs. About the same
Social Isolation								
Perceived decrease in in-person family contact since COVID	1.88*** [1.42,2.48]	1.23 [0.87,1.72]	1.77*** [1.32,2.37]	1.18 [0.84,1.66]	1.59 [0.98,2.57]	1.52* [1.07,2.16]	1.56 [0.96,2.53]	1.47* [1.03,2.09]
Perceived decrease in in-person friend contact since COVID	1.71*** [1.31,2.24]	0.99 [0.70,1.40]	1.52** [1.17,1.98]	0.91 [0.64,1.29]	1.18 [0.66,2.12]	2.04** [1.34,3.12]	1.14 [0.64,2.03]	1.66* [1.07,2.59]
Emotional Well-being During COVID								
Loneliness (0-9)			1.20*** [1.13,1.28]	1.12** [1.04,1.19]			1.06 [0.94,1.19]	1.20** [1.07,1.36]
Anxiety (0-6)			1.07 [0.96,1.20]	1.10 [0.98,1.23]			1.02 [0.83,1.26]	1.20 [1.00,1.46]
Felt depressed (1-4)			0.91 [0.76,1.10]	0.89 [0.74,1.07]			0.87 [0.64,1.19]	1.16 [0.83,1.62]
Covariates								
Female	1.05 [0.82,1.34]	1.21 [0.86,1.70]	1.01 [0.79,1.28]	1.17 [0.84,1.64]	0.65 [0.40,1.06]	1.10 [0.73,1.68]	0.65 [0.39,1.09]	1.02 [0.65,1.58]
Age	0.98* [0.97,1.00]	0.96*** [0.94,0.98]	0.98* [0.97,1.00]	0.96*** [0.95,0.98]	0.98 [0.95,1.01]	0.96** [0.93,0.98]	0.98 [0.95,1.01]	0.96** [0.93,0.99]
Race/ethnicity (ref. White)								
Black	1.03 [0.68,1.56]	1.07 [0.65,1.74]	1.17 [0.75,1.81]	1.16 [0.70,1.92]	1.09 [0.53,2.24]	1.04 [0.55,1.97]	1.11 [0.54,2.28]	1.43 [0.75,2.75]
Hispanic	0.97 [0.62,1.50]	0.71 [0.37,1.82]	1.09 [0.70,1.71]	0.75 [0.40,1.43]	0.88 [0.35,2.18]	0.59 [0.22,1.55]	0.89 [0.36,2.23]	0.76 [0.32,1.85]
Other	1.23 [0.67,2.28]	0.75 [0.31,1.82]	1.26 [0.69,2.30]	0.75 [0.31,1.85]	0.14* [0.03,0.75]	0.76 [0.24,2.37]	0.15* [0.03,0.78]	0.90 [0.32,2.51]

Education (ref. High school)								
Less than high school	1.10	1.69	1.16	1.77	1.69	0.10**	1.67	0.07**
	[0.68,1.76]	[0.77,3.70]	[0.70,1.93]	[0.80,3.88]	[0.70,4.09]	[0.02,0.48]	[0.69,4.04]	[0.01,0.38]
Some college	1.51*	1.77*	1.46*	1.72*	0.55	0.96	0.53	0.93
	[1.05,2.18]	[1.15,2.74]	[1.02,2.10]	[1.11,2.65]	[0.29,1.06]	[0.48,1.92]	[0.28,1.03]	[0.43,2.02]
BA or more	2.03***	2.50***	1.93***	2.41***	1.15	1.97*	1.11	2.10
	[1.44,2.88]	[1.58,3.96]	[1.37,2.71]	[1.51,3.86]	[0.65,2.05]	[1.02,3.80]	[0.63,1.96]	[0.98,4.49]
Partnered	0.69**	0.99	0.85	1.12	0.59*	0.97	0.62	1.40
	[0.52,0.90]	[0.66,1.49]	[0.64,1.13]	[0.74,1.71]	[0.35,0.99]	[0.57,1.67]	[0.38,1.03]	[0.80,2.45]
Functional limitations	1.01	0.91	0.96	0.88	1.04	1.19	1.04	1.13
	[0.88,1.15]	[0.76,1.08]	[0.83,1.12]	[0.74,1.06]	[0.83,1.29]	[0.96,1.48]	[0.84,1.29]	[0.85,1.51]
Comorbidities	1.00	0.89	0.97	0.88	1.14	0.85*	1.14	0.81*
	[0.90,1.11]	[0.76,1.06]	[0.87,1.09]	[0.74,1.04]	[0.96,1.36]	[0.72,1.00]	[0.95,1.36]	[0.67,0.98]
Finances since COVID-19 (ref. no change)								
Worse off	1.25	2.13***	1.01	1.86**	1.72*	1.12	1.66	0.79
	[0.91,1.73]	[1.49,3.03]	[0.74,1.37]	[1.27,2.73]	[1.04,2.86]	[0.60,2.12]	[0.99,2.77]	[0.40,1.53]
Better off	1.12	2.26*	1.05	2.16*	2.40*	1.15	2.31*	0.97
	[0.65,1.93]	[1.19,4.30]	[0.59,1.88]	[1.11,4.21]	[1.21,4.75]	[0.54,2.45]	[1.17,4.55]	[0.46,2.04]
Concern about COVID-19	1.10**	1.06	1.07*	1.04	1.07	1.10	1.07	1.04
	[1.04,1.17]	[0.99,1.14]	[1.01,1.14]	[0.97,1.11]	[0.98,1.18]	[1.00,1.22]	[0.98,1.17]	[0.94,1.16]
Increased phone family contact	1.00	1.08	0.96	1.05	1.06	1.06	1.04	1.14
	[0.70,1.43]	[0.73,1.61]	[0.66,1.39]	[0.71,1.57]	[0.62,1.83]	[0.59,1.91]	[0.59,1.81]	[0.62,2.11]
Increased messaging family contact	1.12	1.24	1.16	1.26	0.74	1.14	0.74	1.07
	[0.81,1.54]	[0.87,1.78]	[0.84,1.60]	[0.88,1.80]	[0.43,1.29]	[0.65,1.99]	[0.42,1.31]	[0.59,1.93]
Increased video call family contact	0.96	1.20	0.96	1.20	0.75	1.12	0.74	1.15
	[0.68,1.36]	[0.72,2.00]	[0.68,1.37]	[0.73,2.00]	[0.44,1.26]	[0.61,2.05]	[0.44,1.26]	[0.62,2.12]
Increased phone friend contact	1.75**	1.64*	1.76**	1.61	1.21	1.63	1.21	1.62
	[1.24,2.48]	[1.01,2.66]	[1.24,2.49]	[0.99,2.61]	[0.64,2.27]	[0.86,3.08]	[0.65,2.27]	[0.80,3.26]
Increased messaging friend contact	1.26	1.45	1.16	1.37	1.34	1.22	1.30	1.16
	[0.90,1.76]	[0.92,2.29]	[0.83,1.62]	[0.87,2.14]	[0.81,2.22]	[0.72,2.07]	[0.79,2.16]	[0.67,2.02]
Increased video call friend contact	0.93	0.92	0.96	0.94	1.57	1.10	1.58	1.13
	[0.66,1.33]	[0.53,1.58]	[0.67,1.38]	[0.54,1.61]	[0.82,2.98]	[0.57,2.12]	[0.84,2.98]	[0.57,2.24]

Change in household size from 2015 to 2020 (ref. no change)								
Decrease	0.91	0.86	0.89	0.85	0.85	1.21	0.86	1.11
	[0.69,1.19]	[0.56,1.33]	[0.68,1.17]	[0.55,1.31]	[0.51,1.43]	[0.78,1.87]	[0.52,1.44]	[0.71,1.74]
Increase	1.02	0.85	1.11	0.88	1.60	1.54	1.61	1.74
	[0.71,1.47]	[0.47,1.53]	[0.76,1.62]	[0.48,1.60]	[0.77,3.33]	[0.80,2.96]	[0.77,3.33]	[0.90,3.37]
Month of interview (ref. Sep 2020)								
Oct 2020	0.87	1.32	0.79	1.26	1.86	1.05	1.79	0.93
	[0.58,1.30]	[0.79,2.22]	[0.53,1.18]	[0.75,2.10]	[0.97,3.58]	[0.50,2.24]	[0.93,3.44]	[0.43,2.02]
Nov 2020	0.90	1.15	0.83	1.10	1.30	0.53	1.31	0.45*
	[0.54,1.51]	[0.61,2.16]	[0.50,1.39]	[0.59,2.06]	[0.59,2.90]	[0.25,1.12]	[0.60,2.84]	[0.21,0.98]
Dec 2020	0.66	0.92	0.60	0.87	1.83	0.59	1.83	0.51
	[0.39,1.13]	[0.48,1.76]	[0.36,1.02]	[0.45,1.69]	[0.83,4.01]	[0.25,1.39]	[0.83,4.02]	[0.21,1.22]
Jan 2021	0.84	0.33	0.76	0.30*	0.67	0.40	0.64	0.45
	[0.43,1.64]	[0.10,1.08]	[0.39,1.48]	[0.09,1.00]	[0.23,1.97]	[0.13,1.21]	[0.22,1.87]	[0.14,1.44]
Interview mode (ref.Web)								
Phone	1.77*	1.25	1.99*	1.31	3.50**	0.39	3.46**	0.44
	[1.01,3.10]	[0.70,2.23]	[1.14,3.48]	[0.74,2.34]	[1.61,7.60]	[0.10,1.48]	[1.61,7.44]	[0.11,1.83]
PAPI	1.40	0.88	1.51	0.91	1.67	2.41*	1.68	2.43*
	[0.83,2.35]	[0.49,1.56]	[0.89,2.55]	[0.51,1.63]	[0.82,3.40]	[1.13,5.15]	[0.83,3.39]	[1.07,5.49]
Constant	0.29	0.59	0.18	0.49	0.29	0.67	0.30	0.22
	[0.08,1.05]	[0.13,2.54]	[0.05,0.65]	[0.10,2.34]	[0.03,2.79]	[0.07,6.41]	[0.03,2.81]	[0.02,2.07]
N	2,487		2,487		1,316		1,316	

Note: p* < .05; p ** < .01 p *** < .001 (two-tailed tests).

Table A.3 Multinomial Logistic Regression on Changes in Smoking Behavior and Sleep Quality since COVID-19 Began (Relative Risk Ratios, 95% Confidence Intervals)

	Smoking				Feeling rested			
	Baseline		+ Emotional well-being		Baseline		+ Emotional well-being	
	Less vs. About the same	More vs. About the same	Less vs. About the same	More vs. About the same	Less vs. About the same	More vs. About the same	Less vs. About the same	More vs. About the same
Social Isolation								
Perceived decrease in in-person family contact since COVID	2.09 [0.76,5.74]	1.81 [0.43,7.51]	2.03 [0.73,5.67]	2.03 [0.51,8.13]	1.51* [1.04,2.20]	1.48 [0.91,2.41]	1.45 [0.99,2.14]	1.40 [0.85,2.29]
Perceived decrease in in-person friend contact since COVID	1.98 [0.70,5.65]	1.07 [0.33,3.51]	1.49 [0.41,5.39]	0.91 [0.29,2.85]	1.86** [1.33,2.75]	0.77 [0.46,1.28]	1.60* [1.07,2.39]	0.66 [0.39,1.11]
Emotional Well-being During COVID								
Loneliness (0-9)			1.33 [1.00,1.78]	1.01 [0.80,1.29]			1.27*** [1.18,1.37]	1.23*** [1.09,1.38]
Anxiety (0-6)			1.22 [0.91,1.62]	1.15 [0.78,1.69]			1.12 [0.99,1.27]	1.23** [1.06,1.43]
Felt depressed (1-4)			0.41* [0.21,0.80]	1.22 [0.55,2.70]			1.34** [1.08,1.66]	1.03 [0.82,1.30]
Covariates								
Female	1.97 [0.68,5.72]	2.96 [0.92,9.53]	2.02 [0.71,5.74]	2.76 [0.89,8.58]	1.19 [0.87,1.63]	1.74* [1.10,2.75]	1.06 [0.77,1.44]	1.69* [1.05,2.70]
Age	0.99 [0.94,1.05]	0.93* [0.87,0.99]	0.99 [0.94,1.04]	0.93* [0.87,1.00]	0.96*** [0.95,0.98]	0.94*** [0.91,0.96]	0.97*** [0.95,0.98]	0.94*** [0.92,0.97]
Race/ethnicity (ref. White)								
Black	1.71 [0.56,5.26]	2.65 [0.95,7.36]	1.73 [0.55,5.47]	2.73 [0.90,8.24]	0.68 [0.36,1.26]	1.42 [0.92,2.19]	0.82 [0.42,1.59]	1.71* [1.08,2.69]
Hispanic	2.36 [0.37,15.18]	0.67 [0.06,7.88]	1.73 [0.30,10.03]	0.75 [0.06,9.57]	1.16 [0.64,2.09]	0.50 [0.19,1.34]	1.58 [0.85,2.96]	0.61 [0.22,1.65]
Other	-	-	-	-	1.82 [0.89,3.73]	0.47 [0.14,1.53]	1.97 [0.91,4.27]	0.50 [0.15,1.63]

Education (ref. High school)								
Less than high school	0.67 [0.19,2.36]	0.69 [0.10,4.91]	0.61 [0.15,2.42]	0.92 [0.12,6.74]	1.38 [0.72,2.66]	0.62 [0.28,1.37]	1.56 [0.76,3.20]	0.71 [0.30,1.65]
Some college	0.87 [0.24,3.20]	0.33* [0.12,0.88]	0.63 [0.17,2.32]	0.33* [0.12,0.85]	1.66* [1.02,2.72]	0.88 [0.50,1.55]	1.71* [1.05,2.79]	0.90 [0.49,1.63]
BA or more	0.86 [0.19,4.00]	0.80 [0.20,3.31]	0.86 [0.18,4.06]	0.81 [0.20,3.32]	2.28** [1.38,3.77]	1.35 [0.68,2.70]	2.38*** [1.44,3.95]	1.44 [0.72,2.88]
Partnered	1.00 [0.40,2.49]	0.60 [0.19,1.93]	1.35 [0.52,3.50]	0.66 [0.18,2.36]	0.77 [0.54,1.10]	0.98 [0.59,1.62]	1.11 [0.78,1.59]	1.30 [0.77,2.19]
Functional limitations	1.24 [0.84,1.82]	0.76 [0.44,1.30]	1.16 [0.81,1.64]	0.71 [0.41,1.26]	1.08 [0.98,1.19]	0.99 [0.80,1.22]	0.97 [0.84,1.12]	0.92 [0.73,1.15]
Comorbidities	1.15 [0.83,1.60]	0.62 [0.30,1.31]	1.22 [0.89,1.69]	0.60 [0.28,1.26]	1.17* [1.03,1.34]	1.13 [0.95,1.34]	1.15 [1.00,1.32]	1.10 [0.93,1.30]
Finances since COVID-19 (ref. no change)								
Worse off	4.56** [1.60,12.99]	5.43*** [2.03,14.53]	3.69* [1.14,11.94]	5.03** [1.77,14.32]	2.73*** [1.91,3.89]	2.17** [1.34,3.51]	1.92*** [1.37,2.71]	1.54 [0.92,2.60]
Better off	0.95 [0.13,7.25]	0.98 [0.07,14.41]	0.48 [0.05,4.67]	1.02 [0.06,17.41]	0.84 [0.44,1.61]	0.95 [0.30,2.98]	0.73 [0.38,1.40]	0.86 [0.27,2.73]
Concern about COVID-19	0.91 [0.72,1.15]	0.98 [0.80,1.20]	0.90 [0.71,1.14]	0.93 [0.74,1.17]	1.11* [1.02,1.20]	1.17* [1.04,1.32]	1.03 [0.94,1.11]	1.10 [0.98,1.23]
Increased phone family contact	1.51 [0.55,4.18]	1.90 [0.50,7.27]	1.65 [0.52,5.22]	1.97 [0.55,7.11]	0.95 [0.65,1.37]	1.25 [0.69,2.29]	0.94 [0.66,1.35]	1.17 [0.63,2.17]
Increased messaging family contact	0.61 [0.21,1.83]	0.50 [0.11,2.35]	0.85 [0.28,2.62]	0.54 [0.12,2.42]	1.01 [0.71,1.42]	1.42 [0.68,2.97]	1.07 [0.73,1.57]	1.51 [0.74,3.08]
Increased video call family contact	1.33 [0.28,6.37]	1.87 [0.38,9.08]	1.09 [0.20,6.08]	2.11 [0.39,11.43]	1.64** [1.13,2.39]	1.06 [0.59,1.91]	1.82** [1.24,2.69]	1.16 [0.65,2.05]
Increased phone friend contact	1.76 [0.55,5.61]	0.53 [0.11,2.60]	1.27 [0.41,3.95]	0.39 [0.07,2.29]	1.31 [0.78,2.20]	1.15 [0.61,2.17]	1.39 [0.79,2.46]	1.16 [0.61,2.23]
Increased messaging friend contact	7.08*** [2.48,20.20]	5.10 [0.93,28.04]	6.25*** [2.18,17.91]	4.72 [0.84,26.46]	1.72* [1.05,2.82]	2.08** [1.21,3.56]	1.50 [0.90,2.51]	1.74* [1.03,2.94]
Increased video call friend contact	0.36 [0.08,1.53]	0.49 [0.06,4.17]	0.36 [0.08,1.61]	0.47 [0.06,3.87]	0.71 [0.43,1.15]	0.57* [0.33,0.98]	0.70 [0.42,1.17]	0.58* [0.33,0.99]

Change in household size from 2015 to 2020 (ref. no change)								
Decrease	0.48	2.05	0.39	1.84	1.04	0.90	1.01	0.91
	[0.15,1.55]	[0.70,6.00]	[0.11,1.40]	[0.62,5.47]	[0.71,1.52]	[0.50,1.62]	[0.68,1.50]	[0.50,1.63]
Increase	0.59	1.49	0.58	1.65	1.15	0.95	1.56	1.15
	[0.13,2.76]	[0.28,7.93]	[0.13,2.66]	[0.28,9.57]	[0.69,1.93]	[0.46,1.94]	[0.94,2.60]	[0.56,2.37]
Month of interview (ref. Sep 2020)								
Oct 2020	0.46	0.84	0.36	0.78	0.65	0.92	0.53*	0.76
	[0.09,2.40]	[0.18,3.90]	[0.05,2.44]	[0.13,4.59]	[0.41,1.05]	[0.48,1.77]	[0.33,0.86]	[0.38,1.55]
Nov 2020	0.74	0.79	0.66	0.70	0.59	0.82	0.47*	0.69
	[0.14,3.81]	[0.24,2.55]	[0.14,3.19]	[0.17,2.84]	[0.34,1.04]	[0.34,2.00]	[0.26,0.82]	[0.28,1.70]
Dec 2020	0.65	0.28	0.67	0.22	0.57	0.48	0.45*	0.38
	[0.09,4.46]	[0.05,1.49]	[0.10,4.65]	[0.04,1.17]	[0.28,1.16]	[0.21,1.13]	[0.22,0.90]	[0.14,1.02]
Jan 2021	2.68	2.14	3.05	2.61	0.50	1.14	0.38*	0.89
	[0.35,20.64]	[0.15,31.25]	[0.37,25.25]	[0.16,41.84]	[0.21,1.20]	[0.43,2.99]	[0.15,0.91]	[0.34,2.33]
Interview mode (ref.Web)								
Phone	7.51*	0.70	7.48*	0.68	2.06*	3.02**	3.04***	3.66**
	[1.07,52.62]	[0.14,3.60]	[1.26,44.35]	[0.10,4.56]	[1.15,3.67]	[1.39,6.56]	[1.72,5.39]	[1.54,8.68]
PAPI	3.68	0.68	3.45	0.59	1.45	1.51	1.59	1.62
	[0.71,19.03]	[0.12,3.78]	[0.77,15.42]	[0.09,3.93]	[0.82,2.55]	[0.69,3.31]	[0.88,2.90]	[0.74,3.55]
Constant	0.04	12.75	0.09	8.97	0.24	0.49	0.06***	0.18
	[0.00,2.30]	[0.12,1376.4]	[0.00,3.39]	[0.05,1475.6]	[0.06,1.01]	[0.06,3.75]	[0.01,0.26]	[0.02,1.52]
N	318		318		2,447		2,447	

Note: *p** < .05; *p* ** < .01 *p* *** < .001 (two-tailed tests).

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