THE UNIVERSITY OF CHICAGO

MULTIDIMENSIONAL HEALTH:

APPLICATIONS ACROSS CULTURES, COHORTS, AND THE COVID-19 PANDEMIC

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE DIVISION OF THE SOCIAL SCIENCES

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

DEPARTMENT OF SOCIOLOGY

BY

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CHICAGO, ILLINOIS

AUGUST 2021

DEDICATED TO

MY PARENTS & GRANDPARENTS

Health is the greatest gift,

contentment the greatest wealth,

the trustworthy are the best kinsman,

Nibbāna (liberated mind) the highest bliss.

Verse 204, *Dhammapada* (translated)

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ABSTRACT

The conceptualization of health has been evolving, especially with the advent of the COVID-19 pandemic in 2019, broadening beyond a singular definition of complete well-being to incorporate individual characteristics as well as contextual factors. In this dissertation, I propose a multidimensional model of health that applies to three disparate contexts: Chinese medical residents in Wuhan, a cohort comparison of two generations in the United States, and U.S. older adults who delayed medical care during the COVID-19 pandemic. The first study examines the determinants of medical residents' quality of life based on fieldwork conducted pre-pandemic in Wuhan, China. Psychological drives (intrinsic and extrinsic motivation), along with external support from social interactions, significantly predicted the health and happiness of these medical residents. In the second study, I used longitudinal data from the National Social Life, Health, and Aging Project (NSHAP Rounds 1-4 from 2005-2021) to compare Traditionalists' and Baby Boomers' partnership and sexual activity behaviors, and to examine whether sexual activity and relationship quality can predict physical and mental health, respectively. Boomer women were less likely to be partnered and more likely to be sexually active than their Traditionalist counterparts. Sexual activity was able to predict physical health five years later, whereas relationship happiness was positively associated with current mental health but not a predictor of future mental health. Finally, in the third study, I looked at the delays and completions of needed medical care during the COVID-19 pandemic in the U.S. using data from the NSHAP-COVID Study (2020/21), and found that socio-demographic disadvantage, poor emotional health, and resource deficiency in terms of financial and social capital, were strong predictors of delaying needed medical care; race/ethnicity and self-rated health predicted differences in completion of care and method of completion. In conclusion, I advocate for improvements in patient-physician trust, as well as more widespread mental healthcare and awareness, to advance global and public health systems.

INTRODUCTION

What is health? The World Health Organization first defined health in its Constitution (1946) as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. Since then, the definition of health has been changing. Ahmed, Kolker, and Coelho (1979) pointed out that disease cannot be defined in purely medical terms by observing symptoms; rather, disease is influenced by context and sociodemographic characteristics. The Ottawa Charter for Health Promotion (WHO, 1986) proposed that health emphasizes "social and personal resources, as well as physical capacities" and that health promotion should focus on "achieving equity in health." Breslow (1999) shifted the focus from disease prevention, which is largely environmentally-dependent, to health promotion, which relies more on individual actions. The Lancet (2009) wrote that "one cannot be healthy in an unhealthy society," accounting for complex social determinants of health, and proposing that health is the ability to adapt to one's environment. Similarly, Huber et al., (2011) advocated for the concept of health as the ability to adapt and self-manage physical, mental, and social health, and "a human right…affected by social, political, economic and environmental factors," pointing out that changes to the environment improve public health more than individual action.

Particularly since the COVID-19 pandemic began in 2019, the conceptualization of health has transformed. During the pandemic, macro-level changes such as universal mask-wearing, social distancing and mass vaccinations have been promulgated by public health recommendations (CDC, 2021), and previously known disparities in healthcare access and health outcomes have only been magnified (Kim, Marrast, and Conigliaro, 2020). Therefore, now more than ever, health can be conceptualized as multi-dimensional: incorporating genetics, individual health beliefs and behaviors, socio-demographics (economic stability, education

access and quality, healthcare access and quality, neighborhood and built environment, social and community context), environmental changes, and government policies (Healthy People, 2030). By explaining these determinants of health from individual and contextual factors, I demonstrate through this dissertation that the mechanisms behind multidimensional health can apply to a variety of situations, from medical residents' quality of life in China, to older adult cohort differences in sexuality and partnership behaviors, to delayed medical care during the COVID-19 pandemic.

In this introductory chapter, I provide an overview of the socio-cultural determinants of health for adults, including neighborhood effects, social cohesion, and social support. I also discuss cultural differences, personality aspects and older adult health. These are presented in a multidimensional framework of health that can explain health outcomes in a holistic manner and be applied to different situations. Finally, I introduce the content of subsequent chapters.

1.1 THEORETICAL BACKGROUND

Social characteristics including one's relationships and surrounding environment are well-recognized determinants of health that act on individual, community and international levels throughout the life course. Most recently, the COVID-19 pandemic demonstrates that the environment impacts public health at the national, community-level and individual levels, often unequally. Thus, on a community and individual level, living in disadvantaged neighborhoods is often associated with multiple challenges, including poorer infrastructure and ventilation, higher crime, lower walkability and fewer health-related resources (Mather and Scommegna, 2017). Furthermore, the level of social cohesion and collective efficacy within different neighborhoods vary.

While this dissertation does not focus exclusively on neighborhood disparities, many aspects of disadvantage are tied to neighborhoods, including socio-economic status,

race/ethnicity, educational attainment, and social capital and cohesion. Therefore, I provide a brief overview of literature here in order to holistically explain multidimensional health.

1.1.1 Neighborhood effects

There are multiple causal pathways by which neighborhoods are theorized to affect health. Neighborhoods can be conceptualized to include the natural, built (human-made) and social environments. Alternatively, they can also be conceptualized into compositional and contextual components (Pruchno, Wilson-Genderson, and Cartwright, 2012). Compositional characteristics include the features of people living in the neighborhood (economic status, educational attainment, wealth) whereas contextual components include built and non-built aspects of the geographic area (supermarkets and the type of produce they sell; violent crime rates); these can interact, in that resources of a neighborhood are determined by the composition of its residents.

Initial theories on neighborhood effects focused on social processes and the etiology of crime. Social disorganization theory, first proposed by Shaw and McKay (1942), focused on "zones of transition" that had high rates of population turnover and economic deprivation, and high levels of crime; low levels of social control and cultural transmission of delinquency were theorized to perpetuate "criminal traditions." Structural models examined disadvantage reflected in neighborhood characteristics such as low socioeconomic status or high poverty.

Researchers gradually noticed that neighborhoods reflected ethnic-racial disadvantage. Wilson (1987) wrote that the urban concentration of poverty in predominately Black neighborhoods was associated with multiple social problems; after middle-class residents left poor inner-city neighborhoods, local community institutions also declined, which led to decreased informal social control. As Small and Newman (2001) noted, individuals are not randomly distributed across neighborhoods; for example, parents with low levels of education

are also more likely to live in poor neighborhoods. Williams and Collins (2001) argue that racial residential segregation causes differences in socioeconomic status due to access to education and employment opportunities, and in conjunction, racial disparities in health.

1.1.2   Social cohesion and collective efficacy

Several community-level mechanisms that may mediate the effects of structural conditions at the neighborhood level include social capital, social cohesion and collective efficacy (Browning and Cagney, 2003). Social capital can be conceptualized as resources (trust, norms and exercise of sanctions) available to members of social groups, or as individual and social attributes embedded within an individual's social network of social support (Kawachi, Subramanian, and Kim, 2008; Kawachi, 2006). Coleman (1988) also conceptualized social capital as obligations and expectations, information channels, and social norms. Whereas social capital focuses more on the individual, social cohesion refers to the strength of relationships among members of a community (Healthy People, 2020). Social cohesion describes how residents think and feel about their neighborhood, whereas collective efficacy describes what residents are willing to do to improve their neighborhoods (Higgens and Hunt, 2016).

Social cohesion was found to be positively related to neighborhood socioeconomic status, whereas social and physical disorder was negatively related with neighborhood socioeconomic status (Cagney et al., 2009). In younger adults, Cagney and Browning (2004) found that individual level factors and neighborhood levels are associated with asthma; while individual-level income and education were not predictive of asthma/breathing problems, collective efficacy was protective, possibly through social control of health-compromising behaviors such as smoking. For older adults, particularly African Americans, collective efficacy was not associated with self-rated health, but community affluence was positively related, attenuating the association between race and self-rated health (Cagney, Browning, and

Wen, 2005). Therefore, health outcomes in neighborhoods are influenced by both physical and mental stressors in the environment; neighborhood institutions and resources; and neighborhood-based networks and social norms (Ellen, Mijanovich and Dillman, 2001).

Sampson, Raudenbush and Earls (1997) proposed a collective efficacy framework based on social disorganization theory and social capital theory (Sampson, Morenoff, and Gannon-Rowley, 2002) that links structural factors such as socioeconomic disadvantage, instability and resident heterogeneity. Collective efficacy can be conceptualized as the process of utilizing social ties among neighborhood residents in order to achieve collective goals (Sampson, Raudenbush, and Earls, 1997). In combination with social cohesion (mutual trust between residents) and informal social control ("eyes on the street"), neighborhood collective efficacy may work to decrease crime (Jacobs, 1961), and influence health through pathways such as social contagion, social control of health behavior, access to services, and management of neighborhood physical hazards (Browning and Cagney, 2003), as well as improve general well-being through mutual trust and respect (Kawachi and Berkman, 2000).

1.1.3   Social support and isolation

One of the well-researched pathways by which social relationships affect individuals' health is through social support (Cohen and Syme, 1985). Defined as the perceived or actual receipt of social resources, social support is a highly reliable predictor of disease morbidity and mortality (Uchino et al., 2018). There are two models postulated to explain how social relationships affect mental health. Cohen and Wills (1985) proposed the direct effects (main effects) model where social integration and embeddedness improve general well-being, and the stress-buffering model, where effective social support networks decrease the adverse psychological consequences of stress, and support is related to well-being only for persons under stress. The stress-buffering model is theorized to work through helpful mechanisms such

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as direct aiding with resources, modeling effective coping behavior, changing perceptions of external reality, and buffering the physiological stress response of 'fight or flight' to mediate the effects of stress on illness (Reblin and Uchino, 2008; Cohen, Gottlieb and Underwood, 2000). Uchino et al., (2018) postulate that there may not be one key determinant or source of social support that impacts health, but rather that different sources of support are interchangeable. In Chapter 2, I look at the significance of social interactions in predicting medical residents' quality of life.

On the other hand, negative social interactions or problematic support such as disconfirmation or unsolicited advice can be harmful to health. Miller, Ingham and Davidson (1976) found a differential relationship between the number of acquaintances and health symptoms, suggesting that both the quality and quantity of relationships matter. Through a meta-analysis, Seeman (1996) found that although social integration is generally associated with better health outcomes such as post-myocardial infarction prognosis, the quality of existing ties (supportive versus non-supportive social interactions) also appears to influence the extent of such health benefits. An analysis of rheumatoid arthritis patients found that greater positive support receipt was related to lower depression, whereas greater problematic support receipt was associated with greater depression. Problematic support interacted with positive support but did not cancel out the positive benefits (Revenson, et al., 1991). In Chapter 3, I examine relationship quality in a dyadic partnership and its association with mental health.

Social isolation, which has been increasing during the COVID-19 pandemic due to social distancing measures, has negative consequences for mental and physical health (Hwang et al., 2020). Conceptualized by Cornwell and Waite (2009) as both social disconnectedness and perceived isolation, social isolation is associated with lower levels of self-rated physical health; perceived isolation is also associated with poor mental health. Social isolation, while not necessarily a correlate for loneliness, increases the risk for loneliness. Hawkley and

Cacioppo (2007) postulate that loneliness contributes to age-related decreases in physiological resilience through its influences on health behaviors, stress exposure, and psychological and physiological stress responses. HRS (2002-2008) data indicate that feelings of loneliness among older adults were associated with an increased mortality risk over a 6-year period that was not explained by social relationships or health behaviors (Luo et al., 2012). Considering that around thirty percent of older adults in the U.S. responded that they perceived lack of companionship, felt left out and felt isolated from others (AARP, 2018), it seems important to consider whether social support and positive social interaction can be provided for more of the aging population. Particularly given the emphasis on social distancing, universal masking, and government lockdown/shutdown during the COVID-19 pandemic (CDC, 2021), people around the world are more isolated than they have been in recent history, as reflected in my conceptual model of health and in the context of Chapter 4.

1.1.4 Cultural influences

Beyond socioeconomic influences on health behaviors, cultural factors can influence health beliefs, health-seeking behaviors, as well as health outcomes (Hernandez and Gibb, 2020). For example, Kramer et al., (2002) identified cultural factors that preclude Asian Americans from seeking mental healthcare, such as the conception of mental health issues as the manifestation of evil spirits. As immigrants acculturate, health-seeking behaviors also shift. For example, Pang et al., (2003) found that among older Chinese Americans in the U.S. who had stayed between ten and twenty years, their expectations of filial piety – for their children to take care of them until old age – had changed, and they relied more on informal support networks such as neighbors to provide transportation and translation for medical services.

Health advantages for immigrants may occur due to cultural and social cohesion in ethnic enclaves. Cagney, Browning and Wallace (2007) found that foreign-born Latinos

embedded in a neighborhood that had a high percentage of foreign-born residents experienced a significantly lower prevalence of asthma and other breathing problems; those in communities that had a low percentage of foreign-born residents had the highest prevalence overall (even when compared with African Americans). Similarly, older Mexican Americans were more likely to rate their health as poorer if they lived in neighborhoods that were economically disadvantaged and less populated by other Hispanics (Patel et al., 2003). Eschbach et al., (2004) found that Mexican Americans (aged 65 or older) living in high-density Mexican American neighborhoods experienced sociocultural advantages that outweighed disadvantages associated with high poverty. This suggests that older immigrants may live in special sociocultural environments (often with younger family members) that buffer them from environmental stressors. For example, Hispanic cultural values include *familism* and *allocentrism* (placing the needs of the family or group above the individual), which may promulgate a strong social support network (Gallo et al., 2009) which attenuates stress effects on health. Therefore, shared culture, which in turn promotes social cohesion, may increase health benefits for immigrants.

However, there may be differential effects of culture across racial/ethnic groups, possibly due to sociocultural variations. Despite this "Latino health paradox" (Markides and Coreil, 1986), further research has found a complex interplay of acculturation, language use, social support, trust in the health system and socioeconomic status in predicting health outcomes for Mexican immigrants in the U.S. (Franzini and Fernandez-Esquer, 2004). Camacho-Rivera et al., (2015) found that Hispanic children of non-Mexican origin reported higher odds of asthma, while there were no significant differences between Hispanics and non-Hispanic Caucasians overall. Mair et al., (2010) used the Multi-Ethnic Study of Atherosclerosis (adults aged 45-84) to look at health outcomes across neighborhoods with homogeneous racial/ethnic backgrounds, and found a disparate effect of neighborhood characteristics on mental health outcomes. African American men reported higher depression scores when living

in a homogeneous neighborhood with the same racial/ethnic background whereas Hispanic men and women and Chinese women reported lower depression scores. Moreover, age at immigration may be critical; data from the HRS (1992-2008) indicate that non-Hispanic foreign born who migrated to the U.S. after age 35, and Hispanic foreign born who migrated after age 18, experienced more rapid declines in self-rated health after age 50, making them disadvantaged in comparison with native born (Gubernskaya, 2015). Thus, the immigrant paradox, while well-documented, is complex; culture that promotes a socially cohesive environment and age at migration seem to improve health outcomes. In Chapter 4, concerns regarding the pandemic, delays of needed medical care, and completion of care via remote or in-person methods varies across race/ethnicity, which seem to indicate that race/ethnicity and culture are strongly associated with health outcomes.

1.1.5 Personality factors: resilience and motivation

After reviewing structural and social impacts on health, I provide an overview of individual internal states that can affect health outcomes, including anxiety, resilience and motivation. While environmental stressors contribute to aging and adverse health, personal responses to stress may attenuate this response. Hampson and Friedman (2008) argue that biopsychosocial factors across individuals account for variations in health outcomes, and updated this in 2017 (Hampson) to propose a bi-directional relationship between personality and health and note that personality and health changes across the life course.

Traditionally, personality is described by Eysenck's (1967) Three-Factor Model (neuroticism, extraversion, and psychoticism) and the Five-Factor Model (neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience). Prior research has associated traits such as neuroticism, also conceptualized as low emotional stability, with higher mortality (Grossardt et al., 2009) and high conscientiousness; high emotional stability

with better self-rated health (Goodwin and Friedman, 2006), and conscientiousness, including resiliency, with better health outcomes (Hampson et al., 2013). These individual traits can influence interactions in a social setting, and thus modulate the level of social support that an individual receives due to their behavior. For example, childhood conscientiousness positively predicted being married later in life, potentially due to behavioral differences in adulthood (Tucker et al., 1996).

During the COVID-19 pandemic, mental health issues have been highlighted as people across the world have been placed under great stress and momentous changes, and thus the ability to cope with this stress is an important component of health (CDC, 2021). Here, I discuss anxiety and resilience as two potentially opposing influences on health. Higher neuroticism (including anxiety) may be associated with sensitive responses to stress (Hampson, 2017) whereas resilience or "grit" may help one cope with stress (Duckworth 2017). Anxiety about COVID-19 and personal health partially mediated the relationship between Eynsencks' five main personality traits and generalized anxiety and depressive symptoms; while the traits of extraversion, agreeableness, conscientiousness and openness were negatively associated with anxiety and depressive symptoms, neuroticism, anxiety about health and high measures of psychological distress due to the COVID-19 pandemic were positively associated with anxiety and depressive symptoms (Nikcevic et al., 2021). Higher anxiety was related to poorer health outcomes in patients with COPD (Eisner et al., 2010). Better health-related quality of life is associated with reduced anxiety and greater optimism (Kepka et al., 2013).

On the other hand, resilience can be interpreted as successful allostasis in which "wear and tear" on the body is minimized as individuals successfully adapt to risk or adversity (McEwen, 2006; Karatsoreos and McEwen, 2011). Individuals with greater adaptive capacity are better able to maintain homeostasis and thus reduce cumulative allostatic load. Biophysiological differences in response to stress, epigenetic factors and developmental history

may determine whether individuals are more vulnerable or resilient. For example, learned helplessness and traumatic experiences in childhood decrease active coping and lower resilient functioning. Nevertheless, resilience is a skill that can be developed through cognitive reframing, active coping by using behavioral or psychological techniques to reduce or overcome stress, humor, altruism, physical exercise and mindfulness. (Wu et al., 2013) For older adults, even those with accumulated disadvantages and stress, beginning resilience training (Harvard Health Letter, 2017) may be helpful to ameliorating negative health effects. Given the difficulties faced by humans across the world during the COVID-19 pandemic, personality characteristics of resilience would seemingly play an important part in the overall health outcome of an individual, as demonstrated in Chapter 4.

1.1.6 Social determinants of health for older adults

In anticipation of Chapters 3 and 4, I provide an overview of literature on the social determinants of health, applied specifically to older adults. Neighborhood effects and relationship quality may impact health outcomes for older adults more significantly than younger ones due to reduced physical mobility, tighter social networks and changing patterns of spatial use (Kawachi and Berkman, 2000). The AARP Home and Community Preferences Survey (2018) found that around three-quarters of adults aged 50 and over preferred to "age in place," meaning that many older adults will continue living in their home after retirement, likely in a familiar neighborhood. Therefore, older adults may be more affected by their neighborhood and its characteristics due to more time spent in a limited circumference, as well as inter-related social determinants of health such as social support, socioeconomic status, and racial segregation.

Older adults staying at home, and living either alone or with their partner, tend to have fewer social relationships than before (Cornwell, Laumann and Schumm, 2008). This may

occur due to life-course trajectories, such as retirement, where adults lose their social network from the workplace, and "empty nest" situations where older adults do not live with their grown children, or decreased activity spaces (Cornwell and Cagney, 2017; Browning and Soller, 2014). Thus, relationships with a partner, and relationships with close neighbors and friends, become increasingly important. These social networks, which include significant others, friends and relatives, religious affiliations and membership, and membership in voluntary/community organizations, can be characterized by size, density, boundedness, and homogeneity (Berkman and Glass, 2000). Social networks may influence health through the provision of perceived and actual social support, social influence, social engagement, interpersonal contacts and access to resources (Berkman et al., 2000).

Again, social networks differ in complex ways across age, among men and women, and for different socioeconomic statuses and education levels. Poverty in neighborhoods but not racial composition is significantly associated with weaker social ties (Small, 2007). Ajrouch, Blandon and Antonucchi (2005) also found that found that older women had smaller networks; professional women reported older less proximal networks with a higher proportion of friends than homemakers. Both men and women with higher education (high school or above) reported larger social networks. Importantly, inner social network size (close social ties) was not found to change with age or socioeconomic status. Considering that older adults may interact daily with their significant other, more often than other persons, dyadic partner relationships may be more important to health at older ages.

Since older adults have smaller social networks but greater frequency of socializing and participating in the community (Cornwell, Laumann and Schumm, 2008), maintaining positive relationships are key to good health. Optimistically, research based on RAND's American Life Panel found that older adults, despite having smaller networks than younger adults, do not necessarily have fewer close ties; older age was associated with better well-being, mainly due

to relationships with close friends (Bruine de Bruin, 2019). Curiously, older adults may use strategies to promote positive social experiences and minimize negative ones by avoiding conflicts, whereas socially, others often reciprocate by treating older adults more positively and with greater forgiveness than they do younger adults (Luong, Charles and Fingerman, 2011). Older adult partnerships are examined more closely in Chapter 3.

1.2 CONCEPTUAL MODEL

Inequalities across the life course cumulate and result in higher allostatic loads at older ages. Social determinants of health influence individuals' health beliefs, behaviors, and outcomes. Cultural enclaves, motivation, and resilience on the individual and community level may mitigate the effects of stressors on health. For older adults in particular, social relationships may be primary among the contextual determinants of health.

In Figure 1.1, I delineate a conceptual model for health, incorporating biopsychosocial processes of health (Engel 1977, 1980) as well as individual and contextual factors (Andersen and Davidson, 2007). Almost all blocks are interrelated, such that individual characteristics (biological, psychological and social) interact with contextual factors (environmental influences, natural and man-made disasters) to determine overall health. Figure A1.2 is a more detailed conceptual model in color (Supplementary Analyses, Appendix A).

Whereas biological and psychological processes are mostly individually-derived, they interact with contextual factors when it comes to social relationships and environmental influences. For example, one's ethnic-racial group and genetics affects skin tone, which changes how the individual interacts with their environment and is received by society. Furthermore, racial-ethnic group is interrelated with lower educational attainment and socioeconomic status, living in a neighborhood with higher crime rates, and thus, health-seeking behaviors and health maintenance habits.

Figure 1.1 Conceptual model of multi-dimensional health

Individual Characteristics ⟨ Interactions ⟩ Contextual Factors

Biological

- Physical health
- Age
- Gender
- Disability
- Ethnic-racial group
  o appearance
  o skin tone
  o genetic pre-disposition

Environment

- Political (government policies)
- Built environment
- Neighborhood effects
  o Community cohesion
  o Informal social control and crime rates
  o Social contagion of behaviors

Psychological

- Mental health
- Personality
  o Coping mechanisms
  o Social skills
- Attitudes/Beliefs
- Learning/Memory
- Emotions

Social

- Social capital
  o Interpersonal relationships
  o Neighborhood and community
  o Related to below social factors
- Family background and upbringing
- Cultural traditions
- Religious beliefs
- Educational attainment
- Financial capital and SES

External surprises

Natural and man-made disasters (e.g., COVID-19 pandemic), followed by political and public responses

Personal factors: health-care seeking, health maintenance behaviors, resilience/anxiety, aging & cumulative disadvantage

Social factors: community resilience, neighborhood social cohesion, informal social control, government policy, healthcare coverage

Individual Health

Overall Health

Public Health

Over time, cumulative disadvantage accumulates and can be reproduced intergenerationally. Family exposure to neighborhood poverty across two generations is associated with significantly decreased child cognitive ability (Sharkey and Elwert, 2011). Thus, individual health is determined by a variety of factors that interact with each other. Individual health-promoting behavior, from health maintenance to healthcare-seeking, is an important component of achieving good personal health, and reflects the facets of the biopsychosocial model in action.

Although macro-level health determinants are not the main focus of this dissertation, I provide a brief overview of factors related to public health, in order to provide a holistic overview of the determinants of health. Rathman et al., (2015) conducted a meta-analysis of papers and factors that affected public health included income inequality, market regulation (e.g., tax on tobacco, alcohol, unhealthy foods), balance of privatized, nationalized and social economy, prior economic crises, employment rates and government welfare programs. In countries where there is political disruption, lack of sanitation systems, or close proximity to earthquakes/volcanoes, these environmental determinants of health negatively affect the way that people live (Pan-American Health Organization/WHO, 2020).

The third United Nations' sustainable development goal (SDGs) for 2030 is "good health and well-being." Combatting climate change, improving the availability of clean water and sanitation, expanding clean energy usage, building sustainable cities and communities, and responsible consumption will help bring this goal closer to fruition. In Chapter 5, I conclude this dissertation with ideas for future improvements in global and public health.

1.3 SUMMARY

In this dissertation, I argue that health can be conceptualized into individual and contextual variables, which include biological, psychological, social and environmental components. These can be applied to a variety of situations, as I illustrate in the subsequent

three chapters (Chapters 2-4). In the final chapter (Chapter 5), I summarize these findings and present ideas for future directions, including a focus on improving patient-doctor trust and individual mental health from micro- and macro-level angles.

In Chapter 2, I present original survey research highlighting the importance of psychological states (individual motivation, particularly intrinsic over extrinsic motivation) and social relationships (social capital and social support) when predicting the perceived health and happiness of young adults who are medical residents in Wuhan, China.

In Chapter 3, I shift to focusing on older adults in the U.S., utilizing survey data from all waves of the National Social Life, Health and Aging Study. First, I compare the partnership and sexual behaviors of the Baby Boomer cohort (b. 1946-1964) with the previous generation, the Traditionalists (b. 1925-45) using the first three waves of the NSHAP study (2005-2016). I then incorporate physical and mental health indicators from the NSHAP-COVID Study (2020-21) to examine whether sexual activity and relationship happiness from Wave III (2015-2016) can predict future physical and mental health.

In Chapter 4, I focus on the actions taken during the COVID-19 pandemic (2020-21) by older adults in the U.S. to delay medical care, and how disadvantage in multiple forms predicts the delay and completion of care. Internal states such as resilience, education, cultural and religious beliefs, as well as external structural barriers such as cost of care and ease of access to care play a part in determining whether an individual actually receives beneficial care.

Finally, in Chapter 5, I summarize these findings and present the importance of two themes that recurred throughout these studies: fiduciary trust between doctors and patients, and the importance of mental healthcare and coverage. Throughout these chapters, I highlight the importance of individual and contextual factors when considering health, and the universal application of these multidimensional determinants of health – in a different culture in China, across two cohorts of older adults in the U.S., or during the COVID-19 pandemic.

CHAPTER TWO

WHITE COAT LABOR: SOCIAL DETERMINANTS OF
HEALTH AMONG MEDICAL RESIDENTS IN CHINA

Medical residency, a stage of graduate medical training, often involves working long hours with relatively low pay in high-stress environments. The negative effects of work conditions on the quality of life of health professionals, including their mental and physical health, have been documented in both the U.S. and China (Xu, 2010; Wu, Wang, Lam and Hesketh, 2014; Dyrbye et al., 2014; Hillhouse, Adler, and Walters, 2010). A shortage of medical personnel in China – an estimated 2.138 million practicing doctors in 2013 (Wu, Zhao and Ye, 2016) and around 20 billion patients (NHFPC, 2020) – contributes to the high workload and burnout that residents experience.

Since the COVID-19 pandemic began in late 2019, its negative impact on healthcare workers' quality of life has received increased attention around the world. Medical professionals have reported decreased health-related quality of life and burnout during the pandemic (Shanafelt, Ripp, and Trockel, 2020). Doctors and nurses in various regions of China reported depression, anxiety, insomnia, and distress while working during the pandemic in early 2020 (Lai et al., 2020); pediatric medical staff across provinces in China also reported lower health-related quality of life during the COVID-19 outbreak (Huang et al., 2020). The pandemic highlighted deficiencies in medical services in China, as brick-and-mortar hospitals could not meet the demand for medical services, and there was a shortage of healthcare workers and medical equipment –though this was remedied with rapidly built shelter ("*fangcang*") hospitals and the transition of physical hospitals to "internet hospitals," a more extensive form of telemedicine (Sun et al., 2021). While the COVID-19 pandemic has negatively affected medical professionals' quality of life, it has also increased public awareness about this issue (Zhou and Panagioti, 2020).

In this chapter, I validate the previously proposed multi-dimensional model of health by illustrating that physical and mental health are affected both by internal psychological perceptions (intrinsic motivation) and external social and psychological influences (social support and interaction, extrinsic motivation), for medical residents in China. I also note that gender (biological) and adherence to gender norms (cultural and socio-psychological) are not significantly related to health and happiness for these young adults. The chapter begins with an introduction to the Chinese medical education system, overview of the variables measured by this survey, and description of the fieldwork methodology. Through several models predicting health and happiness, I demonstrate the significance of individual and contextual impacts. Finally, I tie in the importance of this finding for medical residents, providing micro-level recommendations to improve their quality of life.

2.1   BACKGROUND

Generally, medical education in China consists of an undergraduate curriculum spanning four years of basic courses and clinical sciences, plus a year of clinical internship with month-long rotations in various departments; afterwards, graduates work as resident physicians for a specified period of time in hospitals or clinics (Huang, Chen and Liu, 2018). Residency training in China has evolved dramatically during the healthcare reforms of the past decade (Lio et al., 2017; Lio et al., 2016; Dai et al., 2013). Unified standards for training medical residents were nonexistent until 2012 (Bo et al., 2014; Zhu, Li and Chen, 2016). In 2014, China established a nationally standardized medical residency training program (SRT) consisting of a "5+3" route, the five-year undergraduate degree described earlier, followed by three years of residency (Lio et al., 2017). Despite these intended improvements in medical training, China's standardization policy also affected medical residents' lives by bringing sudden change to new cohorts, as residents were required to complete additional coursework and residency training beyond their initial expectations.

Few studies on medical residents' quality of life in China had been conducted prior to the COVID-19 pandemic. One of the few pre-pandemic studies was conducted at Peking Union Medical College (PUMC) in August 2017, one of the first institutions in China to incorporate clinical residency training beginning in the 1920s; the majority of residents there experienced burnout (62.2%), and a minority (28.3%) experienced depression (Zhang et al., 2019). Therefore, the present study, using data collected from June-August 2016, captures a unique point in time after the initial implementation of standardized residency training, and provides a baseline of medical resident's self-rated health pre-pandemic, which can be used for comparison in future research projects.

2.1.1   Workplace stress and health effects

Prior research on U.S. health services employees found a higher rate of depression and suicidal ideation in medical residents and doctors than in the general population (Mata et al., 2015; Goebert et al., 2009; Comondore, Wenner, and Ayas, 2008). Job stress levels positively predicted burnout experienced by doctors in the U.K. (Deary et al., 1996). Pearlin's stress process model (1999, 1985; Pearlin et al., 1981), which describes the process of chronic role strains, may explain this relationship. Stressors deplete resources and self-confidence, whereas personal and social resources mediate and/or moderate the relationship between stress and mental health outcomes (Aneshensel and Avison, 2015). In the literature review below, I examine the theoretical mechanisms by which social connections and personal motivation affect medical residents' health and happiness.

2.1.2   Social support and health

Durkheim postulated in Suicide (1897) that social network ties were important to a person's well-being and health, and that the absence of social support negatively affected mental health. Prior literature supports the relationships between increased social support with

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decreased stress, and in turn, improved health, even when adjusting for initial health status (Kaplan, Cassel, and Gore, 1977; Cohen and Wills, 1985). Social support is a classical social determinant of health, theorized to work through mechanisms such as direct aiding with resources, modeling effective coping behavior, changing perceptions of external reality, and buffering the physiological stress response of 'fight or flight' to mediate the effects of stress on illness (Reblin and Uchino, 2008; House, Landis and Umberson, 1988; Broadhead et al., 1983; Caplan, 1972). Miller, Ingham and Davidson (1976) also found a differential relationship between the number of acquaintances and health symptoms; people with few casual friends tended to experience exacerbated symptoms of illness, suggesting that both the quality and quantity of relationships matter.

Medical doctors face a higher risk of anxiety and depression than much of the general population (McKinley et al., 2019). However, feeling connected to others in the workplace, supported by colleagues, and social interaction with colleagues has been found to be positively associated with greater resilience and better health. A twelve-year longitudinal study of doctors in the U.K. determined two variables that were highly significant predictors of happiness at work: overall satisfaction with medicine as a career and perceived support from colleagues. High perceived workload and poor social support (actual or perceived), was related to more stress, burnout, and dissatisfaction with medicine as a career across time (McManus, Keeling & Paice, 2004). The psychological health of physicians in China was positively associated with social support (Sun et al., 2020). Furthermore, social support was positively associated with increased self-efficacy and sleep quality, and negatively associated with anxiety and stress (Xiao et al., 2020). Social support also mediated the effect of workplace violence on Chinese physicians' job satisfaction, burnout and turnover (Duan et al., 2019).

2.1.3   Traditional gender norms

In China, traditional culture emphasizes a gendered division of labor, dictating that the "man works outside, while the woman stays at home," a Confucianism-derived traditional gender order that places the female role centrally in the home and family (Fang and Walker, 2015). Yet, China's gender roles and family-work trends have been changing. Using data from the 2006 Chinese General Social Survey, Hu and Scott (2016) find that while Confucian filial piety still remains important, traditional gender roles are not widely accepted anymore. Women's educational attainment has risen to be almost equivalent to men, and both premarital cohabitation and divorce rates have increased since the 1950s (Xie, 2013). The majority (90%) of mothers in rural Gansu agreed that girls had a right to education, and that "women can achieve as much as men do," and mothers with higher educational attainment were less likely to hold onto traditional gender norms linked to low educational aspirations for their female children (Zhang, Kao and Hannum, 2007). From 1949 to 1979, the rate of employment amongst women in China increased to 70% (Jiang, 2003). The majority (63%) of women in China participate in the labor force, compared to 78% of men (World Bank, 2017).

However, working women in China still face gender discrimination and a wage gap. All else being equal, a female college graduate is less likely (7.6%) to receive a callback for a job than a male applicant based on their resume submission alone (Zhang et al., 2021). Among college students in Beijing graduating between 2009-2013, women with more traditional attitudes, believing that "men are more capable than women," were more likely to join a female-dominated profession (e.g., office clerk) after graduation; in general, women were less likely to hold managerial positions or work in science and technology (He and Zhou, 2018). The medical profession, with its stressful environment and long hours, particularly during residency, may be a less likely career choice for traditional Chinese women. Wang, Rodriguez

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and Shu (2010) found that women were 1.82-fold more likely to voluntarily withdraw from a medical residency program in Sichuan, from 2003 through 2008.

The impact of adhering to gender norms may be associated with self-rated health, as women who adhere to traditional gender norms may work a 'second shift' during their marriage (Hochschild and Machung, 1990). This would entail extra work spent maintaining the household and taking care of children, in addition to residency training responsibilities, that would detract significantly from time spent on self-care and health maintenance. If this theory holds amongst medical residents in China, it may indicate on a local level that university support and counseling can be tailored for women and new parents, and that more attention be paid to gender equality.

2.1.4 Motivation: extrinsic and intrinsic

Contrary to classical sociological theory (Mills, 1940; Weber, 1964; Turner, 1987) which viewed motivation most saliently as an externally-based reasoning that shifts based on environmental context and a person's changing social position, psychological theories view motivation as multi-faceted, characterized not only by the level (strength) but also orientation (direction) of motivation (Ryan and Deci, 2000). Factors of extrinsic motivation include external regulation (behaviors driven by externally imposed rewards and punishments), introjection (focus on approval from self and others), identification (with the value of the activity), and integration (congruence between external rewards and internal actions). In contrast, intrinsic motivation is identified as internally-derived natural interest and pleasure, propelling a "free choice" action (Deci and Ryan, 2010). In this chapter, we conceptualize extrinsic motivation as an external reason for an action that earns a reward or avoids punishment, while intrinsic motivation refers to the desire to perform an action for intrinsic interests or enjoyment.

Recently, Ryan and Deci (2020) conceptualized motivation as a spectrum of behavior ranging from non-self-determined to self-determined; that is, amotivation to extrinsic motivation to intrinsic motivation. Self-determination theory suggests that individuals are motivated by a need to grow through innate psychological needs. Ryan et al., (2019) identify three basic psychological needs: autonomy, competence and relatedness. Autonomy can be defined as a sense of ownership in one's actions apart from being externally controlled; competence as a sense of mastery and perceived opportunities for growth; and relatedness as a sense of belonging. Ryan and Deci (2020) propose that more autonomous forms of motivation will enhance students' learning and engagement, coupled with psychological supports from teachers and families in an educational setting. The relationships between motivation, social support, health, and happiness are thus a focal point of this paper. Relatedness and a sense of community, as measured by social ties and participation in social events, is discussed in relation to overall health and happiness.

2.2   HYPOTHESES

This study primarily examines factors that predict medical residents' physical and mental health, including social support, motivation, while adjusting for demographic characteristics and cultural beliefs such as adherence to traditional gender norms. Defining social interaction in terms of the number of close friends and frequency of social activities, and motivation – factors that respondents indicated motivated them to become doctors – I hypothesize that:

1) Higher levels of social interaction frequency are positively associated with self-rated health and happiness.

2) Higher motivation scores are positively associated with health and happiness; intrinsic motivation will better predict health and happiness than extrinsic motivation.

In line with prior research, I predict that residents who report a higher frequency of social interaction and a greater number of close friends will report better psychological and physical well-being, on average, than others. In terms of motivation, intrinsic motivation will likely be more strongly related to health and happiness than extrinsic motivation. For medical residents, feeling that their work is valuable and important, and being supported by others, is more likely to be related to happiness and good health, than external motivators such as salary or an increased educational curriculum.

2.3 METHODS

Wuhan is a third-tier city in central China with a population of more than 8 million, on par with London and New York City (UN Population Division, 2018). Residents at two of Wuhan University's School of Medicine's affiliated teaching hospitals, *Zhongnan* and *Renmin,* were surveyed. Both hospitals are ranked as tertiary (Tier 3, the highest tier) in China, indicating comprehensive general hospitals with more than 500 beds that serve as medical hubs; the survey sample thus consists of Chinese medical residents in a highly-ranked and well-resourced medical residency program. Below, I discuss the rationale behind the creation of the survey instrument and the methods used in the fieldwork process.

2.3.1 Survey instrument design

I created a bilingual survey in English and simplified Chinese, receiving both IRB approval from the University of Chicago (IRB #09-126-B, Biological Sciences Division) and written administrative approval from Wuhan University. I also created a Chinese-language consent form, which was placed at the beginning of each survey. The survey instrument consists of three sections totaling thirty questions, including basic demographic information, personal opinions, and resident health, utilizing a mix of fill-in, multiple-choice and open response questions (Supplementary Materials, Appendix B). Since there were few open-ended

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responses, they are addressed briefly in the discussion to supplement the results of statistical analyses. Physical and mental health were measured through a series of Likert-scale questions adapted from the Chinese version of the *Chinese Health and Family Life Survey*, utilizing five questions from the Chinese translation of the short-form 36 (SF-36). Oral consent forms were created in Chinese by the author and provided along with each survey.

Scores were coded in the same direction for all questions, ranging from worst (lowest score) to best (highest score). The first question (Q25) measured overall health based on the standard SF-36 question. Sleep was classified as both a representation of physical and mental health. Feelings of depression, anxiousness, and happiness were all meant to measure mental health. We test variables related to individual measures of physical and mental health.

In this survey, both the quality and quantity of social support were assessed. Quality was measured by a fill-in-the-blank question (Question 18B), asking respondents to approximate the number of close acquaintances (e.g., strong ties) they knew before and after arriving at Wuhan University. Quantity (Q19) was measured by a Likert-scale choice of the reported frequency of social outings per week, excluding outings with family members. These questions estimate social support and social participation, covering both strong and weak ties. The questions were asked in two different formats to reduce the likelihood of interaction.

The motivation construct was addressed by two questions (Q12 and Q20). The first question asked: "Did you make the decision to study medicine after high school?" (Q12), with a "Yes/No" response option, and is thus interpreted as a dichotomous variable. This question asks temporally about high school decisions specifically because of China's education system, as students apply to college majors based on their performance in the National College Entrance Examination ("*gaokao*"), which they can retake annually in high school.

The second question was a multiple choice ("check as many as apply") question asking about "reasons you became a doctor" (Q20). Extrinsic motivations listed included a) high social

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status, b) respected by family and friends, and d) high income; intrinsic motivations included c) trusted and respected by patients (e.g., emphasizing an intrinsic desire to help patients), e) improve personal development, and f) interest in community-based healthcare. An optional 'fill-in-the-blank' section existed if the motivations were not listed, but few responses were received, and answers were similar to the choices given (e.g., personal interest in the field). This question was scored based on the number of responses chosen in the six-answer multiple-choice question (0-3 possibilities). None of the respondents chose all six motivating factors, indicating that each respondent either favored extrinsic or intrinsic motivators slightly more.

Two questions measured adherence to gender norms and traditional concepts of the division of labor. Respondents were asked if they were "willing to change careers for more personal time" (Q16) and whether they believed that "men should work while women should stay at home" (Q17), using a Likert scale response. Interactions between gender and social outing frequency, as well as gender and motivation, are discussed further below.

2.3.2   Survey methodology

Due to a long-standing collaboration between the University of Chicago (Pritzker School of Medicine) and Wuhan University (School of Medicine) on medical education reform (WUMER), I was supported by faculty and administration from both institutions in completing this study. I first met with the medical education coordinators from both hospitals[1] to introduce my study and receive their approval of the survey. The attending doctor[2] at *Zhongnan* set up a meeting where I presented my study objectives to medical residents, and also accompanied me when I distributed paper surveys in-person across the wards there.

Initially, four in-person cognitive interviews of about thirty minutes each served as usability tests for the survey to ensure that participants understood the questions; following that,

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1 Zhanghong Lu, Renmin Hospital and Jinxin Li, Zhongnan Hospital.
2 Dr. Yanqing Ye, Internal Medicine Department, Zhongnan Hospital.

106 surveys were distributed to residents. *Zhongnan* hospital surveys (n=58) were distributed in person, while *Renmin* hospital surveys were distributed online due to administrative constraints (n=48). I created a web survey on an administration-specified website (*Wenjuanxing*) and the administration disseminated the link via WeChat, a multi-purpose messaging platform in China. In both cases, Wuhan University administrators asked residents to fill out surveys by sending out an official electronic notice; therefore almost all medical residents filled out the survey. Since the four respondents in these pilot interviews interpreted the survey correctly, their responses were incorporated into overall results (n=110).

After these surveys in Wuhan were completed, I visited Peking Union Medical College in Beijing, China (August, 2016), and met with an endocrinologist (Dr. Miao Yu) and a medical resident that she supervised. After obtaining consent and explaining my research project, I conducted an in-person interview with one medical resident using the survey as an interview guide, and learned that because medical residency training had been standardized early on, residents at PUMC did not experience significant changes with the national policy implementation of SRT. The main purpose of that trip was to provide a comparison to the experience at Wuhan University, and I found that the curriculum at PUMC was not drastically changed as a result of residency standardization, since they had implemented one of the first comprehensive residency programs in China.

2.3.3 Data analyses

Survey responses were analyzed using STATA (Version 15.1). Basic demographic characteristics of the sample were determined. Correlation analyses tested the strength of relationship between similar variables and eliminate multicollinearity. Three regression models were tested for the singular outcome variable of self-rated health (Q25) and three variables were found to be significant predictors ($p < 0.0001$). Similarly, determinants of self-rated happiness (Q29) were evaluated in a regression model. Confirmatory factor analysis

(correlation matrix and scree plot) was used to extract a single factor of "Overall Health" from five sub-variables of self-rated health, sleep quality, depression, anxiety, and happiness. Eleven regression models were tested with the aggregate factor "Overall Health." Of these, one model best predicted overall health. Finally, Fisher's exact test was used to determine if there were nonrandom associations between motivation and gender norms (willingness to change career for more personal time); due to the relatively small sample size, this method was chosen over Pearson's chi-squared test.

2.4 RESULTS

2.4.1 Demographic characteristics

As shown in Table 2.1, the sample is roughly gender-balanced. Residents were young, averaging 25.4 years and ranging in age from 22 to 33. Most residents had begun the program in 2015, whereas the rest had begun in 2014 and 2016. The residents specialized in a variety of fields, ranging from plastic surgery to neurology to obstetrics/gynecology, and worked in both in-patient and out-patient wards. The majority of residents (71.8%) had obtained a bachelor's degree prior to beginning residency, whereas others (28.2%) had obtained a graduate degree (master's or doctor's); only one person reported transferring from another program. Educational attainment was treated as a dichotomous variable, due to low response rates for doctoral degree attainment (n < 5).

The majority of medical residents (60.9%, count: 67) were single, which is surprising given that the average age of marriage in China is around 25 (Guilmoto and Oliveau, 2007). This phenomenon may have occurred because of self-selection bias. This survey sampled respondents who had made the effort to complete their medical education and begin residency; logically, they would be less likely to adhere to traditional gender norms or suddenly change their jobs after such a significant investment of time and energy.

Table 2.1 Demographic characteristics of medical residents in Wuhan (Total n=110)

Variables	N	%
Gender		
Female	56	50.9%
Male	54	49.1%
Relationship status		
Single	67	60.9%
Partnered	43	39.1%
Educational attainment		
Bachelor	79	71.8%
Graduate and higher	31	28.2%
Area lived in at age 14		
Rural Area	65	59.1%
Provincial City	30	27.3%
City	15	13.6%
Made autonomous decision to study medicine		
Yes	72	65.5%
No	38	34.5%

Marital status was originally intended to represent a form of social support, with the expectation that married individuals would report better health due to greater support from their partner (Waite, 1995). However, due to the low count of married residents in the sample (n < 5), those who answered "in a relationship" were grouped together with those "married," and categorized as "partnered." No residents self-identified as widowed or divorced.

Most residents (69%) came from the local province of Hubei province, of which Wuhan is the capital. The majority (59.1%) reported living in the rural villages as adolescents (at age 14), with a third hailing from provincial cities (27.3%) and only a minority hailing from a city at least as large as Wuhan (13.6%). No respondents reported living abroad during adolescence. This may indicate that most of the residents that were sampled have been able to achieve some degree of upward social mobility between adolescence and young adulthood, as they moved from rural to urban environments – possibly to attend college.

2.4.2   Social ties and outings

The two variables that measured social support, including 1) number of ties— defined as reporting five or more close friends and 2) frequency of social outings— ranging from several times a week to never, were not significantly related (Pearson's chi-squared = 1.39, p > 0.5). However, a higher proportion of those with fewer social ties (<5 close friends) reported that they almost never (63.6%) participated in social activities each month, compared to those with more social ties (36.4%); on the other end, respondents with more social ties (5+ close friends) were also more likely to participate in social activities than those with fewer social ties (<5 close friends). Therefore, the quantity and quality of social support seems to be positively related. Neither the number of social ties nor the frequency of social outings varied significantly by gender.

2.4.3   Effects of motivation

While the majority (65.5%) of residents chose to study medicine autonomously before entering college, about a third of respondents (34.5%) did not (Table 2.1). During personal interviews, respondents noted that their parents studied medicine, and/or wanted them to study medicine; others thought that learning medicine would provide greater care access to family members needing healthcare.

For the second measure of motivation, the intrinsic motivation factor of personal development received the highest response rate, while more extrinsic motivations such as income and status received lower response rates (Figure 2.1). The majority of respondents indicated that improving personal development was important. Though there were no statistically significantly differences between males and females for each motivating factor, there is a slight discrepancy. Females were more likely than males to respond to factors related to social status and respect, while males cared more about income than females did. This may be a response to social conditions, where women, aware of the gender gap in wages, focus more

on qualitative benefits of having a job outside of income, whereas men focus on the traditional need to be breadwinners. Using a paired t-test (Table 2.2), we find that responses to extrinsic and intrinsic motivation differed, with more respondents favoring intrinsic motivation factors ($p = 0.012$).

Figure 2.1 Motivating factors for being a doctor, by gender (%)
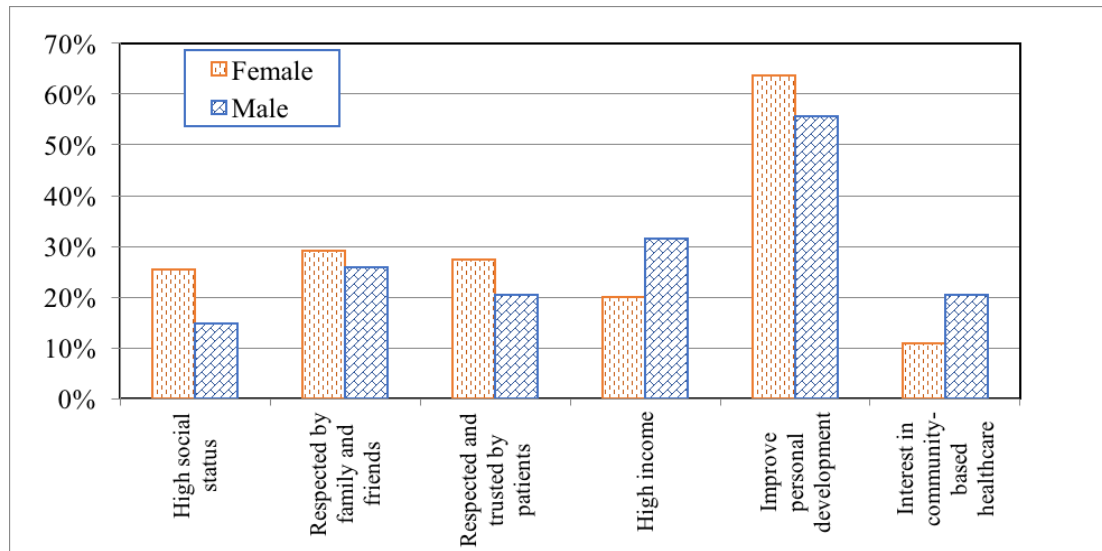
Table 2.2 Paired T-test results comparing extrinsic and intrinsic motivation

	N	Mean	SD	t	df	P (diff <0)
Extrinsic motivation	109	0.73	1.08			
Intrinsic motivation	109	0.99	0.93			
Difference	109	- 0.26	1.17	-2.30	108	0.01

2.4.4 Physical and mental health

Prior to conducting the main regression analysis by combining physical and mental health into one variable (Overall Health), I tested variables related to individual measures of physical and mental health. For the purposes of the regression models only, questions with three possible responses (Q12 and Q16) were analyzed as dichotomous variables, with the few 'non-response' and 'do not know' responses (n=9) recoded as 'no' (0). Three models predicting

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self-rated health (Q25) are shown below in Table 2.3. The first model incorporated a wide range of variables including demographics, gender norm adherence, motivation and social participation: age, gender, personal decision to study medicine (Q12), willingness to change career for more personal time (Q16), belief in traditional gender norms (Q17), social interaction frequency per week outside of family gatherings (Q19), and motivation (Q20). Of these, only social support frequency, intrinsic and extrinsic motivation were significant predictors.

The second model dropped insignificant variables, but kept Q12 (e.g., autonomous decision to study medicine) to determine if this indicator of intrinsic motivation could have been significant in the regression model. However, this was not significant in the second model, and thus a third model was presented. This final model for self-rated health included social support frequency, and intrinsic and extrinsic motivation.

Table 2.3 Predictors of self-rated health (Q25)

Variable	Model 1	Model 2	Model 3
Age	0.04		
Gender	-0.06		
Q12: autonomous decision to study medicine	0.13	0.11	
Q16: would change career for more personal time	-0.03		
Q17: agree with traditional gender norms	-0.09		
Q19: more social interactions	0.22*	0.21*	0.21*
Extrinsic motivation	-0.23*	-0.23*	-0.23*
Intrinsic motivation	0.30***	0.31***	0.33***
Constant	2.01	2.75***	2.81***
R^2	0.25	0.21	0.22

*$p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 2.4 Predictors of self-rated happiness (Q29)

	β	SE(β)	95% Conf. Interval	
More social interactions	0.05	0.07	-0.08	0.18
Extrinsic motivation	-0.01	0.07	-0.15	0.14
Intrinsic motivation	0.27**	0.09	0.10	0.44
Q12 (decision to study)	0.26	0.16	-0.06	0.57
Constant	2.47**	0.19	2.11	2.84

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

Similarly, a regression analysis on self-rated happiness (Q29) alone found a significant relationship with intrinsic motivation, but not extrinsic motivation nor surprisingly, social support frequency (Table 2.4). Regression models incorporating other health-related variables of anxiety, depression and sleep did not yield conclusive results.

Bivariate correlations (Table 2.5) indicate that happiness and health are positively and significantly associated, which can be expected as physical and mental health are often closely related. Social support frequency and health are positively and significantly associated, as predicted based on prior U.S. research. Intrinsic motivation and happiness are related significantly and positively, in line with prior research. Other significant relationships include motivation (both extrinsic and intrinsic) and social support frequency, which can be interpreted to mean that the motivation to participate in social events is multi-faceted and due to both individual and contextual reasons.

Table 2.5 Correlation matrix for self-rated health and happiness, with potential predictors

	Health	Happiness	Extrinsic motivation	Intrinsic motivation	More social interactions
Health	1.00				
Happiness	0.30***	1.00			
Ext. motivation	-0.10	0.14	1.00		
Int. motivation	0.31***	0.37***	0.33***	1.00	
More social interactions	0.30*	0.14	0.20*	0.18*	1.00

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

2.4.5 Confirmatory factor analysis

A correlation analysis is conducted and depicted in the correlation matrix below (Table 2.6) to determine if the five variables measuring health can be composited. Sleep, depression and anger/anxiety are statistically significantly related to health and happiness (p < 0.001). In turn, health and happiness are strongly correlated (p < 0.01). Therefore, these five variables may be aggregated to measure one underlying factor – Overall Health, which incorporates both mental and physical health. Maximum likelihood extraction produces a scree plot indicating that one factor should be extracted (Appendix A, Figure A2.2).

Table 2.6 Correlation matrix for all five health-related variables

	Health	Happiness	Sleep	Depression	Anxiety
Health	1.00				
Happiness	0.26**	1.00			
Sleep	0.47***	0.32***	1.00		
Depression	0.39***	0.41**	0.42***	1.00	
Anxiety	0.28**	0.36**	0.47***	0.68***	1.00

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

2.4.6   Testing regression models

Using a logistic regression model to predict the outcome variable of "Overall Health," I first included all possible predictor variables: age, gender (M/F), rural versus urban origins (location at age 14), decision to study medicine after high school (Q12 – yes or no), willingness to change career for more personal time (Q16), adherence to gender norms (Q17), higher social outing frequency per week (Q19), and motivation (extrinsic and intrinsic, Q20). Of the regression models tested (Table 2.7), the final three significant factors found in Model 11 (M11), including extrinsic and intrinsic motivation, and social interaction frequency, validate classical models for social determinants of health. Of the other regression models tested in Table 7, age and gender (M1) did not have a significant effect on health, nor did rural/urban origin when added to the model (M2). The personal decision to study medicine after high school did have a positive and significant impact on overall health (M3) when accounting for demographic variables. However, when combined with other factors such as the willingness to change careers—which had a non-significant negative effect on health— the significance of the personal decision to study medicine decreased (M4).

Adherence to gender norms was tested in three models (M5, M6, M7) and had a slight but non-significant negative effect on health, as was predicted. Social support frequency was initially tested separately from motivation (intrinsic and extrinsic). While M7 demonstrated that the personal decision to study medicine, willingness to change careers, and social outing frequency were significant factors affecting overall health, the addition of motivation in M8 decreased the significance of the personal decision and willingness to change careers. This suggests that overall, the original motivation to study medicine, and the willingness to change careers, does have a small impact on overall health. However, this significance disappears in the integrated models (M9 and M10), which may mean that the impact of a high school decision becomes less significant over time, as motivation, both extrinsic and intrinsic, develops during

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medical school (bachelors) and the course of residency. On the other hand, the willingness to change careers may imply that there is low job satisfaction and a lack of intrinsic motivation.

Intrinsic motivation and frequency of social interactions were found to be significant positive predictors of "Overall Health" in Table 2.7 (M11). The most parsimonious version of this model, with non-significant variables eliminated (Table 2.8), consisting of social interaction frequency, extrinsic and intrinsic motivation. Social interaction frequency has a significant and small positive predictive impact on overall health; intrinsic motivation had a significant and moderate positive impact on overall health, while extrinsic motivation had no significant impact on overall health.

Table 2.7 Regression model predicting "Overall Health"

Variable	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
Age	0.06	0.08	0.11	0.14	0.08	0.22	0.09	0.19	0.14		
Gender	0.04	-0.01	-0.13	0.02	0.03	0.06	0.05	-0.22	-0.14		
Childhood environment (location at age 14)											
Rural Villages		0.62									
Third-Tier City		1.63									
Metropolitan City (1st and 2nd Tiers)		0.31									
Q12: autonomous decision to study medicine in high school			1.54^{**}	1.37^{*}			1.20^{*}	0.96	0.95	1.03	
Q16: willing to change career for more personal time				-1.03			-1.30^{*}	-0.69	-1.06		
Q17: traditional gender norms adherence					-0.30	-0.46	-0.25		-0.17		
Q19: high social interaction frequency						1.01^{***}	1.06^{***}		0.94^{***}	0.83^{*}	0.82^{**}
Extrinsic motivation								-0.48	-0.56	-0.55	-0.53
Intrinsic motivation								1.28^{***}	1.01^{*}	1.09^{*}	1.22^{***}
Constant	13.71	12.49	11.52	11.18	14.22	13.71	10.89	9.34	9.39	12.13^{*}	12.70^{*}

$^{*}p < 0.05$; $^{**}p \leq 0.01$; $^{***}p \leq 0.001$

Table 2.8 Final regression model predicting "Overall Health"

	β	SE(β)	95% Conf. Interval	
More social interactions	0.82**	0.28	0.27	1.36
Extrinsic motivation	-0.53	0.31	-1.15	0.09
Intrinsic motivation	1.22**	0.36	0.51	1.94
Constant	12.70**	0.70	11.31	14.09

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

A separate correlation analyses also found significant relationships amongst overall health, social outing frequency, and intrinsic motivation (Table 2.9). Similar to Table 2.5, having more social interactions was associated significantly and positively with intrinsic and extrinsic motivation, as well as overall health. There was also a positive and significant relationship between intrinsic motivation and overall health. Extrinsic motivation was positively associated with intrinsic motivation; that is, both internal and external motivators drive individual actions.

Table 2.9 Correlation matrix for predictors of "Overall Health"

	Extrinsic motivation	Intrinsic motivation	Overall health	More social interactions
Ext. motivation	1.00			
Int. motivation	0.37***	1.00		
Overall health	0.01	0.33***	1.00	
More social interactions	0.20*	0.18*	0.31***	1.00

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

When predicting "Overall Health," two variables were found to be significant predictors when motivation was not included in the model: Q12 (autonomous decision to study

medicine in high school), and Q16 (willingness to change career for more personal time). Making a personal decision to study medicine was significantly different across disparate levels of intrinsic motivation (Tables 2.10-11); willingness to change jobs was also significantly different across levels of intrinsic motivation but not extrinsic motivation (Tables 2.12-2.13). In the Appendix, supplementary analyses using row frequencies and total counts are provided for comparison (Tables A2.1, A2.2, A2.3 and A2.4) that indicate more saliently the proportional differences of making one's own decision to study medicine across different levels of intrinsic motivation, and willingness to change careers across levels of intrinsic motivation.

Table 2.10 Contingency table: Extrinsic motivation and own decision to study medicine

Own decision	Extrinsic motivation			
	0	1	2	3
No	25	7	3	3
Yes	42	11	7	11

P-value from Fisher's exact test: 0.714

Table 2.11 Contingency table: Intrinsic motivation and own decision to study medicine

Own decision	Intrinsic motivation			
	0	1	2	3
No	18	16	4	0
Yes	20	27	15	9

P-value from Fisher's exact test: 0.022, significant at $p < 0.05$

Table 2.12 Contingency table: Extrinsic motivation and willingness to change careers

Career change	Extrinsic motivation			
	0	1	2	3
No	24	2	6	4
Yes	21	7	3	3
Don't know	22	9	1	7

P-value from Fisher's exact test: 0.125

Table 2.13 Contingency table: Intrinsic motivation and willingness to change careers

Career change	Intrinsic motivation			
	0	1	2	3
No	9	17	8	2
Yes	15	10	9	0
Don't know	14	16	2	7

P-value from Fisher's exact test: 0.009, significant at $p < 0.01$

2.5   DISCUSSION

Results indicate that there are several significant predictors of physical health and mental health among medical residents in China, confirming classic theoretical concepts regarding social support and health, as well as extrinsic and intrinsic motivation. Significantly, high intrinsic motivation seems to be key to retaining residents, as it predicts health and happiness. Conversely, extrinsic motivation is negatively associated with both health and happiness. Additionally, the autonomous desire to pursue medicine in high school (Q12) is related to intrinsic motivation.

Pursuing medicine as a career not only involves a grueling schedule but also an intense work environment. Motivation thus plays a key part in retaining residents. The three basic human needs identified earlier as components of self-determination theory (autonomy, competence, and relatedness), and in conjunction, intrinsic motivation (Ryan and Deci, 2020), can be applied to the present study. In Wuhan, medical residents indicated discontent with both extrinsic motivators (salary and vacation) and intrinsic motivators (patient trust and respect) in their in-person interviews—confirming several long-standing issues in the Chinese medical field (Zhang and Sleeboom-Faulkner, 2011). With increased residency training requirements, there was little autonomy in medical residents' day-to-day tasks, and fewer perceived career growth opportunities.

At the local level, university-wide curriculum changes that increase the autonomy of residents, and improve on-the-job training and feedback from attending doctors, may help ameliorate these issues, and potentially improve job satisfaction and motivation among these residents. Medical residents' intrinsic motivation during their program is important and can be developed through introducing meaningful experiences in their training program. Those who feel motivated to become doctors for intrinsic reasons may have an internal reason to persevere

through residency, even despite low extrinsic motivators such as sleep deficits, low wages, and busy schedules.

Extrinsic motivation however acts as a double-edged sword. Increasing current pay and benefits for residents may decrease intrinsic motivation as well as health and happiness in the long run. As expressed in individual interviews and open-ended response questions in the surveys, residents are concerned about low pay, long hours, and lack of vacation time, with one student writing: "they want to make the horse run but do not feed it grass."

Based on this written feedback, respondents' primary concerns – beyond a lack of salient extrinsic motivators such as pay and vacation time – were mostly centered on the lack of on-the-job training. Through in-person interviews and open-ended survey responses, residents indicated that they worked for doctors as "interns fetching coffee" rather than learning actual skills ("more time spent writing papers than learning from work"). Prior research had found that ophthalmology residency residents in southern China reported receiving less supervision than neighboring Hong Kong counterparts; only 4.4% of Chinese residents felt that their training was supervised more than 90% of the time, versus 65% of Hong Kong residents (Young et al., 2015).

Moreover, medical residents tended to receive the brunt of anger from patients who "were not likely to yell at actual doctors, but more at residents." Nationwide changes in the Chinese medical system, including better patient education, revised renumeration system for physicians, and hospital policy changes may improve physician-patient relations. Locally, improvements in medical education (e.g., bedside manner) could help improve this relationship from the physician-side. In China, problematic doctor-patient relationships have been long-standing, and thus the COVID-19 pandemic provides an opportunity to restore public trust in the healthcare system (Gan et al., 2020).

Finding that social support (measured by social participation/social interaction frequency) is significantly and positively related to health helps affirm classical sociological theory regarding the social determinants of health. The slightly significant relationship between social support and intrinsic motivation bears further examination; a preliminary hypothesis suggests a causal relationship; that is, intrinsically motivated people may be happier and seek out others like themselves for fun events or career-related networking.

2.6   LIMITATIONS

Although gender norm adherence was not significant in any of the models, a negative relationship with health was indicated. The reason that this measure was not significant may have been due to self-selection bias. Respondents were well-educated, having all attained at least a bachelor's degree, and mostly single (and likely childless). This group had already chosen a career in the medical field since high school, knowing ahead of time that years of training were required to become a doctor. Thus, they may be less likely to believe in traditional gender norms. Respondents who were not partnered had not experienced a 'second shift' after marriage, and thus found it difficult to understand the question about switching careers for more personal time. Thus, beliefs in gender norms may not be a pertinent question to ask medical residents in China.

Regarding motivation, the first question (Q12) regarding an autonomous decision to study medicine in high school may have been a good measure of intrinsic motivation, as demonstrated by significance in the Fisher's exact test with the other measure of motivation (Q20). However, temporally, intrinsic motivation from many years ago (e.g., during high school) would not likely influence present health and well-being, since much can change in a person's psychology and social state from high school through college and graduate education.

For the second question measuring motivation (Q20), this question could be re-phrased and improved. Currently, the question is asked in a multiple-choice, "check all that apply" format; it may be better to ask each choice separately as a question with a Likert-scale response (e.g., "You chose to become a doctor in order to…" asked six times, with responses ranging from "Disagree a lot" to "Agree a lot").

While the quantity of social ties (Q18) was insignificant in the initial regression model, it is also possible that the question was asked in a manner that was hard to understand or difficult to recall ("how many friends do you have right now?") or that the number of friends interpreted as having few social ties ("fewer than five"), was too high of a threshold.

2.7 CONCLUSIONS

Healthcare services in China are still developing. Although China has increased its financial investment in the healthcare system, issues such as low health-care provider renumeration and fee-for-service payment for prescription drugs (resulting in the overuse of antibiotics), gaps in the in-service training of medical professionals, and lack of coordination of care between PHC providers and community health centers, still necessitate reform (Li et al., 2020). Particularly given the physical and mental stress placed on medical professionals since late 2019 during the COVID-19 pandemic, the importance of support for health professionals, particularly in terms of mental health, is increasingly noticed (Xiang et al., 2020).

This survey, conducted in summer 2016, aimed to capture resident impressions at a moment when China's new medical residency training had just been implemented. I examine resident opinions towards this new training protocol and their feedback on the residency training program overall, collecting basic demographic information as well as self-reported health and social behaviors. Several significant relationships warrant further attention: higher social interaction frequency and better health, as well as intrinsic motivation and its positive

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relationship to health and happiness (e.g., physical and mental health). The power of intrinsic motivation, or an internal psychological drive, is particularly highlighted by these results.

Although in-person individual interviews revealed negative career outlooks among medical residents, certain improvements may help alleviate their stress and anxiety. Intrinsic motivation could be increased by allowing residents to handle cases with more autonomy, incorporating more 'hands-on' training, and building up physician-patient trust and relationships with hospital-wide programs. Furthermore, the university could build community by sponsoring group activities, and creating targeted support groups, that in turn promote the motivation, health, and happiness of their medical residents. This would potentially reduce medical errors and improve patient outcomes, and improve retention rates in the medical field. Positively, the quality of life of medical professionals has received more attention since the COVID-19 pandemic, and thus improvements to the medical education system and healthcare infrastructure are more likely to occur now than before.

In this study, individual internal states as well as micro-level and macro-level contextual factors are examined in relation to health, for a specific population. I demonstrated that among Chinese medical residents in a large urban city, the theoretical concepts underlying determinants of health still hold true. As biological factors (age, gender, ethnic-racial group, educational attainment) were mostly similar across the sample – young (average age of 25), Chinese, bachelor's or higher educational attainment, and evenly split (male/female) – I was able to investigate the impact of psychological, cultural, social and governmental influences on health. Variations in motivation and social relationships were the most salient predictors of health and happiness. Next, we shift to a completely different population – older adults in the U.S. – and dive deeper into dyadic relationships, sexual behavior, and predictors of physical and mental health.

CHAPTER THREE

PARTNERSHIP, SEXUAL ACTIVITY AND HEALTH:
COMPARING TWO U.S. COHORTS OF OLDER ADULTS

As life expectancy increases and people live longer, healthier lives in various parts of the world including the United States (CDC, 2020), population aging and its effects become a new challenge to overcome. By 2030, about 1 billion people will be 65 or older, or roughly 1 in 8 persons (WHO, 2020). An aging population affects manifold aspects of society, from the economy to long-term care to family structures and intergenerational ties. Good health in later life is thus crucial, allowing individuals to participate more actively in society, in turn reducing the negative effects of population aging (WHO, 2020). Thus, a "decade of healthy aging" is the main goal of the World Health Organization for 2021-2030.

In the U.S., Baby Boomers (b. 1946-64) are expected to number around 61 million by 2030, whereas Traditionalists (b. 1924-46) will number around 9 million, increasing the old-age dependency ratio (Knickman and Snell, 2002; U.S. Census 2020). Baby Boomers have been projected to influence national characteristics in the coming years as one of the largest generations entering older adulthood (Pruchno, Will-Genderson and Cartwright, 2012; Hughes & O'Rand, 2004). Members of this generation experienced great social change, including the Civil Rights Movement, Women's Liberation Movement (including legalized and accessible birth control for women), Vietnam War, and Cold War (Rowntree, 2015), which may have influenced partnership and sexual behaviors.

In this chapter, I explore four main relationships: 1) cohort differences in sexual activity and 2) partnership, 3) sexual activity as a predictor of physical health, and 4) relationship quality (e.g., relationship happiness) as a predictor of mental health. I first provide an overview of literature on older adult sexuality and partnership and its ties to physical and mental health. Then, I utilize data from the National Social Life, Health, and Aging Project (NSHAP) to

conduct cross-sectional and longitudinal data analyses to validate the hypotheses based on my proposed multidimensional model of health.

3.1 BACKGROUND

The sexuality of older adults is increasingly recognized as important in medical and sociological research. Throughout their lives, many older adults maintain sexual and intimate relationships (Lindau et al., 2007; Waite et al., 2009). Das, Waite and Laumann, (2012) conceptualize sexual activity as a tree, with branches that individuals follow towards disparate pathways of sexual expression through time – branching points are associated with physical health, partner availability, partners' health, attitudes towards sex, and social embeddedness. Main factors that affect sexual relationships are the availability of a partner, and the individual and/or partner's health (Waite 2010; Ginsberg, Pomerantz, and Kramer-Feeley, 2005; Gott and Hinchliff, 2003).

Sexual behaviors of older adults are associated with physical and mental well-being, including cardiovascular health (Liu, Waite, Shen & Wang, 2016), subjective well-being (Lee, Vanhoutte, Nazroo & Pendleton, 2016), and self-rated health (Lindau and Gavrilova, 2010). Having an older partner, or prior diagnoses of diabetes mellitus, coronary heart disease, or depression, was related to lower rates of sexual activity for older adults in Sweden (Beckman et al., 2014). Older men and women in the U.K. (English Longitudinal Study of Ageing) who reported a decline in the frequency of sexual activity had higher odds of deterioration in self-rated health (Lee et al., 2016). Sexual dysfunction was associated with mortality in older men in the U.S., suggesting that sexual activity is an indicator for overall health (Hsu et al., 2007; Lindau et al., 2007). Erectile dysfunction (ED) was also associated with poorer health outcomes due to cancer and coronary heart disease, as well as poor/fair self-rated health (Jackson et al., 2020). Changes in sexual activity can thus be a "canary in the coal mine" signaling

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cardiovascular disease and other health conditions (Hakky, 2020). Generally, we can expect lower levels of sexual activity with older age, poorer physical health, and partner mortality (Waite et al., 2017; Waite et al., 2009).

Prior literature has indicated differences in sexual behavior by gender, culture, and race/ethnicity. Overall, a minority of older adults (7%) aged 65-80 reported sexual activity when not in a relationship (Solway et al., 2018); few sexually active women (13%) participating in MIDUS II (Midlife in the U.S.) were unpartnered (Thomas, Hess, and Thurston, 2015). Women tended to report a lack of interest in sex more often than men (Das, Waite and Laumann, 2012). Cultural or racial-ethnic differences in sexual attitudes and behaviors (Das, Waite and Laumann, 2012; Laumann, Das, and Waite, 2008; Laumann et al., 1994) may also play a role in the relationship between sexuality and health. For example, among older women, African Americans were significantly more likely to report HIV-related changes in their sexual behavior, and to discuss sex with a physician (Lindau et al., 2006).

Partnerships, particularly dyadic ones such as marriage, are also significantly linked to health, as marriage is one of the central relationships for most adults (Robles and Kiecolt-Glaser, 2003). Especially since older adults' social circles tighten later in life and they may lose social network members due to illness, death or relocation (Rook, 2009), their relationships with their significant others become paramount. Thus, changes in marital quality can affect older adults more than their younger counterparts (Liu and Waite, 2014).

Marriage is associated with health behaviors, healthcare access and use, physical and mental health, and intergenerational health (Wood, Goesling and Avellar, 2007). A good marriage can be protective for health and has been found to have positive impacts on health behaviors among older adults (Schone and Weinick, 1998), with positive marital quality buffering stress and moderating relationships between disability and loneliness (Warner and Kelley-Moore, 2012), and positive marital relationships related to better actigraphy-estimated

sleep characteristics (Chen, Waite and Lauderdale, 2015). Conversely, the physiological impact of chronic stress in an aversive marriage is detrimental to health. Negative and hostile behaviors during marital conflict are associated with elevated cardiovascular activity, altered hormones related to stress, and dysregulation of immune function (Robles and Kiecolt-Glaser, 2003). During the COVID-19 pandemic, individuals with good relationship quality in Austria reported better mental health than those with poor relationship quality or no relationship; those with poor relationship quality also reported the poorest mental health, compared to people without relationships (Pieh et al., 2020).

There is mixed literature on gender effects interacting with the relationship between marriage and health outcomes. Using data from the Health and Retirement Study (1992-2008), Bulanda, Brown and Yamashita (2016) found that marital status itself is more important for men's mortality risk than women's, while marital quality is more important for women's survival than men's. Women demonstrated greater and more persistent physiological changes related to marital conflict than men (Kiecolt-Glaser et al., 1998). Net of demographic characteristics, poor health status is associated with more negative marital quality; frequency of sexual activity mediates the association between health status and marital quality (Galinsky and Waite, 2014).

Finally, partnership behaviors vary by race/ethnicity, educational attainment, and socioeconomic status. Prior literature on racial disparities in family formation found divergences in partnership and dissolution patterns, theorized to have begun in the 1960s, due to social class differences (Raley, Sweeney and Wondra, 2015). African Americans are less likely to marry, more likely to separate, and less likely to remarry, compared to Caucasians (Cherlin, 1998). Education is associated slightly negatively with the probability of ever marrying among Caucasians, but is associated positively with marriage among African Americans; this may occur due to interactions with other factors such as the marriage squeeze,

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labor-market success, and premarital childbearing (Bennet, Bloom, and Craig, 1989). While the marriage to divorce rate overall was 2.2 in the U.S. in 2018 (approximately two marriages for every divorce), across racial-ethnic groups, only African American women had a higher divorce to marriage rate, whereas women who were Caucasians, Hispanic/Latinos and of Other ethnicities had a higher marriage to divorce rate; women who had attained a bachelor's degree or more had the highest marriage to divorce ratios, whereas women who had less than a high school degree were the only group with a higher divorce to marriage ratio (Schweizer, 2019). Lundquist (2006) argues that the marriage gap is due to socioeconomic status rather than race/ethnicity, as African American soldiers in the military with a stable and higher income than their civilian counterparts are much less likely to divorce than Caucasian soldiers. Thus, educational attainment and socioeconomic status are closely tied to the racial-ethnic differences in marriage patterns.

Literature also suggests that some minority groups, while less likely to marry or remain married, are able to receive social support through kin networks, which may offset the health effects of missing a traditional dyadic partnership. Older adult African Americans are less likely than Caucasians to live alone, be childless and have limited contact with religious congregation members (Taylor, Chatters, and Taylor, 2019). Similarly, postmenopausal Hispanic women had a survival advantage when compared to Caucasians and African Americans (but not Asian/Pacific Islander women), despite higher rates of divorce compared to non-Hispanic Caucasians, based on nationally representative U.S. data from 1993-1998 (Flores et al., 2021). Earlier research had found that Mexican immigrants living in the U.S. reported lower levels of distress and are less impacted by social stressors, compared to African Americans, Caucasians, and Mexican Americans, due to cultural proclivities such as extended-family ties and pseudo-kinship ties, which provide social support despite life changes such as divorce or separation (Mirowsky II and Ross, 1980).

3.2   CONCEPTUAL MODEL

A cohort comparison is a useful demographic approach to study social change, as each cohort is an aggregate of individuals with a distinctive composition that reflects experiences of the same events within the same interval (Ryder, 1965). Whereas the oldest generation alive in the U.S. is composed of the Traditionalists (born 1945 or before) – a generation that grew up during the Great Depression (1929-1933) and World War II (1939-1945), and maintained traditional gender norms, Baby Boomers (b. 1946-1964) experienced the Cold War (1947-1991), Civil Rights Movement (1954-1968), and Vietnam War (1955-1975), and are now entering older age as the largest generation in the United States (Britannica 2020). Therefore, these two juxtaposed generations – one the oldest and one the largest, are important cohorts to compare.

Due to historical events such as the Women's Liberation Movement beginning in the 1960s (Burkett 2020), which introduced more relaxed norms for sexual behavior (Francis 2013) and improved contraceptive methods for women (with the Federal Drug Administration approval of the Pill in 1960 and of intrauterine devices in 1968; Planned Parenthood, 2013), I postulate that women in the Baby Boomer generation will have more liberal attitudes towards sex than women in the earlier generation of Traditionalists. They will likely be more sexually active than the previous generation, at similar ages, outside of traditional partnerships such as marriage. Prior literature has found that Boomers experienced higher rates of separation and lower rates of marriage than their previous generation, the Traditionalists (Lin and Brown, 2012). Here, I also expect that Baby Boomers will be less likely to be married and more sexually active than Traditionalists, at similar ages.

Furthermore, sexual activity has been associated with physical health in prior literature, potentially as an indicator of good health. The quality of a dyadic relationship is also closely related to an individual's mental health. These associations can be explained bi-directionally.

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Respondents with good physical health prior to entering a relationship would be physically able to have sex; those who are sexually active may also maintain their health through continuous sexual activity and other factors such as a positive relationship with their partner. Respondents with pre-existing good mental health would likely be more able to maintain a positive relationship with their partner, and in turn this relationship would be better able to foster future mental health. In this study, I consider sexual activity and relationship quality as indicators of health, and use them to predict future physical and mental health, respectively, adjusting for other factors such as cohort differences and socio-demographics.

Previously, analyses of older adult sexuality using NSHAP Round 1 (Lindau et al., 2007; Laumann, Das, and Waite, 2008; Waite, Laumann, Das & Schumm, 2009) and Round 2 (Lindau et al., 2018; Galinsky, McClintock and Waite, 2014) have been used to analyze older adult sexual behavior. However, cohort differences in partnership and sexuality have not been examined by incorporating survey data from 2015-16, nor has sexual activity and marital quality been used to predict future health using data from the NSHAP-COVID Study (2020-21). In this chapter, I utilize NSHAP survey data (2005-2021) to test the hypotheses below.

3.3   HYPOTHESES

Given prior literature on generational differences and the relationships between sexual activity, relationship quality, and physical and mental health, I propose that:

1) Baby Boomers will report higher levels of sexual activity and lower levels of partnership compared to Traditionalists at similar ages, net of other sociodemographic factors.

2) Sexual activity in 2015-16 positively predicts physical health in 2020-21, whereas marital quality (relationship happiness) in 2015-16 positively predicts mental health in 2020-21, net of other sociodemographic factors.

3.4   METHODS

3.4.1   Data

The National Social Life, Health and Aging Project (NSHAP) is one of the primary longitudinal studies in the U.S. that incorporates in-person interviews while following cohorts over time. Following two initial rounds of surveys (2005-06 and 2010-11) that interviewed Traditionalists only (Cohort 1), Round 3 (2015-16) also included a second cohort (Cohort 2, Round 1) colloquially referred to as the Baby Boomers. In 2020-21, respondents who had participated in Round 3 were interviewed again as part of the NSHAP-COVID Study. Round 1 included more than 3,000 interviews conducted during 2005-2006 with a nationally representative sample of community-dwelling adults aged 57 to 85 (O'Muircheartaigh, Eckman and Smith, 2009; O'Muircheartaigh et al., 2014). Round 2, conducted in 2010-2011, included around 3400 interviews completed with prior respondents, along with individuals who had declined to participate previously, and their spouses or cohabiting romantic partners. In 2015-2016, all surviving respondents were again interviewed and a new cohort of respondents, the Baby Boomers, was added along with their spouses or partners, totaling 4,777 interviews. In the 2020-21 NSHAP-COVID Study, respondents from 2015-16 (including both cohorts) were surveyed using web, phone and paper-and-pencil surveys (n=2672 responses).

To test the first hypothesis, I utilize data from Rounds 1-3, including demographic measures as well as sexual activity and self-rated physical and mental health. As I compare Baby Boomers and Traditionalists at the same age at the time that they were surveyed, only ages 57-67 are included in the first portion of the analyses (e.g., the youngest Traditionalists were aged 57 in 2005-06, then 62 in 2010-11, and 67 in 2015-16; Boomers were aged 57-67 in 2015-16). Since Boomers (32.47%, n=1239) were interviewed only beginning in 2015-16, more data points were available from the Traditionalists (67.53%, n=2577), including 1372 Traditionalists interviewed in Round 1, 1040 in Round 2 and 165 in Round 3 (these data point

include the same respondents at different time points and ages).

To test the second hypothesis, I compare data from Rounds 3 and 4 by matching respondent identification codes (n=2672). Since both cohorts are well-represented in the third and fourth rounds, I incorporate the age range of "50 and above" to test my hypothesis. Of those aged 50-97 in the 2015-16 survey, Traditionalists (52.09%, n=2400) and Baby Boomers (47.91%, n=2207) were about evenly split. Of those aged 50-99 in 2020, a similar split was noted for Traditionalists (52.99%, n=1401) and Baby Boomers (47.01%, n=1243). The NSHAP-COVID study does not ask about sexual activity or non-cohabiting intimate partners, but does survey self-rated physical and mental health, as well as relationship happiness (interpreted as a measure of relationship quality), during the pandemic. All estimates are survey-weighted, and adjusted for non-response based on age and urbanicity. The institutional review boards of the National Opinion Research Center and the University of Chicago approved the study; respondents provided informed consent.

3.4.2   Predictor and outcome variables

Variables considered in these analyses include: age, gender (e.g., male/female), cohort, race/ethnicity, educational attainment, partnership status, sexual activity, relationship happiness, and physical and mental health. Biological sex was indicated by the respondent during in-person interviews. Across all surveys, race/ethnicity and educational status were similarly worded. The race/ethnicity of respondents was categorized as Caucasian, African American, Latino/Hispanic and Other (including Asian-Pacific, American Indian, mixed and other ethnicities). Educational status was posed as an ordinal question, with responses ordered from "less than high school" to "bachelor's degree or more."

Respondents were asked if they were: married, cohabiting, separated, widowed, divorced, or never married. Those who reported being separated, widowed, divorced, or never

married were asked if they had a current sexual or romantic partner. If they reported having a sexual or romantic partner, they were also considered to be partnered. Respondents were also considered to be partnered if they reported being in a marriage or in a cohabiting relationship. Thus, three main types of partnership are included in this analysis: married partners, unmarried partners cohabiting, and unmarried partners not cohabiting.

When testing the first hypothesis, partnership includes both married and unmarried partners. When testing the second hypothesis, only married partners were considered, as the NSHAP-COVID Study measured marital status but not sexual activity or intimate partnerships, and literature primarily links marriage with health outcomes. Sexually active adults were identified as those who reported being sexually active with at least one partner in the prior twelve months.

Physical health was measured by the classic SF-36 question: "Would you say your health is…" with choices on a Likert scale ranging from "Excellent" to "Poor". In the leave-behind questionnaire, respondents were asked to self-rate their mental health with the question "How is your emotional or mental health?" using the Likert scale "Excellent" to "Poor". In the NSHAP COVID Study (2020-21), these questions were asked in the same survey, whereas in the previous rounds they were in separate questionnaires. When coding these results for data analyses, answers that were more positive ("good," "very good," and "excellent") were coded as "1" versus results that indicated poorer health ("fair" and "poor"), which were coded as "0".

Relationship quality was measured by the question: "How happy is the relationship with your spouse/partner," with choices on a Likert scale ranging from "Very unhappy" to "Very happy." This question was asked slightly differently in 2020-21: "How happy is the relationship with your spouse/partner since the pandemic?" with Likert scale choices ranging from 'a lot worse" to "a lot better." When coding these responses for analyses, answers of "neither happy or unhappy" were grouped with responses indicating "unhappy" relationships,

so that only "happy" to "very happy" relationships were coded as "1". Overall, all variables were recoded as dichotomous, with the exception of educational attainment and race/ethnicity. The more negative options were grouped together and coded as "0" and the more positive options grouped as "1". In subsequent analyses, good[+] physical and mental health comprise "good," "very good," and "excellent" self-rated health, excluding both "poor" and "fair" health.

3.5   DATA ANALYSES

Analyses were conducted using STATA (Version 15) with survey weights. To test the first hypothesis, demographic characteristics and the proportion partnered and sexually active by cohort and gender are tabulated from the first three rounds (R1-R3). The actual proportion partnered and sexually active, by gender and cohort, are plotted. Logistic regression models predicting partnership and sexuality, while adjusting for demographic variables, physical and mental health, are used to create plots for the adjusted predicted proportion partnered and sexually active, by gender and cohort.

When testing the second hypothesis, I first tabulate the demographic characteristics and responses to variables from respondents in R3 and R4. Logistic regression models predicting physical and mental health in Round 3 (2015-16), respectively, are presented, to provide a baseline for comparison. Next, regression models predicting physical and mental health in Round 4 (2020-21) are presented, using a combination of variables from both rounds, including socio-demographic indicators, prior physical and mental health status (2015-16), sexual activity (2015-16), and relationship happiness (2015-16 and 2020-21). Finally, models predicting relationship happiness in Round 3 and 4, incorporating socio-demographic variables, sexual activity, prior relationship happiness (2015-16), and prior and present physical and mental health, are presented.

3.6 RESULTS

3.6.1 Testing the first hypothesis

Overall demographic characteristics of each cohort's respondents from Rounds 1-3 are compared below using Table 3.1-. The majority of respondents were partnered and sexually active, across cohorts and genders. Married partners and unmarried partners are separately listed here as well, across both cohorts. Distributions of gender and race/ethnicity were similar for both cohorts. More women attained higher education in the Boomer generation, as can be expected due to social changes such as the women's rights movements in the 1960s and 1970s (not shown).

Table 3.1 Demographic characteristics of the two cohorts (Rounds 1-3, aged 57-67)

	Cohort	
Variables	**Traditionalists**	**Baby Boomers**
Gender		
Male (%)	45.71	48.10
Female (%)	54.29	51.90
Total observations (N)	2577	1239
Race/Ethnicity		
Caucasian (%)	69.19	67.29
African American (%)	15.82	18.34
Hispanic, non-black (%)	12.58	9.77
Other (%)	2.42	4.60
Total observations (N)	2567	1238
Education		
< High school (%)	15.95	10.57
High school or equivalent (%)	21.92	21.95
VOC/some college (%)	33.41	39.63
Bachelor's degree or more (%)	28.72	27.85
Total observations (N)	2577	1239
Partnered, all types (%)	81.41	72.24
Total observations (N)	2577	1239
Married partners	74.70	60.94
Total observations (N)	2577	1239
Unmarried partners	6.71	11.30
Total observations (N)	2577	1239

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Table 3.1 (cont.) Demographic characteristics of the two cohorts (Rounds 1-3, aged 57-67)

	Cohort	
Variables	**Traditionalists**	**Baby Boomers**
Sexually active (%)	62.55	63.76
Total observations (N)	2577	1239

The following tables indicate the proportion of each cohort that is partnered, by gender and cohort (Table 3.2a), as well as the different types of partnership – married, unmarried partners, cohabiting and not cohabiting (Table 3.2b), and proportion sexually active by partnership type (Table 3.2c), by gender and cohort.

Table 3.2a Proportion partnered (all three types), by gender and cohort, aged 57-67

Cohort	Men	Women	Total
Traditionalists	89.0% (1178)	75.1% (1399)	81.4% (2577)
Baby Boomers	80.5% (596)	63.9% (643)	72.2% (1239)
Total	86.1% (1774)	71.7% (2042)	**78.4% (3816)**

Note: Counts indicated in this table are *totals*. The *actual count for each category* can be calculated by multiplying the percentage provided with the total count in parentheses.

The table above (Table 3.2a) looks at the proportion of each cohort that is partnered, for men and women. The majority of respondents are partnered, whether Traditionalist or Baby Boomer, or male or female. Comparatively, a slightly greater proportion of Traditionalist men are partnered than Boomer men; more Traditionalist women are partnered than Boomer women.

Next, I categorize respondents who are partnered as married and unmarried (cohabiting and not cohabiting) relationships, comparing men and women across the two cohorts (Table 3.2b). A higher proportion of Traditionalist men and women are married than their Boomer counterparts. Unmarried partnerships make up a minority of partnerships for both cohorts. More Boomers than Traditionalists are in unmarried partnerships than Traditionalists, with higher proportions of men than women in these partnerships.

In terms of sexual behavior within partnerships, a higher proportion of Traditionalists than Boomers are sexually active and married, particularly amongst women. Conversely, there is a higher proportion of Baby Boomer women who are sexually active and unmarried than Traditionalist women. In both types of partnerships, there is a higher proportion of sexually active Boomer women than Traditionalist women.

Table 3.2b Types of partnership, by gender and cohort (aged 57-67)

	Married		
Cohort	Men	Women	**Total**
Traditionalists	81.7% (1178)	68.8% (1399)	74.7% (2577)
Baby Boomers	67.1% (596)	55.2% (643)	60.9%(1239)
Total	76.8% (1774)	64.5% (2042)	**70.2% (3816)**
	Unmarried		
	Men	Women	**Total**
Traditionalists	7.3% (1178)	6.2% (1399)	6.7% (2577)
Baby Boomers	13.4% (596)	9.3% (643)	11.3% (1239)
Total	9.4% (1774)	7.2% (2042)	**8.2% (3816)**

Table 3.2c Proportion sexually active by partnership type (ages 57-67)

	Proportion sexually active of those married		
Cohort	Men	Women	**Total**
Traditionalists	76.2% (962)	66.5% (963)	71.3% (1925)
Baby Boomers	75.5% (400)	68.7% (355)	72.3% (755)
Total	76.0% (1362)	67.1% (1318)	**71.6% (2680)**
	Proportion sexually active of those in unmarried partnerships		
	Men	Women	**Total**
Traditionalists	90.7% (86)	72.4% (87)	81.5% (173)
Baby Boomers	90.0% (80)	81.7% (60)	86.4% (140)
Total	90.4% (166)	76.2% (147)	**83.7% (313)**

3.6.1.1 Partnership and sexual activity across cohorts, by gender

Across the same age range (57-67), Traditionalist men were more likely to be partnered than their Boomer counterparts; similarly, Traditionalist women were more likely to be partnered compared to Boomer women, particularly at older ages (Figure 3.1a). Overall, men

were more likely to be partnered than women (Figure 3.1b). These partnership trends are consistent with prior literature and disparities in cohort behaviors; the Traditionalist generation was more likely to remain partnered and have sex within this partnership, whereas the Boomer generation was more likely to break from these norms, particularly amongst women. These differences are pronounced when looking at partnered sexual activity across cohorts by gender.

Examining sexual activity alone, Boomer men were the most likely to be sexually active, followed by Traditionalist men, Boomer women, and Traditionalist women. The proportions of those sexually active are graphed separately by gender (Figure 3.2a) and then combined for comparison (Figure 3.2b). Trendlines with the highest R-squared value (polynomial trend line, order 2) are added to the figures.

At younger ages, more male Boomers reported sexual activity than Traditionalists, but at older ages, they reported similar levels of activity. Boomer women had higher levels of sexual activity than their Traditionalist counterparts across the age range. Although men were more likely than women to be sexually active, Boomer women overtook both Traditionalist and Boomer men later in life in the proportion sexually active. Traditionalist women reported lower rates of sexual activity than other groups. These trends are discussed later in this chapter, after using logistic regression models to plot adjusted predicted probabilities of sexual activity.

Figure 3.1a Proportion of males and females partnered, by cohort (aged 57-67)
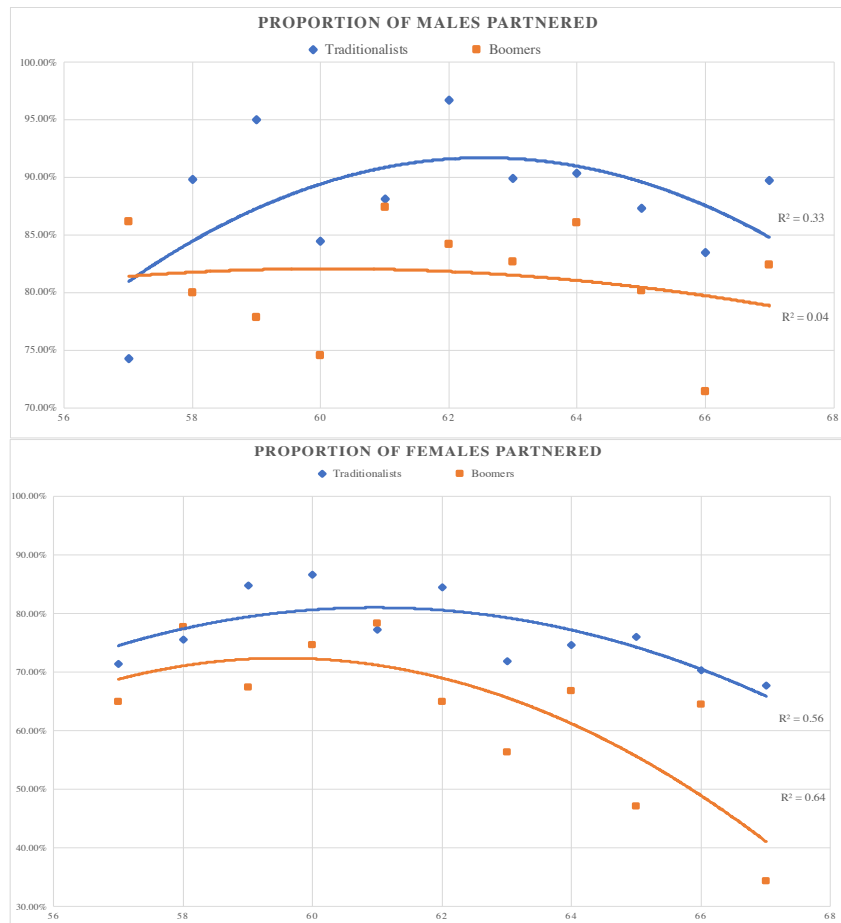
Figure 3.1b Proportion partnered by gender and cohort (aged 57-67), aggregate
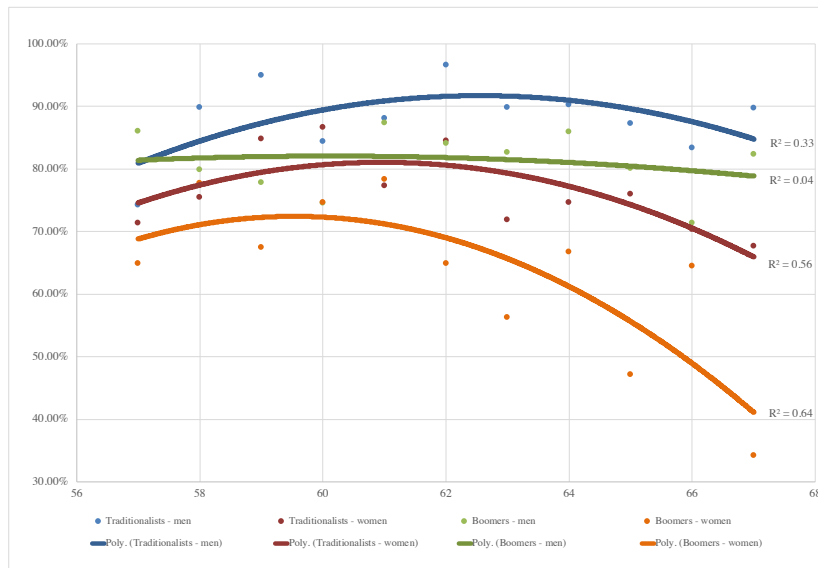
Figure 3.2a Proportion of males and females sexually active, by cohort (aged 57-67)
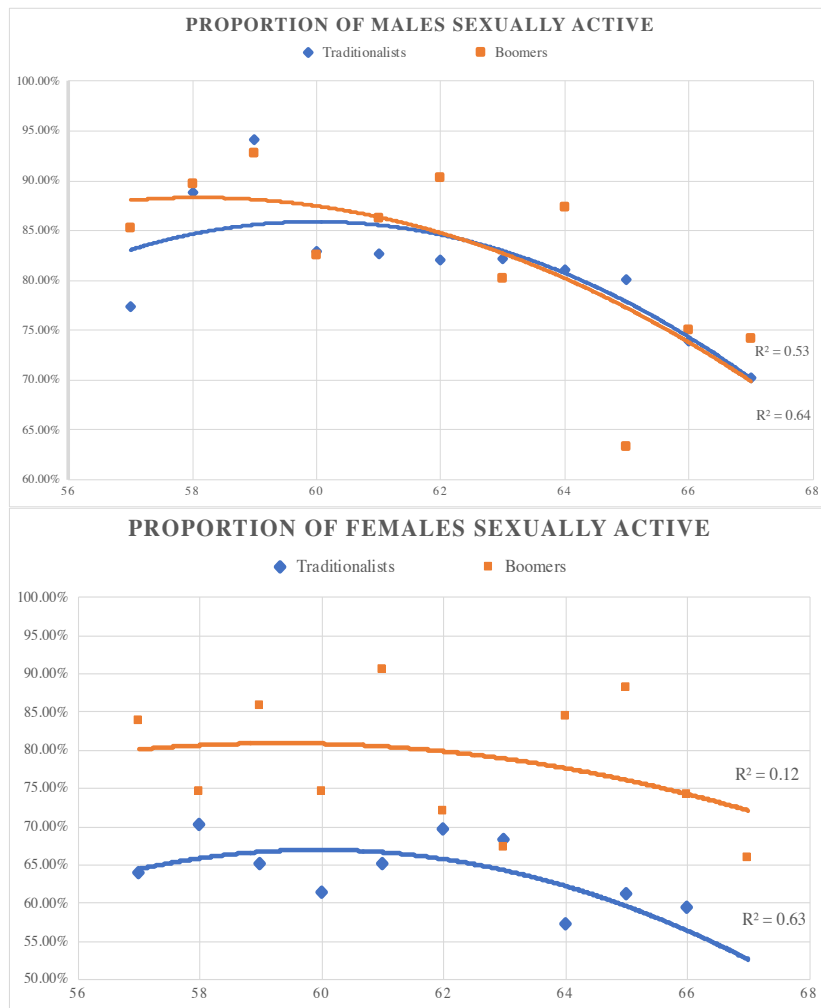
Figure 3.2b Proportion sexually active by gender and cohort (ages 57-67), aggregate
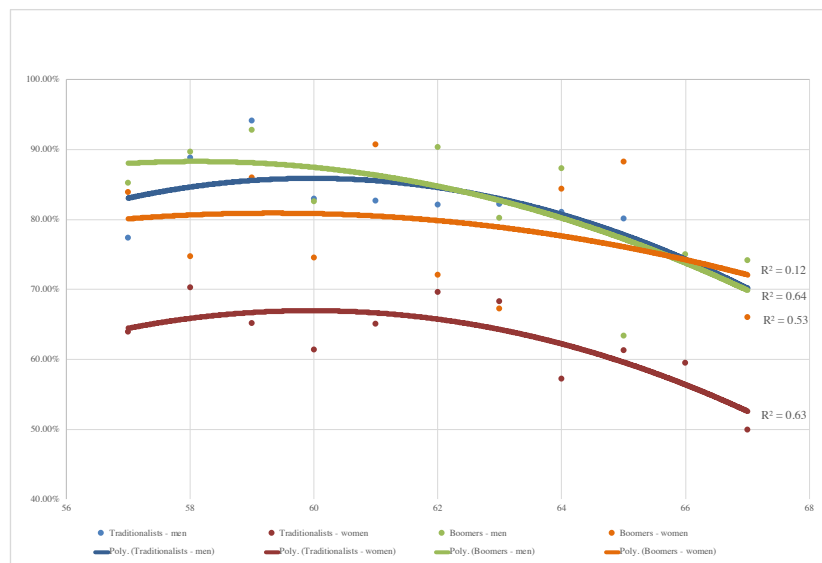
3.6.1.2 Logistic regression models predicting partnership and sexual activity

Two logistic regression models were used to determine the effects of predictor variables on partnership and sexuality, respectively. Furthermore, different types of partnership (married and unmarried) was also predicted by regression models. While one does need to be partnered in order to engage in partnered sexual activity, one does not need to be necessarily sexually active in order to be partnered. Therefore, I included partnership as a predictor of sexual activity, while I did not consider sexual activity as a predictor of partnership.

In Table 3.3, I present a logistic regression model that predicts partnership (including married and unmarried partnerships). When adjusting for socio-demographics and health (Model 1), the negative predictors of partnership include older age (OR = 0.93), being female (OR = 0.39), being a Baby Boomer (OR = 0.58), being African American (OR = 0.53) and belonging to an "Other" ethnicity (OR = 0.46). Conversely, good+ physical health (OR = 1.77), and to a lesser extent good mental health+ (OR =1.41) and higher educational attainment (bachelor's degree, OR = 1.53) are positively associated with being partnered. When an interaction between gender and cohort is considered (Model 2), results are similar. Here,

disparities across cohort by gender are more salient; being a female Baby Boomer (OR=0.22), a female Traditionalist (OR=0.37), or a male Boomer (OR=0.54) are all significant negative predictors of being partnered, compared to Traditionalist men (control). Thus, Traditionalist men were most likely to be partnered, followed by Boomer men, Traditionalist women, and then Boomer women (least likely).

Based on the first model, which does not include interactions, I plot the adjusted predicted proportion partnered, by gender and cohort (Figure 3.3). Using Model 1 to predict partnership, Traditionalist men are most likely to be partnered, followed by Boomer men, Traditionalist women and finally, Boomer women. When the second model (including the gender and cohort interaction) is used to plot the adjusted predicted proportion partnered (not shown), results are nearly identical, which can be expected as these trends are indicated in the gender and cohort interaction in that model.

Figure 3.3 Adjusted predicted probability of partnership (95% CIs)

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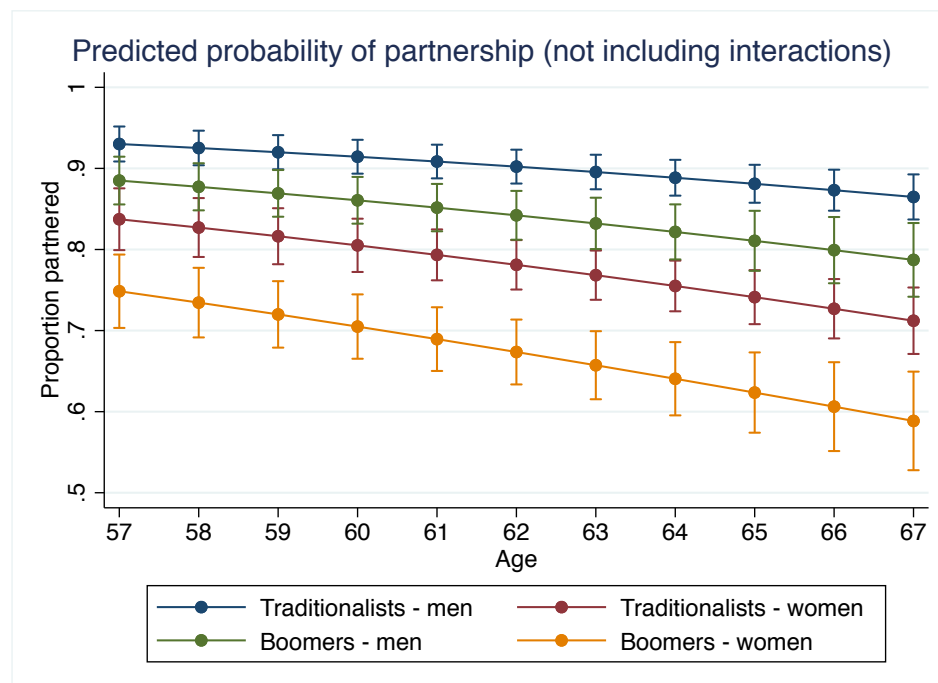
Table 3.3 Logistic regression models predicting partnership (OR, 95% CI), n = 3494

Variables	Model 1	Model 2
Age at time of survey	0.93***	0.93***
	(0.90 0.96)	(0.90 0.96)
Gender (Male as control)	0.39***	
	(0.30 0.49)	
Cohort (Traditionalists as control)	0.58***	
	(0.46 0.73)	
Cohort X Gender Interaction (Traditionalists & female as control)		
Traditionalist & Male		0.54**
		(0.37 0.80)
Baby Boomer & Female		0.37***
		(0.27 0.51)
Baby Boomer & Male		0.22***
		(0.16 0.32)
Race/Ethnicity *(Caucasian as control)*		
African American	0.53***	0.53***
	(0.41 0.69)	(0.41 0.69)
Hispanic	0.96	0.96
	(0.67 1.38)	(0.67 1.38)
Other	0.46*	0.46*
	(0.25 0.85)	(0.25 0.85)
Education *(<HS as control)*		
HS/Equivalent	1.20	1.20
	(0.83 1.73)	(0.83 1.74)
VOC/Some College	1.20	1.20
	(0.85 1.70)	(0.85 1.70)
Bachelor's degree or more	1.53*	1.53*
	(1.04 2.24)	(1.04 2.24)
Good[+] physical health	1.77***	1.77***
	(1.36 2.29)	(1.37 2.30)
Good[+] mental health	1.41*	1.41*
	(1.05 1.90)	(1.04 1.90)
Constant	353.34***	363.21***
	(39.58 3154.72)	(40.26 3276.28)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

There are slight differences in the models for predicting marriage and unmarried partnerships (Table 3.4). In predicting marriage (left), several variables that predict partnership also predict marriage, in the same direction. That is, increased age, being female, being a Boomer and race/ethnicity (African American and Other ethnicity) predict lower odds of marriage, and good+ physical health is positively associated with marriage. Only good+ mental health, which was significantly and positively associated with partnership, is not significantly associated with being married.

When I look at factors that predict unmarried partnerships (right), the main difference in predicting this outcome and marriage lies in race/ethnicity. African Americans (OR=2.57) and Other (OR=2.14) ethnicities predict much higher odds of being in an unmarried partnership, whereas in the previous model, they predicted lower odds of marriage. This finding confirms prior literature highlighting racial-ethnic differences in partnership type and status. Looking at the adjusted predicted probability of marriage (Figure 3.4, left), more men than women are likely to be married, and Traditionalists are more likely than Baby Boomers to be married (e.g., most likely Traditionalist men, then Boomer men, then Traditionalist women, finally Boomer women). When looking at the adjusted predicted probability of unmarried partnerships (Figure 3.4, right), there is a clear disparity between cohorts, with Boomers more likely than Traditionalists to be in unmarried partnerships, and men more likely than women overall. Boomer men are predicted to be most likely to be in unmarried partnerships, then Boomer women, Traditionalist men and Traditionalist women.

Table 3.4 Logistic regression models predicting marriage and unmarried partnerships (OR, 95% CIs), n=3494

Variables	Married partners	Unmarried partners
Age at time of survey	0.95***	0.98
	(0.92 0.98)	(0.93 1.02)
Gender (Male as control)	0.49***	0.92
	(0.40 0.60)	(0.67 1.27)
Cohort (Traditionalists as control)	0.58***	1.31
	(0.47 0.71)	(0.96 1.80)
Race/Ethnicity (Caucasian as control)		
African American	0.40***	2.57***
	(0.31 0.52)	(1.68 3.92)
Hispanic	0.90	1.21
	(0.64 1.26)	(0.65 2.26)
Other	0.39***	2.14*
	(0.22 0.69)	(1.04 4.41)
Education (<HS as control)		
HS/Equivalent	1.04	1.37
	(0.74 1.48)	(0.77 2.43)
VOC/Some College	1.13	1.11
	(0.81 1.56)	(0.65 1.89)
Bachelor's degree or more	1.23	1.44
	(0.86 1.75)	(0.82 2.52)
Good[+] physical health[1]	1.63***	0.97
	(1.28 2.08)	(0.68 1.38)
Good[+] mental health	1.27	1.24
	(0.95 1.68)	(0.72 2.12)
Constant	61.99***	0.19
	(9.08 423.24)	(0.01 4.59)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

Figure 3.4 Adjusted predicted probability of married and unmarried partnerships (95% CIs)
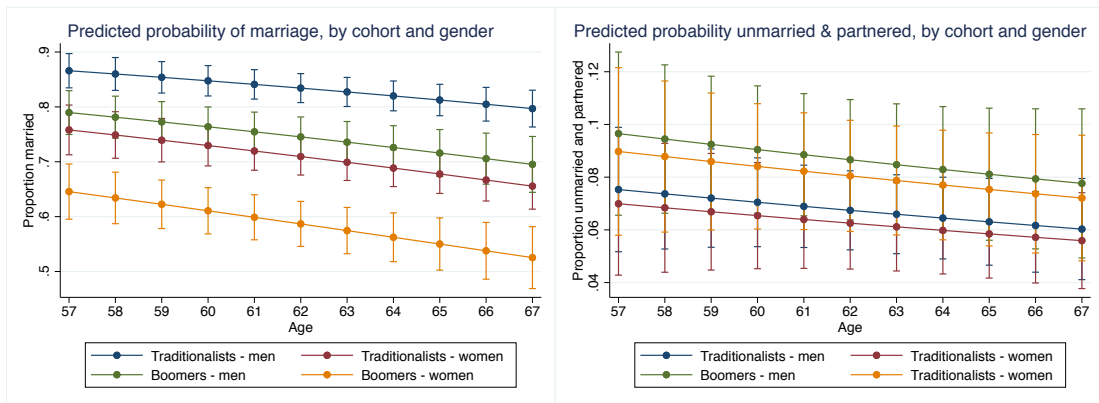
Finally, looking at predictors of sexual activity (Table 3.5), I propose three models, one that includes socio-demographics (including partnership) and self-reported health status, a second that includes the interaction between partnership and cohort, and a third that includes an interaction between gender and cohort. In Model 1, being older (OR=0.90) and female (OR=0.55) predicted lower odds of being sexually active. Being partnered (OR=7.92), well-educated (Bachelor's degree or more, OR=1.76), and Hispanic/Latino (OR=1.46) predicted higher odds of being sexually active. Good+ physical health is positively associated with sexual activity (OR=1.96).

When the interaction between partnership and cohort is included (Model 2), there are significant differences across cohorts, with partnered Traditionalists (OR=10.87) and Baby Boomers (OR=9.77) predicting higher odds of sexual activity than Traditionalists without partners (control, OR=1.00) and Baby Boomers without partners (OR=1.89). That is, Baby Boomers without partners were still almost twice as likely to be sexually active compared to Traditionalists without partners. Similar to Model 1, in Model 2, being older and female predicted lower odds of sexual activity, whereas being more highly educated (some college/VOC or more), Hispanic/Latino, and physically healthy predicted higher odds of sexual activity. These differences are indicated as well in the adjusted predicted probabilities.

Table 3.5 Logistic regression models predicting sexual activity (OR, 95% CI), n = 3494

Variables	Model 1	Model 2	Model 3
Age at time of survey	0.90*** (0.88 0.93)	0.90*** (0.87 0.93)	0.90*** (0.88 0.93)
Gender (Male as control)	0.55*** (0.46 0.68)	0.56*** (0.46 0.68)	
Cohort (Traditionalists as control)	1.07 (0.86 1.32)		
Partnered	7.92*** (6.23 10.08)		8.00*** (6.28 10.18)
Cohort X Partnered Interaction (Traditionalists without partners as control)			
Traditionalists & Partnered		10.87*** (7.75 15.24)	
Baby Boomers without partners		1.89** (1.23 2.90)	
Baby Boomers & Partnered		9.77*** (6.77 14.10)	
Cohort X Gender Interaction (Traditionalists & female as control)			
Traditionalist & Male			0.79 (0.58 1.08)
Baby Boomer & Female			0.47*** (0.37 0.59)
Baby Boomer & Male			0.63** (0.47 0.85)
Race/Ethnicity (Caucasian as control)			
African American	1.11 (0.82 1.49)	1.10 (0.82 1.47)	1.10 (0.82 1.48)
Hispanic	1.46* (1.04 2.04)	1.44* (1.03 2.02)	1.47 (1.05 2.06)
Other	0.60 (0.35 1.03)	0.61 (0.35 1.07)	0.59 (0.34 1.01)
Education (<HS as control)			
HS/Equivalent	0.97 (0.68 1.38)	0.96 (0.68 1.37)	0.97 (0.68 1.38)
VOC/Some College	1.57** (1.12 2.20)	1.57** (1.12 2.19)	1.58** (1.13 2.22)
Bachelor's degree or more	1.76*** (1.24 2.50)	1.77*** (1.25 2.52)	1.76*** (1.24 2.50)
Good$^+$ physical health	1.96*** (1.51 2.54)	1.93*** (1.49 2.50)	1.99*** (1.53 2.58)
Good$^+$ mental health	1.06 (0.76 1.48)	1.08 (0.78 1.50)	1.05 (0.75 1.46)
Constant	119.10*** (16.64 852.70)	99.26*** (13.98 704.97)	129.33*** (18.22 917.80)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

Model 3 highlights disparities across gender and cohort, with female Traditionalists (OR =0.47) and female Baby Boomers (OR=0.63) significantly less likely to be sexually active than Traditionalist men. Male Boomers are not significantly different from Traditionalist men in this model. Other variables remained the same in this model and results similar to Model 1.

In Figure 3.5, Model 1 adjusts for sociodemographic variables including partnership, as well as health status, whereas Model 2 additionally adjusts for the interaction between cohort and partnership. Both models predict higher odds of sexual activity for men than women, with more Boomers sexually active than Traditionalists, as expected. There is a slightly higher probability of being sexually active across age when the interaction effect is included.

Figure 3.5 Adjusted predicted probability of being sexually active (95% CIs)
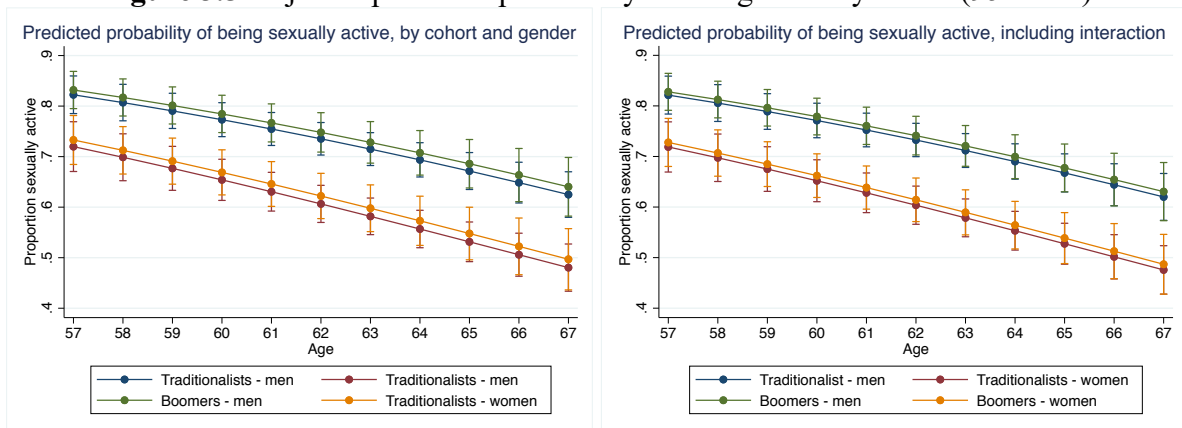
3.6.2 Testing the second hypothesis

Next, we turn to the second hypothesis, testing whether sexual activity and relationship happiness predict physical and mental health, respectively. In this section, both the 2015-16 and 2020-21 survey data is used. Since the respondents in 2020-21 were recruited from those who had participated in the survey in 2015-16, many demographic characteristics are similar (Table 3.7). When predicting outcomes in Round 4, only the responses from those who had participated in both Round 3 and Round 4 are included. Hence, this table includes a subset of responses in 2015-16 from respondents re-interviewed in 2020-21, indicated by parentheses.

The NSHAP-COVID Study only included a measure of marital status, which included married and unmarried (cohabiting) partners. In the regression models, only married partners were used, due to the lack of enough respondents in unmarried partnerships across strata in this smaller sample for a logistic regression. Similar to the prior subset of respondents in the first portion of the analyses, the majority of respondents were partnered (72.26%), most through marriage. Sexual activity data from R3 (2015-16) was used as a predictor variable. Relationship happiness was measured in both 2015-16 and 2020-21 and both were included when appropriate. Although the vast majority of respondents felt that their relationship was happy in 2015-16 (90.47%), this dropped to 79.58% of respondents in 2020-21. In terms of physical health, in Round 3, respondents reported being mostly in good or better physical health (81.95%) and mental health (90.79%), but of the same respondents who responded in R4, there were slightly fewer respondents reporting good physical (80.80%) and mental (86.71%) health.

To test the hypothesis that sexual activity in 2015-16 can predict physical health in 2020-21, I first examined factors that are associated with physical health in 2015-16 (Table 3.6). Being African American (OR = 0.69) and Hispanic/Latino (OR = 0.52) is associated with significantly lower odds of having good[+] physical health in 2015-16. Good[+] physical health is associated with good[+] mental health (OR = 5.40), higher educational attainment (bachelor's degree or more, OR = 4.66) and being sexually active (OR = 2.31). Sexual activity and physical health here are conceptualized to be a bi-directional relationship, where physical health can be maintained or improved through sexual activity, and partnered sexual activity requires some degree of physical health from both self and partner.

Next, I present two models for predicting physical health (Table 3.7). In the first model (M2), sexual activity in 2015-16 (OR = 1.84) is a significant predictor of future physical health in 2020-21, although having good[+] prior physical health (OR = 10.63), higher educational attainment (bachelor's degree or more, OR = 3.31), or being a Baby Boomer (OR = 2.14)

predicted greater odds of having good[+] physical health. Good[+] mental health in 2020-21 (OR = 6.08) is also significantly and positively associated with physical health in 2020-21. Nevertheless, taking into account that sexual activity was measured roughly five years prior, the impact of having had sex previously and still being able to positively predict physical health later on is substantial.

Table 3.6 Demographic characteristics of Round 3 (2015-16) and Round 4 (2020-21)

Variables	NSHAP Round 3 (50+) Ages: 50-97 n=4607	NSHAP Round 4 (50+) Ages: 50-99 in 2020 n=2644
Cohort		
Traditionalist (%)	52.09	52.99
Baby Boomers (%)	47.91	47.01
Total observations (N)	4607	2644
Gender		
Male (%)	45.15	43.23
Female (%)	54.85	56.77
Total observations (N)	4607	2644
Partnered[1]		
Yes (%)	72.26	69.65
No (%)	27.74	30.35
Total observations (N)	4607	2606
Married		
Yes (%)	64.03	65.85
No (%)	35.97	34.15
Total observations (N)	4607	2606
Sexually Active		
Yes (%)	52.77 (56.79)[2]	
No (%)	47.23 (43.21)	
Total observations (N)	4607 (2622)	
Relationship happiness	**(2015-16)**	**(2020-21)**
Very Unhappy to Neutral (%)	9.53 (8.38)	20.42
Happy to Very Happy (%)	90.47 (91.62)	79.58
Total observations (N)	3326 (2064)	1802
Physical Health	**(2015-16)**	**(2020-21)**
Poor or Fair (%)	24.54 (18.05)	19.20
Good, Very Good, (%)	75.46 (81.95)	80.80
Total observations (N)	4600 (2620)	2630
Mental Health	**(2015-16)**	**(2020-21)**
Poor or Fair (%)	9.21 (7.22)	13.29
Good, Very Good, (%)	90.79 (92.78)	86.71
Total observations (N)	3746 (2312)	2627

[1] The few (n=38) missing variables for "marital status" in 2020-21 are excluded from tabulations and analyses.
[2] Numbers in parentheses indicate responses used when predicting results for 2020-21 (e.g., only respondents who were surveyed in both 2015-16 and 2020-21 were included in the model and the parentheses indicate this subset.)

Table 3.7 Logistic regression models predicting physical health (OR, 95% CI)

Outcomes / Predictors	Physical Health (2015-16) Model 1 (n=2740)	Physical Health (2020-21) Model 2 (n=1563)	Model 3 (n= 2549)
Age at time of survey	1.00 (0.98 1.02)	1.02 (0.99 1.06)	1.01 (0.98 1.03)
Gender (Male as control)	1.22 (0.96 1.56)	1.33 (0.91 1.96)	1.58** (1.76 2.14)
Married	1.00 (0.69 1.48)	1.37 (0.67 2.78)	0.99 (0.73 1.35)
Cohort (Traditionalists as control)	0.75 (0.51 1.11)	2.14* (1.16 3.95)	1.76* (1.08 2.85)
Ethnicity (Caucasian as control)			
African American	0.69* (0.48 0.99)	1.04 (0.50 2.18)	1.03 (0.67 1.60)
Hispanic	0.52** (0.34 0.78)	1.32 (0.67 2.62)	1.75* (1.01 3.02)
Other	1.16 (0.61 2.19)	1.26 (0.46 3.46)	1.22 (0.54 2.77)
Education (<HS as control)			
HS/Equivalent	1.73 (1.17 2.57)	1.34 (0.61 2.92)	1.51 (0.85 2.66)
VOC/Some College	2.55*** (1.74 3.73)	1.73 (0.82 3.64)	1.50 (0.87 2.58)
Bachelor's degree or more	4.66*** (3.07 7.05)	3.31** (1.52 7.20)	2.95*** (1.66 5.27)
Sexually active	2.31*** (1.78 3.01)	1.84** (1.21 2.81)	1.52** (1.12 2.07)
Good[+] prior physical health (2015-16)		10.63*** (6.95 16.26)	10.38*** (7.61 14.15)
Good[+] prior mental health (2015-16)	5.40*** (3.70 7.87)	1.60 (0.77 3.30)	
Good[+] current mental health (2020-21)		6.08*** (3.85 9.59)	4.94*** (3.56 6.85)
Relationship was happy (2015-16)	1.19 (0.80 1.78)	1.24 (0.61 2.52)	
Relationship is happy (2020-21)		0.67 (0.42 1.07)	
Constant	0.20 (0.04 1.08)	0.01*** (0.00 0.09)	0.04** (0.00 0.30)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

When the non-significant variables of prior mental health (2015-16) and relationship happiness are excised from the model (M3), the predictor variables of being female (OR=1.58),

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a Baby Boomer (OR=1.76), Hispanic/Latino (OR=1.75), sexually active (OR=1.52), and having a bachelor's degree or more (OR=2.95), good prior physical health (OR=10.38), were significant predictors of having better physical health. Current mental health (OR=4.94) was also positively and significantly associated with current physical health. Prior physical health predicted the highest odds of having good or better future health, whereas sexual activity was not as significant a predictor as other socio-demographic factors and health status, although sexual activity did predict higher odds of future good[+] health.

In predicting mental health, I also first look at factors associated with this outcome in 2015-16 for comparison (Table 3.8). Educational attainment of a high school/GED or higher, good[+] physical health at the time (OR = 5.38) and relationship happiness at the time (OR = 2.04) were significantly and positively associated with having good[+] mental health. Looking at mental health in 2020-21, prior relationship happiness was not a significant predictor of mental health, but current relationship happiness was positively associated with having good[+] mental health. Other measures of health, including prior physical and mental health, and current physical health, were significantly and positively associated with having good[+] mental health in 2020-21. Socio-demographic factors were not significant predictors, nor was sexual activity. When prior relationship happiness and sexual activity were excised from the model, prior physical health (OR=1.77), prior mental health (OR=5.90), current physical health (OR=6.02) and current relationship quality (e.g., happiness, OR=2.89) were significantly associated with having good[+] mental health.

Table 3.8 Logistic regression models predicting mental health (OR, 95% CI)

Predictors \ Outcomes	Mental Health (2015-16)	Mental Health (2020-21)	
	Model 1 (n=2740)	Model 2 (n=1563)	Model 3 (n=1577)
Age at time of survey	0.99 (0.96 1.03)	0.99 (0.95 1.03)	1.00 (0.96 1.03)
Gender (Male as control)	0.98 (0.68 1.39)	0.83 (0.53 1.29)	0.83 (0.54 1.29)
Married	1.62 (0.93 2.83)	1.22 (0.43 3.47)	1.12 (0.42 3.02)
Cohort	0.59 (0.32 1.07)	0.66 (0.32 1.36)	0.65 (0.32 1.32)
Ethnicity (Caucasian as control)			
African American	1.26 (0.72 2.22)	1.42 (0.64 3.18)	1.39 (0.63 3.05)
Hispanic	1.08 (0.64 1.83)	0.95 (0.44 2.07)	0.92 (0.42 2.02)
Other	1.23 (0.43 3.51)	1.44 (0.47 4.41)	1.40 (0.46 4.29)
Education (<HS as control)			
HS/Equivalent	2.48*** (1.46 4.21)	0.90 (0.38 2.16)	0.88 (0.37 2.08)
VOC/Some College	3.10*** (1.86 5.18)	0.86 (0.38 1.95)	0.83 (0.37 1.89)
Bachelor's degree or more	2.37** (1.36 4.14)	0.87 (0.37 2.04)	0.84 (0.36 1.97)
Sexually Active	0.91 (0.60 1.39)	0.80 (0.49 1.32)	
Good[+] prior physical health (2015-16)	5.38*** (3.68 7.88)	1.85* (1.13 3.04)	1.77* (1.07 2.91)
Good[+] prior mental health (2015-16)		5.59*** (2.86 10.93)	5.90*** (3.04 11.49)
Good[+] current physical health (2020-21)		6.14*** (3.87 9.76)	6.02*** (3.80 9.54)
Relationship was happy (2015-16)	2.04** (1.20 3.47)	1.16 (0.53 2.55)	
Relationship is happy (2020-21)		2.81*** (1.74 4.54)	2.89*** (1.82 4.58)
Constant	1.37 (0.10 18.81)	0.33 (0.01 9.45)	0.29 (0.01 6.80)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

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Table 3.9 Regression models predicting relationship happiness in 2020-21 (OR, 95% CI)

| Outcomes | 2015-16 | 2020-21 | |
| | Model 1 | Model 2 | Model 3 |
Predictors	(n=2740)	(n=1563)	(n= 1568)
Age at time of survey	1.01 (0.98 1.04)	1.00 (0.97 1.03)	1.00 (0.97 1.03)
Gender (Male as control)	0.69 (0.50 0.96)	1.14 (0.83 1.58)	1.12 (0.82 1.55)
Married	2.33 (1.50 3.62)	2.05* (1.02 4.12)	2.08* (1.04 4.16)
Cohort (Traditionalists as control)	1.00 (0.58 1.71)	1.35 (0.82 2.20)	1.34 (0.82 2.20)
Ethnicity (Caucasian as control)			
African American	0.56*** (0.36 0.87)	0.91 (0.52 1.60)	0.88 (0.50 1.54)
Hispanic	0.39** (0.23 0.67)	0.54* (0.32 0.91)	0.56* (0.34 0.93)
Other	0.38*** (0.20 0.72)	0.42* (0.20 0.88)	0.42* (0.20 0.87)
Education (<HS as control)			
HS/Equivalent	0.98 (0.55 1.74)	0.69 (0.37 1.30)	0.70 (0.37 1.31)
VOC/Some College	0.86 (0.49 1.53)	0.89 (0.49 1.62)	0.87 (0.48 1.57)
Bachelor's degree or more	1.02 (0.56 1.85)	1.37 (0.74 2.55)	1.33 (0.72 2.46)
Sexually active	2.08*** (1.45 2.98)	1.32 (0.91 1.91)	
Good+ prior physical health (2015-16)	1.21 (0.80 1.81)	1.66* (1.01 2.73)	1.47 (0.96 2.25)
Good+ prior mental health (2015-16)	2.00** (1.18 3.38)	2.66** (1.35 5.26)	2.54** (1.29 5.01)
Good+ current physical health (2020-21)		0.63 (0.38 1.06)	
Good+ current mental health (2020-21)		2.74*** (1.67 4.50)	2.40*** (1.49 3.86)
Relationship was happy (2015-16)		3.78*** (2.19 6.52)	3.74*** (2.19 6.40)
Constant	1.39 (0.12 16.09)	0.07* (0.01 0.88)	0.10 (0.01 1.16)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

Finally, since sexual activity and relationship happiness were significant predictors of physical and mental health, respectively, I incorporate a regression model predicting relationship happiness in 2020-21 (Table 3.9). Similarly, I first look at predictors of relationship happiness in 2015-16 as a point of comparison. Being African American (OR=0.69)

or Hispanic/Latino (OR=0.52) predicted lower odds of relationship happiness. Attaining some college/VOC (OR=2.55) or a bachelor's degree or more (OR=4.66), as well as being sexually active (OR=2.31) predicted higher odds of relationship happiness. Having good mental health in 2015-16 (OR=5.40) was positively associated with relationship happiness.

When predicting relationship happiness in 2020-21, I included physical and mental health, as again this is a bi-directional relationship, where a good relationship can promote health, and good health can in turn be related to a better relationship. I find that being married, having good prior physical and mental health, and prior relationship happiness, predicted higher odds of relationship happiness. Good current mental health is also significantly and positively related to relationship happiness. When excising sexual activity from the model, the final model finds that being Hispanic/Latino (OR=0.56) or Other ethnicity (OR=0.42) predicted lower odds of relationship happiness, whereas being married (OR=2.08), having good prior mental health (OR=2.54), as well as prior relationship happiness (OR=3.74) positively predicted relationship happiness in 2020-21. Current mental health (OR-2.40) is positively associated with relationship happiness as well. Physical health was not significant.

3.7 DISCUSSION

Revisiting the two hypotheses proposed in this study, I had predicted disparities in partnership and sexual behaviors for Baby Boomers and Traditionalists, and also theorized that sexual activity was a positive predictor for future physical health, and relationship quality (happiness) was a positive predictor for future mental health. These two hypotheses are partially validated by the analyses. As shown in initial figures (Figure 3.2a and b), Boomer women were more likely to be sexually active than Traditionalist women, surpassing Traditionalist and Boomer men as well around age 65. Boomer women were also the least likely to be partnered of all groups. While sexual activity did predict future physical health, it was not as strong an indicator as other socio-demographic factors and prior health status. Prior

relationship happiness did not predict future mental health, although current relationship happiness does predict current mental health; however, prior relationship happiness positively predicts current relationship happiness, which in turn affects mental health. There is a clear bi-directional relationship between sexual activity and physical health, and relationship happiness and mental health.

Thus, results from this study affirmed the first hypothesis predicting disparities in partnership and sexual behaviors across two generations. Whereas Traditionalists were raised in an environment that instilled heteronormative relationship values – members married young and had children at younger ages than other generations in America – Baby Boomers in the cohort that followed experienced more social change which likely influenced their partnership and sex behaviors. Results indicate a clear cohort and gender difference in partnership and sexual behavior.

Sexual activity and partnership was lower for both men and women of the Boomer generation than for Traditionalists, for those at the same age (57-67) at the time of the survey. Boomer women were more sexually active than their counterparts, Traditionalist women, but less likely to be partnered. Boomer women can be inferred to have shorter-term partnerships more often than their Traditionalist counterparts, reflecting more liberal sexual attitudes. Boomer women's sexual activity is nearly equivalent to men's in later years, which may reflect the long-term effects of the Women's Liberation Movement in the U.S. beginning in the 1960s.

Additionally, this study confirmed the relationship between sexual activity and physical health, as well as relationship quality (relationship happiness) and mental health. Results indicate that sexual activity is able to positively predict good[+] physical health five years later, and that relationship happiness is significantly associated with higher odds of having good[+] mental health at the time of the survey (2020-21). While sexual activity was not the most significant predictor in the model, when taking into account socio-demographics and prior

health status, its significance is still important, as its decline can act as a "canary in the coal mine" signal to visit a clinician. Moreover, while prior relationship happiness does not directly predict future mental health, it positively predicts future relationship happiness, which in turn is a positive predictor of future mental health. These are significant findings that indicate the importance of a few simple variables in predicting better physical and mental health.

Disadvantage in the form of being older, being female, being a minority or having lower educational attainment is prevalent in nearly all the models. When predicting sexual activity, partnership, relationship happiness, and physical and mental health, one or all of these demographic characteristics predicted lower odds of a positive outcome. This raises questions as to what types of interventions to improve health outcomes can override the disadvantages that one was born into. Saliently, socio-demographic factors such as age, marital status, cohort and race/ethnicity did not significantly predict mental health. This may mean that although structural inequalities are difficult to change (e.g., inadequate nutrition, poor air quality, existing medical system) which precipitate poor physical health, potentially, mental health may vary depending on internal states (e.g., personality traits) as well as social support (e.g., dyadic partnerships, kin networks, etc.) and education (e.g., mental health training and meditation/mindfulness practice etc.) which may result in a more equitable chance at improving mental health across age, gender, racial-ethnic group, and educational attainment, which will in turn improve physical health. Thus, interventions at improving the mental health of older adults may matter just as much as providing traditional forms of medical care.

Clinically, these results can inform medical professionals to provide more patient-centered care. Oftentimes, older adults are assumed to be less sexually active, and thus clinicians may overlook their patients' sexual health needs. Older adults may also feel less comfortable discussing these topics with physicians. Therefore, health professionals could consider proactively asking their older patients about their sexual behaviors in a reasonable

manner, test regularly for sexually transmitted infections, and investigate whether changes in sexual activity may be a symptom of physical or mental health problems.

3.8 LIMITATIONS

As the NSHAP survey data limited the number of sexual partners for which information on the timing of sex was collected, this dataset is not well suited for computing the total number of sexual partners within a period of time (Waite et al., 2009). Furthermore, respondents without a partner were not asked about sexual activity, which may have resulted in underreporting. When controlling for partners who had passed away within the past five years, there were only five couples who had experienced this and thus this study's results were not affected. Future questions could be improved to better reflect partner mortality. Finally, Traditionalist respondents were double-counted to ensure that there were enough data points for the age range needed to compare with Baby Boomers (e.g., 57-67). With future iterations of this survey, should there be further longitudinal analyses conducted on this topic, there will be enough participants so that I will not need to double count Traditionalist respondent at different ages.

3.9 CONCLUSIONS

The present study examines the correlates of sexual problems amongst older adults using data from the National Social Life, Health, and Aging Project (NSHAP). In this chapter, I proposed two hypotheses, one related to cohort differences in sexual activity and partnership, and the second using these outcomes (sexual activity and relationship quality) to predict future physical and mental health. Predicted relationships were validated by these analyses. Respondents who were younger, male, Traditionalist, educated and Caucasian were more likely to be partnered (and married), with African Americans and other ethnicities more likely to be in unmarried partnerships than Caucasians. Being younger, male, a Boomer, educated and

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partnered, were significant positive predictors of being sexually active. Saliently, Baby Boomer women were more sexually active but less likely to be partnered than their Traditionalist peers at the same age, which signifies that historical environments experienced during adolescence and young adulthood may have engendered long-term changes in behaviors among this cohort.

Moreover, while sexual activity is still important as a predictor of future physical health, acting as an early "canary in the coal mine" that alerts respondents to visit their physicians, the quality of interpersonal relationships becomes even more important than sexual relationships at older ages, with people wanting greater connection and meaning derived from sex (Fisher et al., 2010). This mindset shift is reflected in these analyses, where mental health is positively predicted by relationship happiness, and sexual activity is an important predictor of physical health, but not mental health. Sexual activity predicts current relationship happiness but not future relationship happiness. Prior mental health predicts prior and future relationship happiness, whereas current relationship happiness predicts current mental health only but not future mental health, indicating a bi-directional relationship where mental health remains key. Therefore, focusing on improving internal states such as emotional stability may be especially important for older adult relationships.

Again, these findings confirm my proposed theoretical model of multi-dimensional health. Across cohorts and genders, there are different rates of partnership and sexual activity, likely due to contextual influences from events in the environment as these generations were coming of age. Many socio-demographic factors were significant in predicting future physical health, whereas mental health was mostly influenced by non-demographic predictors, relying on internal states (prior mental health) and perceptions such as relationship happiness, which may be influenced by interpersonal dynamics and personality that were not accounted for in this model.

In this chapter, I conclude that older adults' personal relationship to their significant other, including their ability to maintain a happy relationship, and engage in sexual activity, is closely tied to achieving better health later in life. Due to cohort differences in partnership and sexual activity, Baby Boomers— particularly women—who are less likely to be partnered and also more sexually active, may experience disparities in health as a result, compared to their Traditionalist counterparts. The reasons behind this— potentially environmental influences on the Boomer cohort that affect personal relationships such as sexual liberation and gender equality— warrant further research. Furthermore, results point to a bi-directional relationship between physical health and sexual activity, and mental health and relationship quality (happiness); in the absence of medical care, sexual activity and relationship quality, which can be self-evaluated, can serve as indicators of health. Indeed, in the next chapter, I focus on delaying needed medical care, taking a closer look at how internal and external factors, including emotional states, financial and social capital, as well as perceived health, play a role in U.S. older adults' delay and completion of medical care during the COVID-19 pandemic.

CHAPTER FOUR

U.S. OLDER ADULTS' DELAY AND COMPLETION OF NEEDED MEDICAL CARE DURING THE COVID-19 PANDEMIC (2020/21)

The COVID-19 pandemic has disrupted the lives of people globally, not only by overwhelming medical services, but also by delaying other types of needed medical care (Bhambhvani et al., 2021; Blecker et al., 2021). Recent literature has pointed to the shortage of medical staff, government restrictions on primary and specialty care visits (Weinstein et al., 2020), limitations of telemedicine (Snapiri et al., 2020), anxiety and depression (Ganson et al., 2020), difficulty locating a suitable provider or obtaining an appointment (Findling et al., 2020), and concerns regarding COVID-19 infection (DeJong, Katz and Covinsky, 2021), as reasons for these delays. This phenomenon raises concerns about the long-term detrimental effects of the pandemic, health disparities, access to care, health literacy and unmet health needs.

While there is growing insight into health disparities and difficulty accessing healthcare in the U.S., delayed medical care among older adults during the pandemic has not been researched extensively. Recent literature has focused on children and working-age adults, yet the odds of serious illness and death due to COVID-19 are greater at older ages, with exponentially higher rate ratios of hospitalization and death for those aged 50 and above (CDC, 2021). The NSHAP-COVID Study (2020/21) data used here is novel in assessing pandemic-related delays in needed medical care among this vulnerable older adult population.

In this chapter, I examine whether sociodemographic characteristics of disadvantage, emotional well-being, and resource deficiency (financially or socially), including pandemic-induced issues, predict older adults' delay of needed medical care during the pandemic. First, I provide an overview of recent research on health disparities. I then propose a conceptual model for delaying medical care that builds upon prior literature regarding access to care, health literacy, unmet health needs, and delayed medical care. I highlight pandemic-specific factors,

including concerns about the pandemic and mental health issues exacerbated by pandemic stress and social isolation measures, are highlighted. Finally, I present five disparate logistic regression models that predict delaying needed care, along with two models that predict, respectively, completing "at least some" medical care (some and all care) and completing "all care only" as well as models predicting the method of completing care – by phone call, video call, or in-person.

4.1 BACKGROUND

Older adults, minority group members, and those with limited resources faced higher risks of serious illness or death during the pandemic. Among U.S. adults (<65 years of age), those living in low-income households were more likely to have conditions associated with the increased risk of illness from COVID-19 (Raifman and Raifman, 2020), such as hypertension, diabetes and obesity (Lopez, Hart and Katz, 2021; Vahidy et al., 2020). Those who were male, older, Asian, African American, Hispanic/Latino, residing in a financially insecure neighborhood, experiencing low air quality, and transportation or housing insecurity, were at a higher risk of infection from COVID-19 (Rozenfeld et al., 2020). This may occur because on average, racial-ethnic minorities are more likely to attain lower education levels and socioeconomic status than Caucasians, experience housing disadvantages such as living in crowded conditions, and work in-person while using public transportation to travel to work (Carethers, 2021). Indeed, African Americans and Hispanic populations experienced higher rates of COVID-19 infection, hospitalization and mortality than non-Hispanic Caucasian populations (Mackey et al., 2021). These trends reflect health disparities that existed pre-pandemic (Upshaw et al., 2021).

4.1.1 Pre-pandemic disparities in healthcare access

In the U.S., access to care has been a long-debated issue. Contextual and individual factors can affect healthcare access; contextual factors (government policies influencing health service organization and distribution, and environmental characteristics such as air, water, and housing quality, neighborhood ethnic-racial composition, community cohesion, etc.) can influence health behaviors and outcomes on an individual level (Andersen and Davidson, 2007). Additional individual factors that affect access to care include socio-demographic characteristics, the biological predisposition to need healthcare, health insurance status, health beliefs, perceived needs, and behaviors (Gruneir, Silver and Rochon, 2011).

Prior research has highlighted disparities in healthcare access. Those who were uninsured, retired, minorities, and of low socioeconomic status, were more likely to delay or miss needed medical care due to costs (Ayanian et al., 2000; Shi and Stevens, 2005; Weissman et al., 1991). Respondents living in U.S. counties with greater socioeconomic deprivation (e.g., poverty, use of food stamps, Medicaid/Medicare, single parent households, per capita income) and limited healthcare infrastructure (per capita MDs, number of hospitals and nursing homes) experienced more limited access to substance abuse treatment (Archibald and Rankin, 2013). Finally, transportation barriers and mobility, particularly for older adults, African Americans, and those with lower income, is associated with delayed or missed care (Macleod et al., 2015; Syed, Gerber and Sharp, 2013).

In addition to healthcare access, unmet health needs – when respondents felt that they had needed but not received a health care service – are another area of concern. Besides referring to the inability to access care, unmet needs may also occur when respondents received care that did not actually resolve their issues, or received poor quality of care. An overview of quality and access in the U.S. health care system found that African Americans experienced worse quality of care on more measures than Caucasians did in terms of patient safety, person-

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centered care, care coordination, effectiveness of care, affordable care measures, and healthy living measures (AHRQ 2019).

Finally, personal health literacy, or the degree to which individuals have the ability to find, understand and use information and services to inform health-related decisions and actions for themselves or others (CDC 2021), also affects access to healthcare. Having limited health literacy was associated with being older, male, African American, and having lower income and education; low levels of reading were associated with poor healthcare access (Sudore et al., 2006). These disparities have been highlighted during the COVID-19 pandemic.

4.1.2 Delaying medical care during the pandemic

Preliminary research on delayed medical care during different time points of the pandemic found that 36% (Gonzalez et al., 2021) to 40.9% of U.S. adults (12% avoided urgent/emergency care and 31.5% avoided routine care) avoided medical care due to concerns about COVID-19 infection in September 2020 and May 2020, respectively. African Americans and Hispanic/Latinos were significantly more likely to avoid urgent/emergency care (Czeisler et al., 2020). This trend extended to children as well, as minority-race and Medicaid-enrolled children were less likely than non-Hispanic Caucasian children and privately-insured children to visit a U.S. pediatric emergency department in a "deep South" state from January-June 2020 (Sen, Brisending and Ghosh, 2021).

Furthermore, adults who were unemployed were more likely than those who were employed to attribute forgone medical care to fear of coronavirus exposure and financial instability during the pandemic, than those who were employed. Adults without insurance reported forgoing medical care due to costs more often than respondents with commercial/Medicare healthcare coverage; respondents with Medicaid coverage were more likely to report forgoing care due to concerns about coronavirus exposure than those with commercial/Medicare coverage, from March to mid-July 2020 (Anderson et al., 2021).

Reduced public transit and rideshare options, risks of transportation to medical care, and difficulties in telemedicine implementation are also indicators of socioeconomic disparities in accessing care (Chen et al., 2021). Although receiving secure electronic communication through an electronic medical record was associated with decreased risk of coronavirus infection at NYU Langone in March 2020, older patients, men, African Americans, Hispanic/Latinos and other ethnicities were less likely to use telemedicine compared to Caucasians and Asians (Chunara et al., 2021). Thus, access to telehealth highlights yet another disparity in obtaining care, as residents with limited or no internet access or a lack of digital literacy would be unable to use it as an alternative to in-person visits during the pandemic (Kronenfeld and Penedo, 2021).

Moreover, older adults' health during the pandemic may not only suffer due to delayed medical care, but also due to changes in formal and informal functional supports that they have relied on pre-pandemic (Steinman, Perry, and Perissinotto, 2020). Pandemic alleviation measures such as social distancing and isolation may also impact older adults' mental health significantly by decreasing social support and increasing feelings of loneliness, as older adults tend to live alone and be retired with a reduced social circle (Wu, 2020; Berg-Weger and Morely, 2020). Unfortunately, there is little evidence that social media use (Hajek and Konig, 2021) and video calls reduce loneliness in older adults (Noone et al., 2020).

Living arrangements of older adults, including household size, also impact physical and mental health. Generally, older adults around the world live alone, with their spouse or partner, with children, or otherwise (UN DESA, 2017). Globally, older adults most commonly live in an extended household with kin (38%), averaging a household size of 3.4 people; however, those in the U.S. are more likely to live alone or with a spouse/partner only (46%), averaging a household size of 2.1 people (Pew, 2020). Household composition has shifted in the U.S. as a result of population aging; the majority of adults aged 65 and older lived in married

households without children (44%) or alone (42%), rather than heading other family households (10%), while the share of householders who are 65 and older has grown recently (VanOrman and Jacobsen, 2020; Mather et al., 2019). Prior literature indicates that older adults living with others have the poorest self-rated health; single adults living with children reported lower self-rated health than those who lived with a spouse or partner – though this living arrangement may reflect the need for additional support and caregiving for older adults by adult children (Weissman and Russell, 2016). Other research suggests that there is a gender differential; U.S. women living with others fared worse than men in similar arrangements (Henning-Smith, 2016). U.S. men living alone and with someone other than a spouse were disadvantaged equally in terms of survival, although these arrangements had no effect on women (Davis et al., 1992). Finally, older adults living with their spouse only were more likely to use preventive care services than those living alone; however, those living with adult children reported differential rates of completing care and effects were similar to that of living alone (Lau and Kirby, 2009).

4.1.3 Emotional well-being and social isolation during the pandemic

Emotional states may play a significant role in delaying medical care. For example, women who received positive HIV diagnoses were more likely to delay their treatment for months or years if they felt psychological responses such as denial, fear, and anxiety (Raveis, Siegel and Gorey, 2010). Of hospital-employed obese women including nurses, nursing assistants, health unit coordinators and psychiatric assistants, 12.7% delayed or cancelled their appointments because they knew that they would be weighed and felt embarrassed (Olson, Schumaker and Yawn, 1994).

During the pandemic, Ganson et al., (2020) found that individuals who experienced symptoms of anxiety and depression were more likely to delay medical care. Depressive symptoms during the pandemic have been significantly higher than before (CDC 2021).

Adverse mental and behavioral health symptoms disproportionally affected African Americans, Hispanic/Latinos, essential workers, unpaid caregivers for adults, and those with preexisting psychiatric conditions (CDC, 2021). Additionally, those with lower social and economic resources, and higher stress due to COVID-19, had higher odds of depression symptoms (Ettman, Abdalla and Cohen, 2020).

4.1.4 Digital literacy and the digital divide

Particularly during pandemic-alleviation lockdowns, digital literacy and digital inclusion allow individuals to stay connected to the outside world. Digital exclusion has been strongly linked to social exclusion, even pre-pandemic (Helsper, 2008). Older adults who are less affluent tend to be digitally divided from the world (Smith, 2014). Furthermore, digital literacy has provided an avenue for adults to use the internet to obtain health information since before the COVID-19 pandemic. In 2002, Diaz et al., found that around half of the patients from a U.S. private practice were using the internet to obtain medical information, and that these respondents were significantly more educated and had higher incomes. U.S. adults who reported difficulty accessing healthcare services for reasons unrelated to health insurance (could not get an appointment, doctor would not accept them as a new patient or their insurance) were more than twice as likely to use the internet to obtain health information than those who did not experience access difficulties (Amante et al., 2015). Thus, digital literacy is an important component of everyday life that may impact health outcomes.

4.2 CONCEPTUAL MODEL

In this chapter, I examine whether disadvantage predicted delaying needed care, given the disproportionate risks of serious illness due to COVID-19 for older adults and minorities. Here, I conceptualize disadvantage as multi-faceted, with different types of disadvantage co-existing or interacting with each other (Figure 4.1). Based on prior literature, indications of

disadvantage can be socio-demographic (age, gender, marital status, educational attainment, socioeconomic/financial status), social (defined here as a lack of social capital and support from family and friends), and physical (biological predisposition such as hereditary illness, physical and mental health issues).

In my multi-dimensional model of health, inter-related factors contribute to inequities in healthcare access and difficulty in obtaining care. In addition to pre-existing inequality, the pandemic added an additional layer of difficulty with social isolation measures, clinic shutdowns, and overwhelmed medical professionals. Thus, individual concerns about the pandemic may interact with pre-existing disadvantage when older adults make decisions about delaying care. Those who were digitally literate may be able to self-medicate, or use telehealth to complete care. That is, those who were able to use the internet and felt relatively healthy (with an overdue annual check-up or a few symptoms) may have searched for medical information online and avoided remote care (telehealth/telemedicine) due to the costs, hassle of scheduling, and the inability of virtual appointments to screen for vital signs or conduct other comprehensive tests. Although most respondents indicated on the survey that they do not believe the delay impacted their health, as might be the case if they delayed a routine checkup (e.g., vision check, dental cleaning, annual physical), it may be too soon to tell the long-term effects of delayed medical care.

Figure 4.1 Conceptual model for pandemic-period delays of needed medical care

Social support & capital

Racial-ethnic group

Socioeconomic /financial status

Education

Pre-existing physical and mental health issues

Disadvantage in various forms

Digital literacy and ability to connect outside of the household

Interaction

Differential concern about the pandemic

Those who delayed care did not have pre-existing conditions, and thus did not feel affected health-wise

Predictors of delaying care and unmet health needs

Able to self-medicate (web search symptoms); more connected to society

Choosing to delay needed medical care during the pandemic

Most respondents indicated that the delay did not impact their health

Respondents with internet proficiency would be able to use telehealth to complete care

Completing delayed care (in-person)

4.3 HYPOTHESES

Using data collected from older American adults during the pandemic, I investigate these relationships. Based on this conceptual model, I hypothesize that:

1) Those with poor emotional well-being, resource deficiency, and socio-demographic disadvantage would be more likely to delay care during the pandemic.

2) Respondents who lacked social or financial support would be less likely to complete any medical care.

3) Respondents who completed care remotely (e.g., phone or video call) were more likely to be digitally literate than those who completed care in-person. Those who used a particular method to complete care (e.g., phone, video call or in-person) were already accustomed to using this communication method in their daily lives (e.g., to communicate with friends during the pandemic).

4.4 METHODS

The National Social Life, Health, and Aging COVID Study, conducted by NORC at the University of Chicago, surveyed respondents about their experience during the COVID-19 pandemic. Data was collected between September 14, 2020 and January 27, 2021, using web, phone and paper-and-pencil surveys, with a 79% response rate (n=2,672). A few variables were utilized in this analysis from the previous round of NSHAP (R3, 2015-16), including educational attainment, race/ethnicity, usage of the internet/email, self-rated happiness, and self-rated resilience (e.g., bounce back quickly after hard times). All estimates are survey-weighted, and adjusted for non-response based on age and urbanicity. All analyses were conducted using STATA (Version 15).

4.4.1   Predictor and outcome variables

Outcome variables included delaying any or all needed medical care, completing medical care ("none", "some," or "all"), and method of completing care (phone call, telehealth, and in-person visits). Respondents were asked: "Did you delay medical/dental/vision care since the pandemic started?" in three separate questions and given the opportunity to respond "Yes" or "No." Then, they were asked if they had "completed the care that was delayed?" with three response options ("Yes, I completed all of it," "Yes, I completed some of it," and "No, I completed none of it"). Finally, respondents were asked if they completed delayed care by "phone calls," "video calls/telehealth," "emails, texts, or portal/MyChart," "in-person visits to doctor, dentist, or clinic," or "did not complete care via any of the above," and provided "Yes" or "No" response options. Due to the small sample size, MyChart/email (n=58) and Other (n=11) methods of completing delayed care were not predicted using a model. Overall, variables were generally coded "0" for more negative responses including "No" and "1" for affirmative or positive responses including "Yes".

Predictor variables are categorized into socio-demographic characteristics, self-rated health, emotional well-being, resource deficiency, and digital literacy and communication. Socio-demographic characteristics include age in 2020, gender, partnership status ("married" or "cohabiting with partner" versus "separated," "divorced," "widowed," and "never married"), educational attainment, race/ethnicity, and household size. In particular, household size was a variable measured in 2015-16, and respondents with a household of 3 or more people were considered to live in a large household. In this analysis though, the composition of the household is not investigated (e.g., whether respondents are living with spouse/partner or child(ren)).   Self-rated physical and mental health was measured using the classic SF-36 question with a Likert-scale response. Responses were coded such that "good," "very good," and "excellent" health was separated from "fair" and "poor" health. Sleep quality was measured

by asking respondents if they felt truly well-rested upon waking ("mostly" versus "sometimes," "rarely," or "never").

Components of emotional well-being included being "highly concerned about the pandemic" (e.g., rating it as 8-10, on a scale of 1-10, with 10 being most concerned), feeling isolated in the past month ("sometimes" or "often" versus "never" or "hardly ever"), feeling nervous, anxious or on edge in the past month ("several days" up to "nearly every day" versus "not at all"), wanting to see friends not living in the same household "a lot more" (versus "a little more," "about the same," "a little less," and "a lot less") and needing emotional support from outside of the household ("yes" and "no, have not been able to get or find support" versus "no, I have not needed support"). Additionally, two variables measured in 2015-16, of self-rated happiness ("pretty happy" up to "extremely happy" versus "unhappy sometimes" and "unhappy usually") and resilience (bouncing back quickly after hard times, "usually" or "always" versus "never" or "some of the time"), were also included.

Resource deficiency included being financially worse off during the pandemic ("a bit worse off" and "much worse off" versus "about the same" and "better off") and relying on someone outside the household to regularly help with everyday tasks since the pandemic ("yes" and "no, have not been able to get or find help, but I need help" versus "no, did not need help"). Finally, digital literacy included a measure from 2015-16 on email/internet proficiency ("used at least once a month" up to "every day" versus "never used the internet/email" or "used less than once a month"). Communication methods with friends during the pandemic (e.g., phone calls, email/text/social media messages, video chat, in-person meetings) were used to predict different methods of completing care.

4.4.2 Data analyses

Following initial descriptive analyses of the data, I created five logistic regression models to predict delaying needed medical care using the predictor variables described above, with one comprehensive model (Model 5) explaining delayed medical care during the pandemic. Next, I predicted completing "at least some" care and completing "all care only," followed by models predicting the method used to complete care (phone calls, video calls, or in-person visits).

4.5 RESULTS

4.5.1 Descriptive characteristics

First, I present descriptive statistics of the outcome variables and socio-demographic variables (Table 4.1). The majority of our sample of older adults (aged 50-99 in 2020) was partnered/married, with slightly more women than men, and at least a high school degree or equivalent. Most (55.1%) older adults lived in a dyadic household, whereas the rest lived alone (21.0%) or in households with 3 or more people (23.9%). In this analysis, those living alone or with another person were categorized separately from those living in larger households of 3 or more, as described in the subsequent table.

The majority of older adults (54.0%) delayed needed care, including medical (31.5%), dental (39.2%) and vision (24.6%) care (Figure 4.2). Of those who delayed care, a third had not completed this care at the time of the survey (33.9%), around a third (34.1%) completed some care and another third (31.9%) completed all care. In-person care (87.6%) was still the most popular method for completing care, followed by phone calls (24.8%); video calls (19.1%) and MyChart/email (6.4%).

Table 4.1 Outcome variables and demographic characteristics of respondents

Variables	N	%
Outcomes		
Delayed needed medical care, any or all	1391	54.42%
Medical	806	31.53%
Dental	1000	39.52%
Vision	627	24.53%
Completed medical care that was delayed?		
None	467	34.04%
Some	467	34.04%
All	438	31.92%
How was delayed care completed?		
Phone call	226	24.81%
Video calls	174	19.10%
MyChart/Email	58	6.37%
In-Person	798	87.60%
Other	11	1.21%
Socio-demographics		
Gender		
Female	1,491	56.86%
Male	1,131	43.14%
Marital status		
Married or living with partner	1801	69.70%
Single, divorced, or widowed	783	30.30%
Educational attainment		
<High School	259	9.88%
High School/Equivalent	549	20.94%
Some College/Vocational Certificate	934	35.62%
Bachelor's degree or more	880	33.56%
Race/Ethnicity		
Caucasian	1,902	72.79%
African American	369	14.12%
Hispanic/Latino	249	9.53%
Other*	93	3.56%
Household Size (2015-16)		
One or two people	1,977	76.10%
Three or more people (up to six or more people)	621	23.90%

* Other ethnicities include Asian-Pacific, American Indian, mixed race, and other ethnicities.

Figure 4.2 Proportion of respondents delaying different types of medical care (n= 2556)
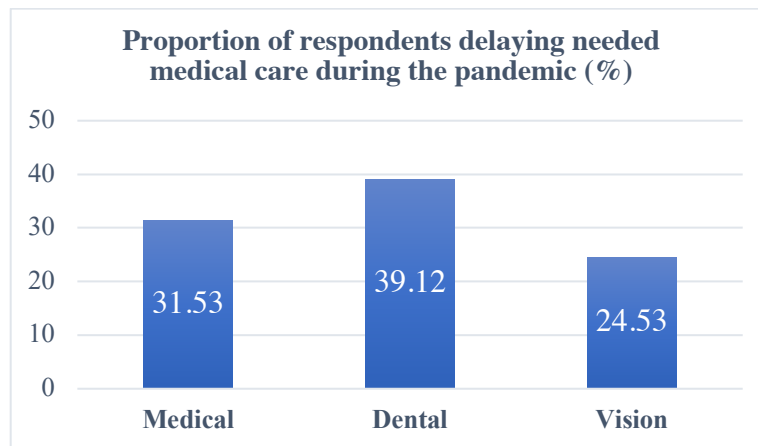
Pandemic-related concern was highlighted by one question, and which differed by race/ethnicity. The proportion of respondents who were highly concerned about the pandemic by racial-ethnic group and the proportion who delayed medical care is contrasted in Figure 4.3. Concern is significantly lower among Caucasians; African Americans, Hispanic/Latinos and Other ethnicities were more concerned about the pandemic. Despite high levels of concerns, African Americans were significantly less likely to delay care. A statistical test for interactions between race-ethnicity and being concerned was not significant in predicting delayed care.

Figure 4.3 Proportion highly concerned about the pandemic vs. delaying medical care
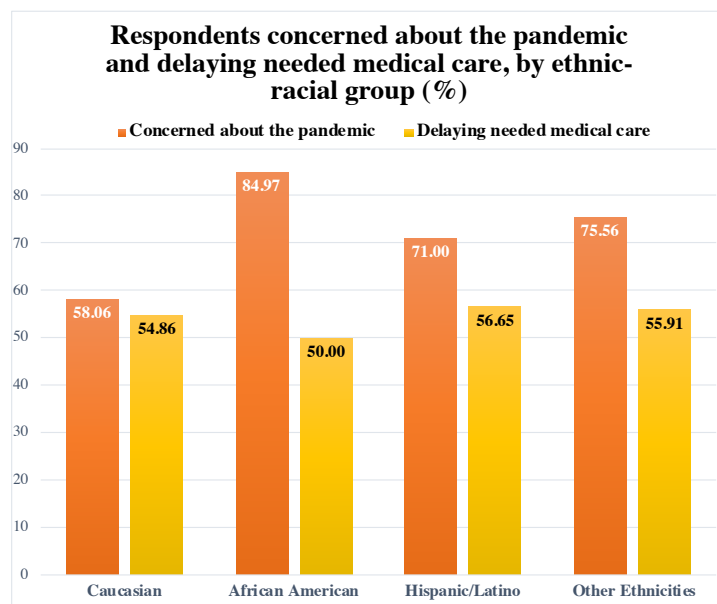
Looking at other predictor variables (Table 4.2), older adults were roughly split in needing and/or receiving emotional support during the pandemic. Though most felt "hardly ever" or "never isolated" in the past month (58.2%), they reported feeling anxious at least "several days" up to "nearly every day" in the past month (51.3%). The majority did not care to see their friends much more (77.9%). Finally, looking at measures from 2015-16, a significant majority (89.4%) of respondents from 2015-16 who were re-interviewed in 2020-21 self-reported being "pretty happy" to "extremely happy." Similarly, most (84.3%) of these respondents self-reported as resilient, or being able to "bounce back quickly after hard times."

The majority of older adults reported in 2015-16 that they were digitally proficient, using email/internet and text/social media fairly regularly (76.1%). Still, a significant percentage (23.9%) had never used the internet/email or used it less than once a month. Most older adults kept in touch with friends via phone call (61.6%) or by email/text/social media (59.2%) A minority of older adults (17.1%) called friends using video chat during the pandemic. A sizeable minority (30.5%) visited friends in person once a week or more during the pandemic. In terms of resource deficiency, a minority of older adults (18.3%) reported being financially worse off due to the pandemic. Nearly one-quarter (23.8%) needed or received tangible help with everyday tasks from outside the household.

The majority of older adults reported good or better physical and mental health, although slightly less than half (46.0%) reported waking up feeling well-rested most of the time. Older adults' sleep quality may decrease naturally with age due to lower levels of growth hormone and changes in the suprachiasmatic nucleus in the hypothalamus (Newsom 2020), although health conditions and pandemic-related stress also interferes with sleep quality.

Table 4.2 Predictor variables by category

Variable	N	%
Emotional Well-Being		
Highly concerned about the pandemic		
Yes (Rated 8-10)	1,603	63.64%
No (Rated 1-7)	916	36.36%
Need emotional support		
Yes (Sometimes, Often)	1,286	49.73%
No (Never, Hardly Ever)	1,300	50.27%
Felt isolated in the past month		
Yes (Sometimes, Often)	1,079	41.81%
No (Never, Hardly Ever)	1,502	58.19%
Felt nervous, anxious, on edge (month)		
Yes (Several days, some days, nearly every day, in the past month)	1,327	51.26%
No (Not at all)	1,262	48.74%
Wanted to see friends not living in HH a lot more?		
Yes	573	22.14%
No (A little more, about the same, a little less, a lot less)	2,015	77.86%
Felt Happy		
Yes (Pretty happy, very happy, extremely happy)	2,341	89.45%
No (unhappy sometimes, unhappy usually)	276	10.55%
Resilient (bounce back quickly after hard times)		
Usually or Always	1,952	84.32%
Never or Some of the Time	363	15.68%
Digital Literacy and Communication		
Email/internet proficiency (2015)		
Proficient (used at least once a month, up to every day)	1,749	76.14%
Not proficient (never used the internet/email or used <once a month)	548	23.86%
Phone calls to friends during pandemic (aggregate)		
Often (From once a week up to daily)	1,604	61.62%
Rarely (Less than once a week or never)	999	38.38%
Sent email/text/social media messages to friends during pandemic		
Often (From once a week up to daily)	1,537	59.16%
Rarely (Less than once a week or never)	1,061	40.84%
Video chat with friends during pandemic		
Often (From once a week up to daily)	442	17.07%
Rarely (Less than once a week or never)	2,147	82.93%
In-person meetings with friends during pandemic		
Often (From once a week up to daily)	789	30.46%
Rarely (Less than once a week or never)	1,801	69.54%
Resource Deficiency		
Financially worse off during the pandemic		
Yes (A bit or much worse off)	475	18.34%
No (About the same or better off)	2115	81.66%
Needed help from someone outside HH?		
Yes (Both able to get help & needed but not able to get it)	621	23.83%
No (Did not need help)	1985	76.17%
Self-Rated Health		
Physical Health		
Excellent, Very Good & Good	2109	80.87%
Fair & Poor	499	19.13%
Mental Health		
Excellent, Very Good & Good	2262	86.80%
Fair & Poor	344	13.20%
Sleep Quality (Woke up feeling really well-rested during the pandemic?)		
Yes (Mostly)	1160	45.96%
No (Sometimes, Rarely or Never)	1364	54.04%

4.5.2   Predicting delayed care

Using these predictor and outcome variables, I present three logistic regression models predicting delayed care (Table 4.3). The first model includes only socio-demographic predictors (age in 2020, gender, partnership status, educational attainment, race/ethnicity, and household size), and the second model adds components of emotional well-being. These include concerns about the pandemic, needing emotional support from outside the household, wanting to see friends outside the household, feeling anxious, feeling isolated, feeling happy (2015-16) and self-rating as resilient (2015-16). The third model looks at resource deficiency, including financial downturns during the pandemic, needing tangible help from outside the household, and prior proficiency with email (2015-16). The fourth model includes self-assessed health, including self-rated physical and mental health, and sleep quality. Although sleep quality is also related to emotional well-being, here it is grouped under self-rated health. When it is added to the model in addition to physical and mental health, the significance of mental health decreases in the model. However, in the final model when all factors are combined together, mental health is significant but sleep quality is not significant.

Finally, the fifth and most comprehensive model incorporates significant variables from all factors, including concerns about the pandemic, needing emotional support, wanting to see friends more, feeling anxious, feeling isolated, financial downturns during the pandemic, needing tangible help, proficiency with email, and self-rated physical health and mental health, while adjusting for socio-demographics.

4.5.2.1   Socio-demographic predictors

In terms of socio-demographic factors (Model 1), the odds of delaying care were slightly lower at older ages (OR=0.98), and higher among females (OR=1.46). There was no significant difference for those married or cohabiting, nor across race/ethnicity groups.

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Table 4.3 Logistic regression models predicting delaying needed care (OR, 95% CI)

Variables	Model 1 (n=2,504)	Model 2 (n= 2,083)	Model 3 (n= 2,183)	Model 4 (n= 2,415)	Model 5 (n= 2,053)
Demographic Factors					
Age at 2020	0.98** (0.97 0.99)	0.98** (0.97 1.00)	0.99 (0.97 1.00)	0.99* (0.98 1.00)	0.99* (0.97 1.00)
Gender (Female)	1.46*** (1.24 1.73)	1.20 (0.99 1.44)	1.53*** (1.29 1.83)	1.44*** (1.21 1.71)	1.22* (1.02 1.45)
Married/Partnered	0.97 (0.91 1.04)	0.94 (0.87 1.02)	0.94 (0.87 1.00)	0.97 (0.91 1.04)	0.95 (0.88 1.02)
Race/Ethnicity (Caucasian as control)					
African American	0.90 (0.69 1.17)	0.84 (0.59 1.20)	0.93 (0.69 1.27)	0.85 (0.64 1.14)	0.88 (0.63 1.24)
Hispanic	1.15 (0.78 1.69)	1.18 (0.78 1.78)	1.40 (0.92 2.13)	1.16 (0.78 1.73)	1.26 (0.80 1.98)
Other	1.44 (0.84 2.49)	1.35 (0.68 2.66)	1.25 (0.66 2.36)	1.47 (0.83 2.60)	1.40 (0.68 2.87)
Education (<HS as control)					
HS/Equivalent	1.33 (0.88 2.00)	1.48 (0.97 2.27)	1.41 (0.91 2.19)	1.49 (0.99 2.24)	1.21 (0.77 1.91)
VOC/Some College	2.23*** (1.50 3.32)	2.24*** (1.47 3.43)	2.13*** (1.36 3.32)	2.44*** (1.62 3.67)	1.81* (1.13 2.88)
Bachelor's degree or more	2.47*** (1.64 3.72)	2.26*** (1.44 3.55)	2.38*** (1.51 3.75)	2.83*** (1.86 4.29)	1.79* (1.12 2.87)
Larger household (≥ three people)	0.76* (0.59 0.99)	0.70* (0.51 0.95)	0.73* (0.54 0.97)	0.78* (0.60 1.02)	0.70* (0.52 0.95)
Emotional Well-being					
Highly concerned about the pandemic		1.72*** (1.36 2.16)			1.64*** (1.30 2.07)
Needed emotional support from outside the household (HH)		1.55** (1.14 2.09)			1.48* (1.08 2.03)
Wanted to see friends outside the household much more		1.57*** (1.20 2.04)			1.53*** (1.18 1.97)
Felt anxious		1.50*** (1.23 1.84)			1.56*** (1.28 1.91)
Felt isolated		1.35* (1.04 1.77)			1.38* (1.05 1.81)
Felt happy (2015-16)		0.55** (0.38 0.81)			
Resilient (2015-16)		1.13 (0.80 1.59)			
Financial and Social Capital					
Financially worse off due to pandemic			1.96*** (1.42 2.69)		1.63** (1.14 2.34)
Needed tangible help with tasks daily			1.96*** (1.48 2.61)		1.54** (1.13 2.11)
Email/internet proficiency (2015-16)			1.84*** (1.36 2.48)		1.99*** (1.43 2.76)
Self-rated Health					
Physical health				0.67** (0.50 0.90)	0.71* (0.51 0.98)
Mental health				0.99 (0.70 1.41)	1.63* (1.10 2.42)
Sleep quality (felt truly well-rested upon waking)				0.77** (0.63 0.94)	
Constant	1.20 (0.50 2.91)	1.44 (0.47 4.36)	0.74 (0.25 2.13)	2.03 (0.76 5.45)	0.39 (0.12 1.29)

* p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

Odds of delaying care increased with educational attainment (VOC/some college, OR=2.23; ≥ bachelor's degree, OR=2.47). Living in larger households predicted lower odds of delaying care (OR=0.76), likely because other household members helped them obtain care.

4.5.2.2 Emotional well-being

While adjusting for these socio-demographic characteristics, I considered the importance of emotional well-being on delaying care (Model 2). Being highly concerned about the pandemic (OR=1.72), needing emotional support from outside of the household (OR=1.55), wanting to see friends much more (OR=1.57), felt anxious (OR=1.50), and feeling isolated (OR=1.35), predicted higher odds of delaying care. Being happy in 2015-2016 predicted lower odds of delaying care (OR=0.55). Resilience was not significant in this model. On balance, it seems that poor emotional well-being predicted higher odds of delaying care, whereas prior happiness, interpreted as positive emotional well-being, predicted lower odds of delaying care.

4.5.2.3 Resource deficiency

While adjusting for socio-demographic variables, financial downturns, social support deficiency, and internet/email proficiency were added to the model (Model 3). Being financially worse off due to the pandemic (OR=1.96), receiving or needing tangible help from outside the household (OR=1.96), and regularly using internet/email (OR=1.84) predicted higher odds of delaying care. This may imply difficulty accessing or paying for healthcare, or the ability to research medical symptoms online in order to avoid seeking care.

4.5.2.4 Self-rated health

While adjusting for socio-demographic variables, self-rated physical and mental health, as well as sleep quality, were added to the model (Model 4). Perceived good or better physical health (OR=0.67) and good sleep quality (e.g., well-rested upon waking most days, OR=0.77) predicted lower odds of delaying care. Thus, those who felt more confident about their health

may have also felt less concerned about infection from COVID-19 during a doctor's visit; moreover, functionally they would be able to access care more easily than those with worse health or poor sleep quality. Mental health was not significant here, but was significant in the final comprehensive model.

4.5.2.5 Comprehensive logistic model

In Model 5, I combined significant variables from each category to create a comprehensive model predicting delayed care. While adjusting for socio-demographics, the other variables included in this model are: being highly concerned about the pandemic, needing emotional support, wanting to see friends more often, feeling anxiety, feeling isolated, financial downturn during the pandemic, needing tangible help with tasks, being proficient in internet/email, and self-rated physical and mental health. Of these, being female (OR=1.22), having higher educational attainment (VOC/some college, OR=1.81; ≥ bachelor's degree, OR=1.79), being highly concerned about the pandemic (OR=1.64), needing emotional support (OR=1.48), wanting to see friends much more (OR=1.53), feeling anxious (OR=1.56), feeling isolated (OR=1.38), financially worse off (OR=1.63), needing tangible help (OR=1.54), being proficient in internet/email (OR=1.99) and having good or better mental health (OR=1.63) significantly predicted higher odds of delaying needed care. In contrast, older age at 2020 (OR=0.99), living in a larger household of 3 or more people (OR=0.70), and having good or better self-rated physical health (OR=0.71) predicted lower odds of delaying needed care. This model indicates that those who were disadvantaged in various ways were more likely to delay needed medical care.

Table 4.4 Logistic regression models predicting completing care (OR, 95% CI)

Variables	Completing at least some care (some and all care) (n= 1,303)	Predicting completing all care (all care only) (n= 1,345)
	(95% Confidence Interval)	
Demographic Factors		
Age at 2020	1.00 (0.99 1.02)	1.01 (1.00 1.03)
Female	1.25 (0.95 1.64)	0.99 (0.77 1.26)
Married/Partnered	0.94 (0.87 1.01)	0.95 (0.88 1.03)
Larger household (≥ three)	0.78 (0.54 1.14)	0.71* (0.51 0.99)
Race/Ethnicity (Caucasian as control)		
African American	1.20 (0.75 1.93)	0.94 (0.54 1.61)
Hispanic	1.43 (0.80 2.57)	1.45 (0.87 2.41)
Other	0.48* (0.28 0.84)	0.35* (0.15 0.85)
Education (<HS as control)		
HS/Equivalent	0.82 (0.40 1.67)	0.66 (0.33 1.29)
VOC/Some College	0.71 (0.37 1.39)	0.45** (0.24 0.82)
Bachelor's degree or more	0.90 (0.45 1.81)	0.50 (0.27 0.94)
Emotional Well-being		
Felt anxious	1.35* (1.02 1.77)	
Health & Resources		
Needed tangible help with tasks daily outside HH		0.62* (0.43 0.90)
Sleep quality (felt truly well-rested upon waking)	0.76* (0.57 1.00)	
Constant	1.59 (0.38 6.64)	0.52 (0.15 1.85)

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

4.5.3   Who completed care?

Next, I examine predictors for completing care, using predictor variables and categories from the previous models. About a third of respondents completed "no" care, a third completed "some" care, and a third completed "all" care (Figure 4.4), so the outcome variables were modified to reflect this disparity. I present one model that predicts completing "at least some" care (some and all care), and one model that predicts completing "all care only" (Table 4.4).

Figure 4.4 Proportion of respondents completing none, some or all care (n=1372)
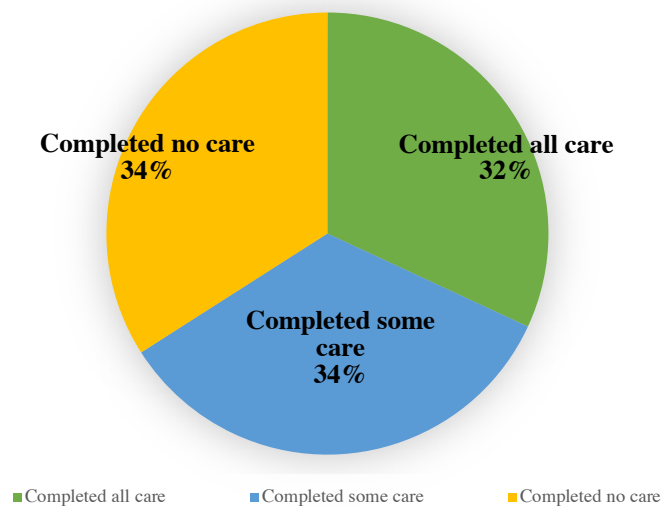
The only variable that was significantly predicted higher odds of completing "at least some" care was self-reported anxiety (OR=1.35). Conversely, being of Other ethnicity (OR=0.48) and feeling well-rested most of the time (OR=0.76) predicted lower odds of completing "at least some" care. When predicting completing "all care only," being well-educated (VOC/some college, OR=0.45; ≥ bachelor's degree, OR=0.50), of Other ethnicity (OR=0.35), living in a larger household (OR=0.71), and needing help with tangible tasks from outside the household (OR=0.62) predicted lower odds of completing all care. Other variables previously described were not significant in these two models.

4.5.4 How was care completed?

Finally, I examine how care was completed, and whether the method of care completion could be predicted based on familiarity with communication methods. Of 911 respondents, most relied on in-person (87.6%), phone (24.8%), or video calls (19.1%) to complete care. Thus, I predict three methods of care completion in logistic regression models (Table 4.5).

Adjusting for the socio-demographic variables previously used (age at 2020, gender, partnership status, race/ethnicity, educational attainment and household size), communicating with friends by making phone calls during the pandemic (OR=1.48) and needing tangible help from outside the household (OR=1.94) predicted higher odds of completing care by phone. Being of older age (OR=1.03), Hispanic/Latino (OR=2.79) and of Other ethnicity (OR=3.06) also predicted higher odds of completing care by phone. Conversely, having good or better physical health (OR=0.60) and feeling mostly well-rested (OR=0.51) predicted lower odds of completing care remotely by phone.

Of those completing care via video call, being a regular user of the internet/email (OR=3.70) and using video calls to communicate with friends during the pandemic (OR=1.99) predicted higher odds of using video calls to complete care. Being female (OR=1.85) and African American (OR=3.45) also predicted higher odds of completing care this way. Conversely, perceived good or better physical (OR=0.46) and mental (OR=0.40) health predicted lower odds of completing care via video calls. It seems reasonable to assume that those who were accustomed to using internet and communicating through it were more likely to complete care using video calls, whereas those who perceived themselves as being physically and mentally healthy were less likely to use this method since they could obtain care in other ways, possibly in-person.

Table 4.5 Predictors of completing care, by method of completion (OR, 95% CI)

Method of completing care	Phone Calls	Video Calls	In-Person
Variables	(n=861)	(n= 771)	(n= 757)
Demographic Factors			
Age at 2020	1.03*	0.99	0.99
	(1.01 1.05)	(0.97 1.02)	(0.95 1.02)
Gender (Female)	0.90	1.85*	0.88
	(0.59 1.37)	(1.13 3.01)	(0.50 1.53)
Married/Partnered	1.04	0.96	0.97
	(0.91 1.18)	(0.84 1.10)	(0.82 1.15)
Larger household (≥ three)	1.05	0.97	1.09
	(0.67 1.66)	(0.55 1.74)	(0.66 1.81)
Race/Ethnicity			
(Caucasian as control)			
African American	1.82	3.45***	0.43
	(0.98 3.39)	(1.86 6.40)	(0.19 1.00)
Hispanic	2.79***	1.02	0.31**
	(1.56 5.00)	(0.35 2.95)	(0.14 0.72)
Other	3.06*	0.79	1.17
	(1.11 8.45)	(0.17 3.75)	(0.20 6.87)
Education (<HS as control)			
HS/Equivalent	1.55	0.33	0.72
	(0.64 3.76)	(0.08 1.44)	(0.15 3.46)
VOC/Some College	1.45	0.38	0.71
	(0.68 3.05)	(0.11 1.32)	(0.17 3.02)
Bachelor or more	1.76	0.48	1.53
	(0.82 3.77)	(0.14 1.62)	(0.32 7.37)
Communication Methods			
Proficiency and usage of internet/email (2015)		3.70***	1.98
		(1.72 7.93)	(0.89 4.43)
Phone calls to friends (daily to few times/week)	1.48*		
	(1.01 2.17)		
Video calls to friends (daily to few times/week)		1.99*	0.50
		(1.16 3.42)	(0.24 1.04)
In-person visits to friend (daily to few times/week)			0.63
			(0.37 1.05)
Health & Resources			
Needed tangible help with tasks daily from outside HH	1.94***		
	(1.30 2.89)		
Physical health (Good, Very Good and Excellent)	0.60*	0.46*	
	(0.38 0.95)	(0.25 0.85)	
Sleep quality (woke up feeling truly well-rested)	0.51***		
	(0.34 0.76)		
Mental Health (Good, Very Good and Excellent)		0.40**	
		(0.22 0.72)	
Resilient			2.45*
			(1.14 5.23)
Constant	0.02***	0.62	13.60
	(0.00 0.12)	(0.05 7.29)	(0.77 240.75)

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Finally, of those who completed care through in-person visits, perceived resilience (OR=2.45) predicted much higher odds of completing care in-person. Across race/ethnicity, being Hispanic/Latinos (OR=0.31) predicted lower odds of completing care in-person. Surprisingly, those who were accustomed to visiting friends in-person during the pandemic (OR=0.63, p = 0.07). and those who often video-called friends (OR=0.50, p=0.06) negatively predicted completing care in-person. Therefore, personality and cultural factors may take precedence in determining whether older adults complete care in-person.

On balance, familiarity with various communication methods, self-rated health (physical, mental, sleep quality), personality (resilience), and socio-cultural (gender and race/ethnicity) factors tend to predict different methods of completing care. Those who needed help from others, implying difficulties in accessing or traveling to obtain care, were less likely to complete all care, and if they did, were more likely to do so remotely (phone or video calls).

4.6 DISCUSSION

Several interrelated factors predicted delaying needed medical care during the COVID-19 pandemic. Socio-demographic variables that indicate disadvantage, such as older age, gender, race/ethnicity, and educational attainment, were significant predictors in these models. Being female may have predicted greater odds of delayed care due to frailty at older ages that precluded access to care. Higher educational attainment predicted higher odds of delaying care. Those who were well-educated may have been more likely to be able to stay at home and use the internet to search for health information, as educational attainment is linked with socioeconomic status.

Of the socio-demographic variables, only partnership status (married or cohabiting) was not significant in any model, although household size was significant in several models. Living in a larger household predicted lower odds of delaying care across all five models, but it also

predicted lower odds of completing *all* care. This result may be in line with prior literature, where household composition and size had differential effects on older adult health.

It is possible that older adults living in households with kin or close ones were able to obtain better access to medical care with help. Those living alone or with a partner may have lacked outside social support to obtain care; one or both may have been sick or unable to travel outside.

Although members of all three minority groups (African Americans, Hispanic/Latino, and Others) were more likely to be concerned about the pandemic than Caucasians were (Figure 4.3), there was no significant difference in their delay of care. To explore this disparity further, I looked at the proportion delaying medical care by race/ethnicity (Appendix A, Table A4.1) and found that African Americans were evenly split in their decision (50.0% delaying care) whereas for all other ethnicities (Caucasians, Hispanic/Latino and Other), the proportion of those delaying care exceeded those not delaying. Again, there was no significant difference overall (insignificant Chi-squared test). When a series of logistic regression models were run to compare the grouping of variables predicting delayed care (Appendix A, Table A4.2), race/ethnicity disparities became significant when the variables of "needing tangible help with daily tasks" and "emotional support from outside the household" were added to the model. African Americans were less likely to delay care (OR=0.74) when emotional support from outside the household was needed in addition to other socio-demographic factors. Whereas African Americans were less likely to delay care (OR=0.71), Other ethnicities were more likely to delay care (OR=1.19) when "needing tangible help" and "needing emotional support" were added to the model. This may indicate that certain characteristics related to social support and cultural nuances in asking for help specific to these minority groups played a part in individual decisions to delay medical care.

Race/ethnicity disparities may also be explained by differences in the preferred method of completing care (Table 4.5), as Hispanic/Latinos and Other ethnicities were much more

likely to use phone calls to complete care, whereas African Americans were more likely to use video calls to complete care. Caucasians were more likely to use in-person visits than any other ethnicity to complete care.

As predicted in the first hypothesis, poor emotional well-being predicted lower odds of seeking care, as did resource deficiency, whether financial or social. Regular internet/email use (in 2015-16) predicted higher odds of delayed care, possibly because respondents could search for health information online rather than consulting a medical professional. Finally, better perceived physical and mental health, as well as sleep quality, likely meant that respondents felt more confident about obtaining medical care and were more likely to do so.

Looking at completing care, there were only a few variables that predicted completing "at least some" or "all care only". Other ethnicities were less likely to complete any care, which may reflect cultural health beliefs and behaviors. Those who felt anxious were likely to complete at least some care – potentially, those who felt anxious also felt a strong need to obtain medical care if they experienced any symptoms. Conversely, those who felt more confident about their health, as reflected by good sleep quality, would be less likely to complete any care – most likely these respondents did not have significant health issues that would necessitate regular medical care or felt that they could "sleep it off." Respondents who needed tangible help from outside the household were less likely to complete all care; in line with the second hypothesis, these older adults may have needed help in order to obtain medical care. While financial status was not significant in these models as expected, other factors such as insurance coverage were not measured in this survey and those could conflate with socioeconomic status.

Preferences in the method of completing care differed by gender and race/ethnicity, with females more likely to use video calls than males and minorities more likely to complete care remotely than Caucasians. Additionally, for completing care remotely via phone or video

call, those who were accustomed to these communication methods were more likely to use them to complete care, as predicted in the third hypothesis. Again, those who needed tangible help from outside the household were more likely to complete care using phone calls, possibly due to difficulties physically accessing medical care, as well as familiarity with using the phone to exchange information. Surprisingly, self-rated resilience predicted much higher odds of completing care in person, more so than internet/email proficiency, frequency of in-person visits with friends, or frequency of video calling friends. This may occur because certain adults needed to obtain care in-person and also felt that they were resilient enough to weather tough situations, and venture out and obtain care, regardless of their ability to use the internet for telehealth and health information.

In conclusion, these results validate the hypotheses proposed in this chapter that associate various facets of disadvantage with a higher likelihood of delaying care and lower likelihood of completing it. While higher educational attainment and internet/email proficiency predicted higher odds of delaying care; yet, this could be interpreted as a sign of privilege, translating into health literacy and the ability to research symptoms and understand health information online. While there was an initial puzzle in the prevalence of minorities being less likely to delay care despite higher concerns about the pandemic, this is later resolved as I find that minority groups were much more likely to complete care remotely, while Caucasians mostly completed care in-person.

Finally, the long-term health effects of this delayed care are still unclear. The majority of respondents (82.3%) did not believe that delayed care negatively affected their health, although those who eventually completed their care were more likely to believe this (93.8%) than those who completed some care (71.9%) and no care (81.5%). Thus, future research will help determine whether these delays in medical care have long-term deleterious effects.

4.7   LIMITATIONS

The NSHAP-COVID Study (2020-21) asked respondents if they delayed "needed" medical, dental and vision care. However, routine check-ups (e.g., annual physical, dental cleaning, vision checks) may be "recommended" but not urgently "needed." In future iterations of this survey, it may be helpful to further define "needed" medical care, as this was left up to the respondent's interpretation. Furthermore, reasons for delaying care could be provided, and respondents given multiple choice options to choose from; this would help clarify the reasoning behind these models that I have found. Health insurance status/coverage of respondents would also be helpful for understanding whether financial or insurance concerns factored into delaying or completing care. While this survey and prior literature looks at the impact of COVID-19 across different time points, there were slight variations from 2020-21 in the severity of the pandemic, government responses (e.g., in the U.S. there were lockdowns, stimulus checks and vaccination campaigns), and public responses. Therefore, when considering these results, this variation should be kept in mind. Finally, in the analyses, the specific composition of the household was not considered, apart from partnership status and household size. Since prior literature indicated a connection between household composition and health outcomes, this could be an additional predicting factor to consider.

4.8   CONCLUSIONS

In this chapter, I examined data from U.S. older adults who delayed needed medical care during the COVID-19 pandemic. As hypothesized, disadvantage, including poor emotional well-being, resource deficiency in the form of adverse income changes and lack of tangible social support, and poor perceived health, played a role in predicting delayed care. There were disparities across racial-ethnic groups in their degree of concern over the pandemic, with African Americans, Hispanic/Latinos and Other ethnicities more likely to be highly concerned than Caucasians. Consequently, the preferred method of care completion differed

across race/ethnicity groups, as minorities primarily used remote methods to complete care whereas Caucasians were more likely to complete care in-person. Familiarity with certain communication methods as well as perceived health and strength of personality (e.g., resilience) were also significant predictors of completing care using various methods.

These findings highlight the secondary effects of the pandemic in delaying access to and obtaining medical care by U.S. older adults, and may provide guidance for researchers and policy makers looking at health disparities in pandemic outcomes. For medical professionals and caregivers of older adults, monitoring older adults for emotional symptoms may be just as important as caring for physical ones; mental health and emotional well-being are increasingly noted as a facet of overall health. Especially since these internal states are not readily apparent, they should be afforded greater importance.

Finally, the results of these analyses validate the multi-dimensional model of health proposed in this dissertation. A variety of factors, classified here under different categories, predict delaying medical care and eventually completing it. The COVID-19 pandemic adds an additional layer of complexity to this model of health, as the virus and situation surrounding it is continuously changing, with nations across the world responding differently with disparate policies, and people reacting uniquely to these variable situations. Most saliently in the U.S., health disparities have become more apparent as a result of this pandemic. Therefore, this pandemic provides an opportunity for policymakers, health systems, medical professionals, and even laypersons to recognize and address social disparities (Lopez, Hart, and Katz, 2021).

The COVID-19 pandemic has highlighted the need for an improved healthcare system across the world. In the final chapter, I discuss two major issues that warrant further research and tie these previous studies together– the importance of the patient-physician relationship and trust, and increasing recognition of mental health's significance and ways to provide better mental healthcare coverage.

CHAPTER FIVE

DISCUSSION AND CONCLUSIONS

Especially since the COVID-19 pandemic became a significant part of everyday life in 2020-21, health has been recognized as multidimensional— composed of individual and contextual factors, not simply a product of hereditary genetics (biology), but also affected by psychological states and personality, social contexts (including culture and religion), environmental situations (including natural disasters and built environments), and government policies. In this dissertation, I proposed a multidimensional model of health that is applicable to three disparate scenarios – one in a different culture (China), one comparing U.S. cohorts, and one focused on healthcare-seeking behaviors during the COVID-19 pandemic. First, I discuss these findings as well as research limitations, and secondly, I propose two areas for future improvement in the healthcare system.

5.1 OVERVIEW

The three studies presented in this dissertation incorporate multiple factors to predict health outcomes in disparate contexts. In my first study (Chapter 2), I focused on medical residents in Wuhan, China who were undergoing a shift in medical residency training, just after China's government instituted sweeping reforms, extending the length of training and changing prior curriculum from 2015-2020. In my primary model, I found that internal states such as intrinsic motivation and extrinsic motivation, as well as external support through frequent social interaction, predicted health and happiness among medical residents in Wuhan. In a secondary model without two variables for motivation, I found that the autonomous decision to study medicine in high school, around five years prior to the start of residency training, was able to positively predict future health, whereas the willingness to change career for more personal time negatively predicted future health. Therefore, both individual and contextual

factors impact perceived physical and mental health, confirming classical Western theories in psychology and sociology in an Asian cultural context.

In the second study (Chapter 3), I examined whether two cohorts of older adults in the U.S., Traditionalists and Baby Boomers, differed in their partnership patterns and sexual activity. I found that Baby Boomers overall were more likely to be sexually active than Traditionalists at the same age, while Traditionalists were more likely to be partnered than Boomers. While men generally were more likely to be sexually active and partnered than women, Boomer women were more sexually active than their Traditionalist counterparts, overshooting men from both cohorts at older ages. Boomer women were also less likely to be partnered than Traditionalist women.

Additionally, I predicted physical and mental health by sexual activity and relationship quality (happiness), respectively. I found a bi-directional relationship between sexual activity and physical health, as well as relationship quality (happiness) and mental health. Physical health (2015-16) was positively associated with sexual activity (2015-16); sexual activity (2015-16) positively predicted future (2020-21) physical health; it was also positively and significantly associated with relationship quality at the time (2015-16), but it did not predict future mental health or future relationship quality in 2020-21. Mental health positively predicted future relationship happiness, but while current relationship happiness was significantly and positively associated with mental health, in both 2015-16 and 2020-21, it did not predict future mental health. Prior relationship happiness (2015-16) was a significant and positive predictor of future relationship happiness (2020-21).

Therefore, I highlight that the quality of romantic relationships may be more significant than sexual relationships at older ages. Mental health is an important component of relationship happiness. More importantly, while being African American or Hispanic/Latino predicted lower odds of good or better physical health, socio-demographic factors were not significant

in predicting mental health. This suggests that improvements in mental health may be possible for everyone, despite structural inequalities that are disadvantageous to health.

Finally, in Chapter 4, I examined delays of needed medical care during the COVID-19 pandemic, and found that factors indicating disadvantage predicted delaying care. In particular, poor emotional well-being and resource deficiency in the form of financial and social capital predicted delaying care. Conversely, perceived good physical and mental health, feeling well-rested and happy (2015-16), and regular use of the internet/email (2015-16), predicted lower odds of delaying care but also of completing care. Methods of completing care varied by race/ethnicity (explained by their differential levels of concerns regarding the pandemic), and perceived health and personality (resilience). Self-rated resilience (2015-16) was a significant predictor of completing care in-person, but not of completing care remotely. Thus, multiple forces from individual and contextual levels combine in complex ways to shape health-seeking behaviors among the U.S. older adult population during the COVID-19 pandemic.

5.2 LIMITATIONS IN THE CONCEPTUAL MODEL OF HEALTH

In these chapters, I aimed to incorporate multiple determinants of health in predicting health outcomes. Predictors included socio-demographic variables such as gender (biological sex) and race/ethnicity as well as other factors that one is born into (cohort/generation) or cannot change (age). Psychological factors included motivation (extrinsic and intrinsic), perceived personality (resilience), emotional states (concerns about the pandemic, feelings of anxiety, isolation, happiness) and perceived health. Socio-cultural factors included educational attainment, partnership patterns, socioeconomic/financial status, cultural health beliefs, and social capital. Political decisions such as China's reform of its medical residency training program, and lockdowns in the U.S. during the initial period of the COVID-19 pandemic, also played a part in influencing health outcomes.

While this list covers multiple determinants of health, I was not able to address every factor, nor parse out the inter-related aspects of some of these variables. For example, digital literacy is an indication of educational attainment but may also differ across age and generations, while communication method (e.g., phone call, video call, email/social media) may vary by personality. Furthermore, religion plays an important role in people's lives, but this was not included in my analyses. Cultural aspects, from the immigrant paradox in the U.S. to Chinese health beliefs, were touched upon but could have been delved deeper into had I been able to obtain more information on these aspects. Finally, I would have liked to incorporate information on epigenetics (e.g., biological changes in response to the environment) and psychological states that interacted with the other determinants of health to produce an overall outcome of physical and mental well-being. Resilience, or bouncing back after hard times, is likely a significant personality trait that affects health outcomes during the COVID-19 pandemic, and community resilience is another type of resilience that was not accounted for. Future iterations of the NSHAP survey could thus include questions on cultural health beliefs, the composition of households and psychological factors such as perceived resilience and feelings of gratitude that may be linked to well-being. Below, I discuss three inter-related areas to be addressed in future research: neighborhood effects, community resilience, and cumulative inequality across the life-course and through generations.

5.2.1 Neighborhood effects among older adults

For many older adults, their home and neighborhood of residence is their primary environment. Therefore, neighborhood characteristics may supersede individual ones in affecting health outcomes. Among U.S. older adults, community socioeconomic status was a better predictor of individual health than individual socioeconomic status; this association was strongest at ages 60 to 69 (Robert and Li, 2001). Kubzansky et al., (2005) found that for older adults (65 and above) in New Haven, living in a poor neighborhood was associated with higher

levels of depressive symptoms, beyond individual vulnerabilities. This relationship was not mediated by additional community services for social engagement. Data from the 2002 HRS (adults aged 55 and above) found that neighborhood economic advantage is associated with a reduced risk of lower body limitations for both men and women (Freedman et al., 2008). Furthermore, living in more economically disadvantaged areas predicted the onset of heart problems for women aged 55 and above; living in more highly segregated, higher-crime areas was associated with greater chances of developing cancer for both men and women (Freedman, Grafova and Rogowski, 2011).

Therefore, it may be more pertinent to examine neighborhood effects on health in the context of social relationships for older adults. Going beyond neighborhood disadvantage, we note that neighborhood context importantly structures older adults' access to social relationships, social capital, and social support through contextual built environments of front porches or stoops (Cagney and Cornwell, 2018). Collective efficacy had a small effect on reducing Chicago heat wave-related mortality (Browning et al., 2006) and positively predicted health among adults (Browning and Cagney, 2003) but did not mediate structural neighborhood effects on health. As Small and Newman (2001) postulate, socialization mechanisms such as collective efficacy view individuals as recipients of "powerful socializing forces" and are more appropriate for children and adolescents. In contrast, instrumental models such as the social isolation model— where isolated individuals are unable to obtain in-group resources are based on environmental limitations— are more readily applied to adults. Therefore, neighborhood effects including measures of disorder, social cohesion and collective efficacy, could be included in future studies of older adult health.

5.2.2 Community resilience

Beyond individual personality, resilience can also be conceptualized in terms of the community. Defined by RAND (2020) as the sustained ability of a community to utilize

resources to respond to, withstand and recover from adverse situations, resilience can also be built in communities by improving infrastructure, health delivery services, transportation and communication. Revisiting concepts discussed in neighborhood effects, community resilience is built upon collective efficacy (social cohesion and informal social control) and social exchange (interactions between residents). Rao and Greve (2017) found that both the framing of disasters within the community and cooperation in dealing with challenges determined community resilience and post-disaster outcomes. Cagney et al., (2016) found that those living in communities with higher social cohesion, informal social control and social exchange perceived their neighborhoods as well prepared for a disaster and more likely to recover quickly. Curiously, social cohesion, informal social control and social exchange were significantly related to increased confidence in quick recovery among members of neighborhoods with low socioeconomic status but not high SES, suggesting that social resources have a stronger relationship with neighborhood resilience in areas of lower socioeconomic status. Especially given the global impact of the COVID-19 pandemic, community resilience may be an important factor to consider.

5.2.3 Cumulative inequality

Poor health at older ages may be compounded by cumulative effects of disadvantage (Hayward and Sheehan, 2016; Sampson and Laub, 1997), scientifically described as allostatic load (McEwen and Stellar, 1993) and also reproduced across generations. Seeman et al., (1997) measures cumulative disadvantages in the body through a concept of allostatic load, or the total "wear and tear" on the body, which predicts an increased risk for declines in cognitive and physical functioning and cardiovascular disease.

Neighborhood effects on health can thus be conceptualized through temporal mechanisms: short-term influences of the neighborhood on behaviors, attitudes and health-care utilization, and a longer-term "weathering" from accumulated disadvantages (Ellen,

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Mijanovich and Dillman, 2001). Fletcher and Jung (2019) analyzed the cumulative ("total effects") of neighborhoods on health and found that neighborhood effects may be understated in classical research, leading to new questions about longitudinal effects of "place." It may be important then to consider how social-environmental conditions may be reproduced across generations. Social systems generate inequality, which become apparent at a meso-level through neighborhood effects; early risk factors and disadvantage shape life trajectories; cumulative inequality may lead to premature mortality and influence future generations. (Ferraro, Shippee, & Schafer, 2009). Furthermore, large-scale events such as the COVID-19 pandemic have affected different groups unequally, including children, and this may have consequences for the next generation.

5.3   FUTURE AVENUES OF FOCUS

Given these findings and the still-ongoing COVID-19 pandemic as of 2021, the need to improve well-being globally is increasingly apparent. I propose that on a micro-level, institutions improve social support programs and initiatives to incorporate mental health education and wellness practices such as mindfulness and meditation, and on a macro-level, that steps are taken to improve patient-physician trust and relationships whether in the U.S. or China, and emphasize mental healthcare.

The patient-physician relationship is a fiduciary relationship, where the physician has a duty to act in the patient's best interest and refrain from exploiting the patient (Zilber, 1996). In the U.S., the American Medical Association currently defines the practice of medicine as a "moral activity" where "the relationship between a patient and a physician is based on trust" (Code of Medical Ethics, Patient-Physician Relationship). A study by Pew Research Center in 2019 found that Americans generally reported a high level of trust in doctors, with the majority (74%) having a positive view of medical doctors; older adults (50+) are more likely to trust their doctors than younger adults (Funk and Gramlich, 2020). According to the American

Medical Association and the American Board for Internal Medicine, physicians play a significant role in building public trust in the COVID-19 vaccine (Bailey, 2020; Baron and Wolfson, 2020). Therefore, an improved physician-patient relationship is beneficial for both individual and population health.

Throughout prior chapters, the relationship between patients and their physicians has been a common hidden theme. Firstly, in my study of medical residents in China, I noted several times responses that referred to discouraging relationships between patients and physicians in the line of work. The patient-physician relationship has eroded significantly in China, with low levels of trust and an attitude of a trading/reciprocal relationship rather than friendship between the majority of patients and their doctors (Yang et al., 2019). Physicians also distrust their patients (along with patients' relatives) which exacerbates difficulties in communication, and results in poorer healthcare outcomes (Nie et al., 2017). Chinese Confucian culture also creates a different type of dynamic ("doctor-family-patient" relationship) where family members, particularly adult children of older adults, become involved in the patients' plan of care (Cong, 2004), which complicates the relationship between patient and physician.

Undoubtedly, improving the patient-physician relationship would ameliorate the quality of life of medical residents in China, as well as improve public health overall through a more empathetic and trusting healthcare delivery dynamic. One possible avenue for this to occur may be improving communication (Du et al., 2020), by training medical residents to better communicate with patients and engage patients in shared decision-making regarding their health. Furthermore, with China's recent medical residency training reforms (2015-2020), medical service quality is likely to improve as well, which in turn will also improve patient satisfaction and the trust in the healthcare system.

In the U.S., the patient-physician relationship is also important. In Chapter 3, I examined older adults' partnership and sexual behavior, but did not discuss thoroughly whether older adults self-reported sexual behaviors to their physicians. Considering that sexual activity among older adults may be overlooked by medical professionals, and that it can be a "canary in the coal mine" indicating health problems, it is important for older patients to discuss issues of sexual health with their doctors, and for healthcare professionals to routinely screen for sexually transmitted diseases and infections, whether or not their patient is married/partnered. Especially since Baby Boomers are more sexually active than Traditionalists and less likely to be partnered, and are the largest generation in the U.S. currently entering older adulthood, regular evaluations of sexual health should become a routine part of care.

Likewise, in Chapter 4 where I discuss health-seeking behaviors, trust in physicians and in the healthcare system is a variable that was not discussed but potentially significant. Patients who indicated higher interpersonal trust in physicians were more satisfied with their telemedicine visits during the COVID-19 pandemic in March-April 2020 (Orrange et al., 2021). It is likely that variations in patient-physician trust contributed to whether or not respondents delayed or completed medical care, and the method of completing care (e.g., being willing to try a new method of remote care such as telehealth/telemedicine).

Finally, the overarching importance of mental health, emotional well-being, and psychological states is highlighted throughout these chapters. Chinese medical residents' happiness and health is closely linked to their levels of intrinsic motivation, despite cultural differences and country-specific issues such as the strained doctor-patient relationship. Older adults' prior (2015-16) mental health predicted future (2020-21) physical and mental health, and relationship happiness. Those who self-reported feelings of happiness (2015-16) and perceived resilience (2015-16) were less likely to delay care during the COVID-19 pandemic (2020-21) and more likely to seek care in-person. Moreover, mental health was not predicted

by socio-demographic factors indicating disadvantage, such as older age, being female, or being a minority, even though physical health was (Chapter 3). Therefore, mental health may be more easily improved through self-care practices and public health education than physical health, despite socio-demographic and structural inequalities.

On a global level, improving mental healthcare involves developing better mental health services, building community mental health centers (including informal community services), and promoting self-care; ideally, self-care is used most frequently at the lowest costs and specialty services least often at the highest costs (WHO 2012). Indeed, self-care and better mental healthcare education for people of all ages can improve well-being. These include tips such as practicing gratitude, staying connected with others, relaxing activities such as meditation and breathing exercises, and getting regular, sleep, exercises, and meals (NIMH, 2021). Finally, speaking openly and positively about mental health by incorporating it regularly into various public health announcements and education, providing training, as well as informal centers of care in the community, will improve individual and public well-being.

In this dissertation, I have proposed a multidimensional model of health and made contributions to literature on the determinants of health through three studies– one in a non-Western culture (China), one comparing two cohorts of U.S. older adults, and one examining healthcare-seeking behavior during the COVID-19 pandemic. I would like to continue this research longitudinally, using future waves of NSHAP to analyze how relationship quality, sexual activity and health are connected; I am also interested in the long-term effects of delayed medical care during the pandemic. Finally, I conclude that improving the patient-physician relationship as well as mental healthcare will promote individual and population health overall.

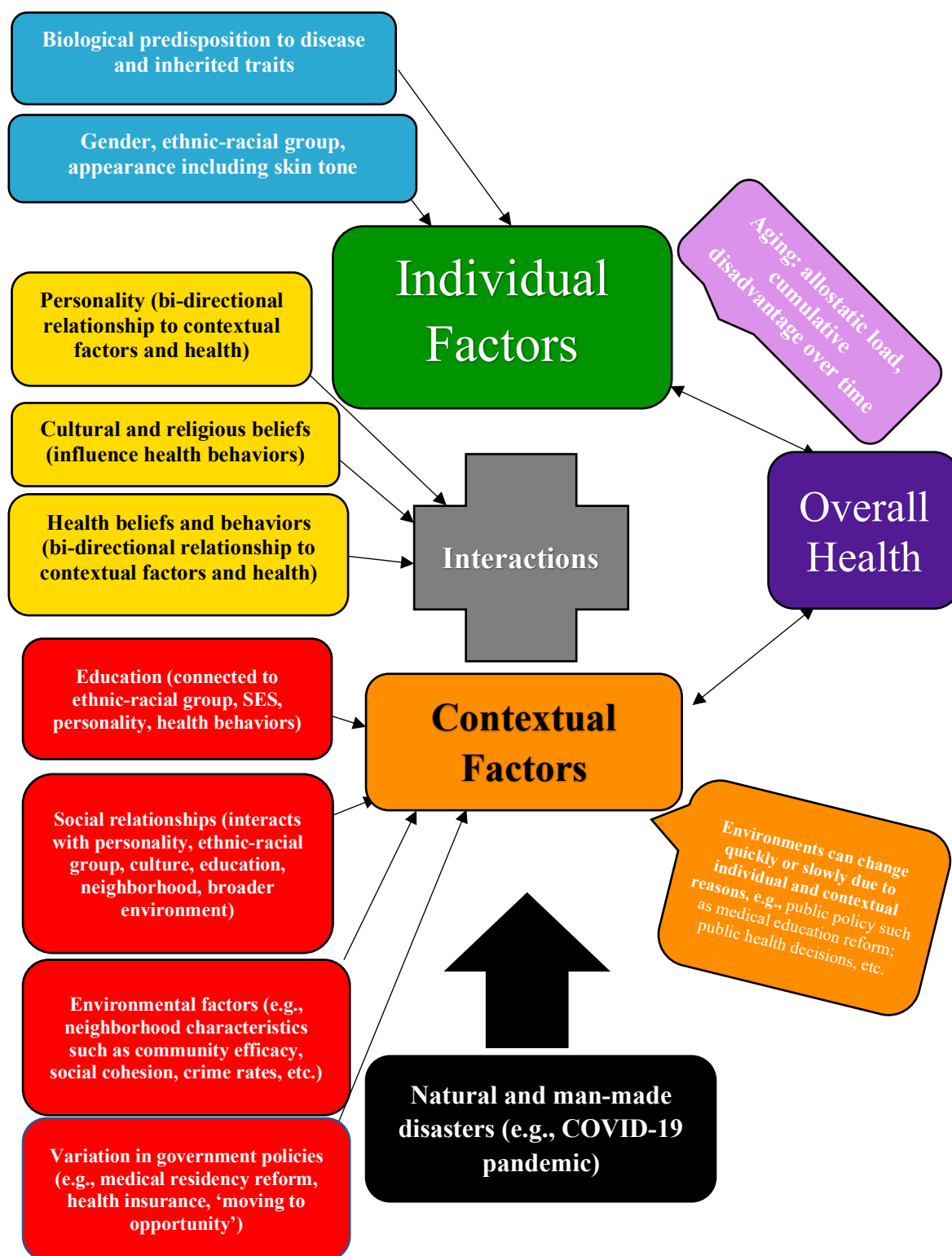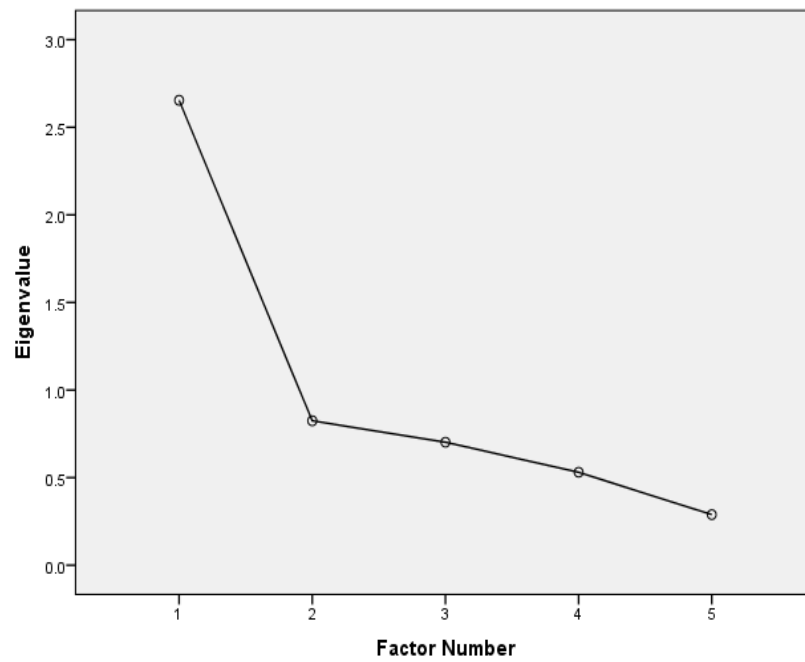**Figure A1.1** Conceptual model of health (color version)

Figure A2.1 Scree plot for extracting the factor variable "Overall Health"

Note: The eigenvalue for the first factor is larger than the eigenvalue for the next factor (2.654 versus 0.653), and the first factor accounts for 53% of the total variance, suggesting that the scale items are unidimensional. Thus, it is desirable to combine these five measures into one scale variable. Cronbach's α (Cronbach, 1951) for the five items is .771, suggesting that the items have relatively high internal consistency. "Overall Health" is thus a composite of the five measures.

Table A2.1 Contingency table: Extrinsic motivation and own decision to study medicine

Own decision (Row %)	Extrinsic motivation				Total (N)
	0	1	2	3	
No	65.79	18.42	7.89	7.89	38
Yes	59.15	15.49	9.86	15.49	71

P-value from Fisher's exact test: 0.714

Table A2.2 Contingency table: Intrinsic motivation and own decision to study medicine

Own decision (Row %)	Intrinsic motivation				Total (N)
	0	1	2	3	
No	47.37	42.11	10.53	0	38
Yes	28.17	38.03	21.13	12.67	71

P-value from Fisher's exact test: 0.022, significant at $p < 0.05$

Table A2.3 Contingency table: Extrinsic motivation and willingness to change careers

Career Change (Row %)	Extrinsic motivation				Total (N)
	0	1	2	3	
No	66.67	5.55	16.67	11.11	36
Yes	61.76	20.59	8.82	8.82	34
Don't know	56.41	23.08	2.56	17.95	39

P-value from Fisher's exact test: 0.125

Table A2.4 Contingency table: Intrinsic motivation and willingness to change careers

Career change (Row %)	Intrinsic motivation				Total (N)
	0	1	2	3	
No	25.00	47.22	22.22	5.56	36
Yes	44.12	29.41	26.47	0.00	34
Don't know	35.90	41.02	5.13	17.95	39

P-value from Fisher's exact test: 0.009, significant at $p < 0.01$

Table A4.1 Contingency table: Delaying medical care by race/ethnicity

Delayed Care	Ethnic-racial group			
	Caucasian	African American	Hispanic non-black	Other
No	846	174	101	41
	45.14%	50.00%	43.35%	44.09%
Yes	1028	174	132	52
	54.86%	50.00%	56.65	55.91%

P-value from Chi-squared test: 0.33

Table A4.2 Logistic regression models predicting delayed care emphasizing race/ethnicity differences (OR, 95% CI)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
N	2548	2548	2548	2516	2509	2496	2491
Age at time of survey		0.98*** (0.97 0.99)	0.98*** (0.97 0.99)	0.99** (0.98 1.00)	0.98*** (0.97 0.99)	0.99** (0.98 1.00)	0.98*** (0.97 0.99)
Gender *(Male as control)*			1.36*** (1.16 1.59)	1.39*** (1.18 1.64)	1.36*** (1.15 1.60)	1.28** (1.08 1.51)	1.27** (1.08 1.50)
Partnered				1.11 (0.86 1.42)	1.17 (0.92 1.49)	1.18 (0.92 1.51)	1.22 (0.96 1.55)
Race/Ethnicity *(Caucasian as control)*							
African American	0.89 (0.69 1.14)	0.85 (0.66 1.09)	0.84 (0.65 1.09)	0.84 (0.64 1.10)	0.78 (0.59 1.03)	0.74* (0.56 0.97)	0.71* (0.54 0.94)
Hispanic	0.91 (0.65 1.26)	0.87 (0.62 1.22)	0.89 (0.63 1.25)	0.87 (0.61 1.24)	0.80 (0.56 1.15)	0.85 (0.60 1.22)	0.81 (0.56 1.15)
Other	1.32 (0.77 2.28)	1.24 (0.73 2.12)	1.24 (0.73 2.11)	1.35 (0.79 2.31)	1.25 (0.73 2.15)	1.24 (0.70 2.18)	1.19* (0.67 2.09)
Needed tangible help with tasks daily					1.72*** (1.35 2.20)		1.44** (1.11 1.86)
Needed emotional support from outside the household (HH)						2.11*** (1.62 2.74)	1.99*** (1.52 2.61)
Constant	1.33*** (1.21 1.47)	4.11*** (2.14 7.90)	3.48*** (1.83 6.61)	2.78** (1.36 5.72)	3.48*** (1.64 7.40)	1.90 (0.91 3.99)	2.25* (1.03 4.92)

*p < 0.05; ** p ≤ 0.01; *** p ≤ 0.001

SURVEY FOR WUHAN UNIVERSITY MEDICAL RESIDENTS

English version of the consent form (in-person)
(Created for IRB approval, not distributed)

We would like to invite you to participate in a research study. The goals of this study are to learn more about the attitudes of residents and faculty towards their medical education and educational reform at Wuhan University. I am Winnie Tong, a rising second-year doctoral student in sociology at the University of Chicago, mentored by Dr. Renslow Sherer at the University of Chicago, Pritzker School of Medicine, who has worked extensively with Wuhan University School of Medicine on multiple projects.

Your participation would involve the completion of an in-person interview following a questionnaire format that takes about 25-30 minutes. There are no physical or medical risks to your participation. Your participation is voluntary, you do not have to answer questions you are uncomfortable answering, and we can stop at any time. This questionnaire will not affect your grades in any courses either negatively or positively. Your responses to the questionnaire are confidential, and there will be no adverse consequences or punishment as a result of your participation.

Do not write your name on the questionnaire. Since each questionnaire is not identifiable you will not be able to withdraw from the research once you have returned the completed questionnaire. Completed surveys will be kept confidential. Completed surveys will be kept in a locked cabinet at the WUMER Project office at the University of Chicago. Completed surveys will be used only for purposes of this study, and no information regarding your comments will be shared with any other individuals who are not directly involved in the study.

If you have any additional questions, you can contact Winnie Tong (wintong@uchicago.edu, Chinese phone number: +86 13162220635) or Renslow Sherer (rsherer@bsd.uchicago.edu).

Do you agree to participate in the survey?

Chinese version of the consent form (in-person)
(Actual distribution)

问卷知情同意书 – 面谈

该问卷旨在研究武汉大学医学部住培学员对住院医培养课程和生活方面的态度和想法。我，Winnie Tong 是芝加哥大学社会学系二年级博士生，在芝加哥大学普利兹克医学院 Dr. Renslow Sherer 的指导下在武汉大学医学部进行此次问卷调查。完成本次问卷调查大约需要 20-30 分钟，通过单独一对一的问答方式进行。问卷结果只会用于研究目的，不会公开给予研究项目以外的人士。您的个人信息并不在问卷上，所以答案是无法识别的。请您答题时也请**不要**留名字或身份证号码等类似信息。该问卷将不会影响您学习评估的成绩，或影响您生活的其他方面。 若有其他问题请联系我 wintong@uchicago.edu，+86 13162220635.

Do you agree to participate in this study?
您同意参与此次问卷调查吗？

□同意 Agree   □不同意 Disagree

感谢您的支持和配合！

English version of the consent form (web/mobile)
(Created for IRB approval, not distributed)

We would like to invite you to participate in a research study. The goals of this study are to learn more about the attitudes of residents and faculty towards their medical education and educational reform at Wuhan University. I am Winnie Tong, a rising second-year doctoral student in sociology at the University of Chicago, mentored by Dr. Renslow Sherer at the University of Chicago, Pritzker School of Medicine, who has worked extensively with Wuhan University School of Medicine on multiple projects.

Your participation would involve the completion of an online questionnaire that takes about 15-20 minutes. There are no physical or medical risks to your participation. Your participation is voluntary, you do not have to answer questions you are uncomfortable answering, and we can stop at any time. Your responses to the questionnaire are confidential, and there will be no adverse consequences or punishment as a result of your participation. This questionnaire will not affect your grades in any courses either negatively or positively.

Do not write your name on the questionnaire. Since each questionnaire is not identifiable you will not be able to withdraw from the research once you have returned the completed questionnaire. Completed surveys will be kept confidential. Completed surveys will be used only for purposes of this study, and no information regarding your comments will be shared with any other individuals who are not directly involved in the study.

If you have any additional questions, you can contact Winnie Tong (wintong@uchicago.edu, Chinese phone number: +86 13162220635) or Renslow Sherer (rsherer@bsd.uchicago.edu).

By proceeding to the next webpage, you are indicating that you agree to participate in the survey.

问卷知情同意书 – 笔试版

该问卷旨在研究武汉大学医学部住培学员对住院医培养课程和生活方面的态度和想法。我，Winnie Tong 是芝加哥大学社会学系二年级博士生，在芝加哥大学普利兹克医学院 Dr. Renslow Sherer 的指导下在武汉大学医学部进行此次问卷调查。您大约需要 15-20 分钟来填写纸质问卷。问卷结果仅用于研究目的，不会公开给予研究项目以外的人士。您的个人信息并不在问卷上，所以答案是无法识别的。请您答题时也请**不要**留名字或身份证号码等类似信息。该问卷将不会影响您学习评估的成绩，或影响您生活的其他方面。若有其他问题请联系我: wintong@uchicago.edu, +86 13162220635.

Do you agree to participate in this study?
您同意参与此次问卷调查吗？

□同意 Agree   □不同意 Disagree

感谢您的支持和配合！

SURVEY FOR WUHAN UNIVERSITY MEDICAL RESIDENTS

English-translation version (created for IRB approval, not distribution)

一， 基本信息 *Basic Demographic Information*

1. 年龄 Age： _____ 2. 性别 Gender：□ 男 Male □ 女Female

3. Marital Status 婚姻状况：

□ 单身 Single □ 未婚 Not married (in a relationship)

□ 已婚 Married □ 离异 Divorced □ 丧偶 Widowed

4. 进入住培年份Year entered residency： 20_ 年

5. 身份类型 (请选一) Type of program：□ 单位人 □ 行业人 □ 四证合一

6. 入培时的最高学历 Educational attainment when entering program

□ 学士 Bachelor's degree □ 硕士 Master's degree □ 博士 Doctoral degree

7. 进入住培前的临床工作经历（不含临床实习）Experience prior to residency training： _____ 年

8. 住培专业 Specialty： _____ .

9. 您出生在哪个省？ Hometown (province)_____ .

10. Area you lived in when 14: 您14周岁的时候是居住在下列哪个地方？

□ 农村 (村里，县里，乡里) Rural area

□ 县城，县级市 Provincial City

□ 三或四级城市 Third/Fourth Tier City

□ 二级城市 Second-Tier City

□ 一级城市 First-Tier City

□ 中国大陆外 Outside mainland China

[11 REDACTED]

二，个人看法 *Thoughts and Opinions*

12. 高中毕业后，您是否自己选择学医？ Did you make the decision to study medicine after high school?

（1）□ 是 □ 不是 □ 其他 （只选一）Yes/No/Other

（2）为什么？ Why was this? _____

[13-15 REDACTED]

16. 您会为了拥有更多个人时间而改变事业选择吗？

Would you change your career in order to maximize your personal time? (Only choose one)

□ 会 □ 不会 □ 不知道（只选一）Yes/No/Don't Know

17. 有人说：女性主要以家庭为主，而男人主要以事业为主。您同意这种说法吗？

Some people say: Women should stay at home while men should work. Do you agree with this statement?

□ 完全同意 □ 比较同意 □ 不确定 □ 不太同意 □ 完全不同意

Completely agree Somewhat agree Not sure Somewhat disagree Completely disagree

18. 您的培训项目里认识几位熟人能在需要时提供您专业或个人上的帮助和支持？

Besides family members, how many people do you currently know that you can turn to for support of any kind?

A. 来前就认识: _____ (数字) Before arriving here

B. 来后认识的: _____ (数字) After arriving here

19. 在过去的12个月之内，您平均多长时间参加一次社交活动 （不包括家庭聚会）？

In the past twelve months, how often do you participate in social activities?

□ 平均每周两三次或更多 Two to three times a week

□ 平均每周一次 Once a week

□ 平均每月两三次 Two or three times a month

□ 平均每月一次或少 Less than once a month

□ 基本不参加 Almost never

20. 您认为是什么原因促使你成为一名医生？（请选择所有相关回答）

What do you think are motivating factors for you to become a doctor in China?

Check all that apply:

□ 社会地位高（high social status）

□ 受亲戚和朋友的尊敬 (respected by family and friends)

□ 受患者尊敬和信赖 (trusted and respected by patients)

□ 高收入 (high income)

□ 提高个人发展 (improve personal development)

□ 对社区为基础的医疗保健感兴趣 (interest in community-based healthcare)

□ 其他 (other) _____

[21-25 REDACTED]

三， 个人健康 Personal Health

25. 总的来讲，您觉得自己健康状态怎么样？

Generally speaking, do you consider the condition of your health to be:

□ 非常好　　　□ 比较好　　　□ 一般，还可以　　□ 不太好　　　□ 很不好

Excellent　　　　　　Good　　　　　　　Alright/Okay　　　　　Fair　　　　　　Poor

26. 最近3个月以来，您睡眠好不好？ In the past three months, how has your sleep been?

　　□ 经常睡得很好　　□ 有时还好　　□ 一直睡得不好

Always sleeping well　　　　Sometimes sleep well　　　　Never sleep well

27. 最近3个月以来，您是不是曾经感到情绪低落，心情沉闷?

In the past three months, have you felt constantly depressed or down?

　　□ 每几天　□ 每周　　□ 每个月　□ 有几次感到这样　□ 从未感到这样

Every few days　Every week　Every month　　　　Several times　　Almost never

28. 最近3个月以来，您是否比较容易生气或 焦虑? In the past three months, do you feel easily

angered or anxious?

Every few days　　Every week　Every month　　　　　Several times　　　　Almost never

29. 总的来说，最近12个月以来，您觉得自己生活的愉快吗？

In general, in the past 12 months, do you feel that you are happy?

□非常愉快　　　□比较愉快　　　□一般　　　　□不太愉快　　　□非常不愉快

Extremely happy　Somewhat happy　Alright　　Somewhat unhappy　Extremely unhappy

30.

A. 您认为生活中**最**大的压力是从什么方面来的？

What do you think is the **greatest** source of stress in your life?

□ 家人　□ 事业方面　□ 身体情况　□ 恋爱/夫妻关系　□ 朋友圈　　□ 社会要求

Family　Career　　Health　　　Romantic relationships　Friendships　Societal expectations

B. 您用什么方法来缓解压力呢？How do you relieve stress?

_____

Additional comments or thoughts 最终：您还有其他想法或意见吗？

_____

_____

谢谢您的配合，若有其他的问题请联系我 (邮箱地址 wintong@uchicago).

WUHAN UNIVERSITY MEDICAL RESIDENTS' SURVEY

Chinese-language version (actually distributed)

武汉大学医学部住院医调查问卷

请注意： 本自评表不会用于个人考评使用，只为更好地了解住培学员的学习和个人状况，以更有针对性地进行教学改进，请如实填写。

一， 基本信息 *Basic Demographic Information*

1. 年龄：_____　　　　　　　　　2. 性别：□男　　　□女

3. 婚姻状况：□单身　　　□未婚　　　□ 已婚　　　□离异　　　□丧偶

4. 进入住培年份：_____ 年

5. 身份类型 (请选一)：□单位人　□行业人　□四证合一

6. 入培时的最高学历：□学士　□硕士　□博士　□其他 _____

7. 进入住培前的临床工作经历（含临床实习）：_____ 年

8. 住培专业：_____ .

9. 您出生在哪个省？_____ .

10. 您 14 周岁的时候是居住在下列哪个地方？

□农村 (村里，县里，乡里)

　　　　　　□县城，县级市

　　　　　　□三或四线城市

　　　　　　□二线城市

　　　　　　□一线城市

　　　　　　□中国大陆外

11. 您的正式长期户口，是在本居委会吗？

　　　　　　□在本居委会　　□在本市的其他居委会　　□在本省的其他地方　　□在外省

二，个人看法 *Thoughts and Opinions*

12. 高中毕业后，您是否自己选择学医？

　　（1）□是　　　□不是　　□其他　　（只选一）

　　（2）为什么？ _____

13. 你为什么会选择现在的住培专业？（请填所有适合选项）

　　　　　　□导师推荐

　　　　　　□被调过来的

　　　　　　□认识部门里负责人/对部门熟悉

　　　　　　□对这方面感兴趣

　　　　　　□其他原因 _____

14. 您目前准备继续住院医师培训吗？

（1）□是　　□不是　　□其他（只选一）

（2）若回答:是➔ 您认为什么促使您继续培训？ _____

（3）若回答:不是/其他 ➔为什么？ _____

15. 培训结束之后您准备继续后续的专科培训吗？

（1）□准备　　　　　　□不准备

（2）若回答:准备➔您准备选择哪个专科？为什么？ _____

（3）若回答:不准备➔您接下来有什么打算？ _____

16. 您会为了拥有更多个人时间而改变事业选择吗？

□ 会　　　□ 不会　　□ 不知道（只选一）

17. 有人说：女性主要以家庭为主，而男人主要以事业为主。您同意这种说法吗？

　　□ 完全同意　　□ 比较同意　　□ 不确定　　□ 不太同意　　□ 完全不同意

18. 您的培训项目里认识几位熟人能在需要时提供您专业或个人上的帮助和支持？

　　A. 来前就认识: ＿＿＿ (数字)

　　B. 来后认识的: ＿＿＿ (数字)

19. 在过去的 12 个月之内，您平均多长时间参加一次社交活动 （不包括家庭聚会）？

□ 每周两三次或更多　　□ 每周一次　□ 每月两三次　□ 每月一次或少　□ 基本不参加

20. 您认为是什么原因促使你成为一名医生？（请选择所有相关回答）

　　　　□ 社会地位较高

　　　　□ 受亲戚和朋友的尊敬

　　　　□ 受患者尊敬和信赖

　　　　□ 高收入

　　　　□ 提高个人发展

　　　　□ 对社区为基础的医疗保健感兴趣

　　　　□ 其他原因 ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

21. 您如何看待中国的医患信任关系?

　　　　□ 很好　　　□ 比较好　　　□ 一般　　　□ 亟待改善　　　□ 很差　　　□ 不知道

22. 您认为什么方面的改进**最**有助于改善医患关系?

　　　　□ 卫生政策

　　　　□ 医院管理

　　　　□ 民众教育

　　　　□ 医学生培养方案

　　　　□ 其他方面: ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

23. 您了解国家 2015-2020 年 住院医师规范化培训的政策吗？

　　　　A. □ 了解　　　　　□ 不了解　　　　□ 没有听说过　(只选一)

　　　　B. 若回答: 了解➔ 您对这个规范化培训政策有什么看法呢？

24. 您认为培养方案什么方面最需要改善／进步？

_____

三， 个人健康 Personal Health

25. 总的来讲，您觉得自己健康状态怎么样？

　　　□非常好　　　□比较好　　　□一般，还可以　　　□不太好　　　□很不好

26. 最近 3 个月以来，您睡眠好不好？

　　　□经常睡得很好　　　□有时还好　　　□一直睡得不好

27. 最近 3 个月以来，您是不是曾经感到情绪低落，心情沉闷？

　　　□每几天　　□每周　　　□每个月　　□有几次感到这样　　□从未感到这样

28. 最近 3 个月以来，您是否比较容易生气或 焦虑？

　　　□每几天　　□每周　　　□每个月　　□有几次感到这样　　□从未感到这样

29.总的来说，最近 12 个月以来，您觉得自己生活的愉快吗？

　　　□非常愉快　　　□比较愉快　　　□一般　　　□不太愉快　　　□非常不愉快

30.

A. 您认为生活中**最**大的压力是从什么方面来的？

　　　□家人　□事业方面　□身体情况　□恋爱/夫妻关系　□朋友圈　□社会要求

B. 您用什么方法来缓解压力呢？ _____

最终：您还有其他想法或意见吗 （比如，武大住培教育，住培医生的个人健康，或现代中国的医疗系统上的问题）？ _____

谢谢您的配合，若有其他的问题请联系我 (邮箱地址 wintong@uchicago.edu).

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