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# Career Trajectories, Gender Differences and Accumulated Health Disparities over the Life Course

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Using longitudinal data from Panel Study of Income and Dynamic (PSID) and multivariate analyses, this dissertation examines the dynamic and longitudinal relationship between gender, occupational career and health among people of working age under the new economy. The major concern is whether there are gender differences in the health returns to occupation/employment resources across life course, whether the gendered health gap diverges with age, and whether health affect men' and women's employment transitions and occupational mobility differently.

Results show that women experience significantly poorer health than men, but this health gap reduces with aging. The health disadvantages experienced by women are entirely explained by SES status. Working becomes increasingly important to maintain health as people age. However, women receive far fewer health rewards from employment than men, and this unequal health returns to employment are compounded with age. The health benefit from a higher occupational status is similar for men and women across the life course. More importantly, all else being equal, health of women declines at a rate half that of men, showing a reversed gender health gap toward old age.

Regarding health selection, results show that health is not a predictor of occupational status for either men or women, but is an important predictor for employment status and downward mobility of both genders.

From a theoretical standpoint, this research illustrates the limitation of using one dominate life course theory, and calls for a more prominent theory that examine both biological and social processes that contribute to the life course gender health inequality. Methodologically, results suggest the superiority of combining longitudinal designs with hierarchical longitudinal models, which are able entangle the within-person health change and between-person effects of time. From a policy standpoint, the study suggests that family-friendly policies should be able to improve both women's employment and, by extension, their health status.

# DEDICATION

To the memory of my father Zheng, Anjun, who distilled the value of education into my heart, although he only finished junior high school.

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# CHAPTER I

# INTRODUCTION

Health, occupation and gender are three vital dimensions of life in American society. Health care has long been among the most controversial institutions in the United States. Occupation, on the other hand, provides an "organizational blueprint" to adult life, and channels resources such as power, status, income, and social security (Moen and Chermack 2005). Occupational classes are a large component of the social fabric that creates social stratification and social inequality, including health inequality in the United States (Warren et al. 2002). Higher occupational status is usually associated with better health, even in countries with universal access to health care (Macintyre 1997; Smith et al. 1990). Individual health status has a moderating effect on later life occupation as well, but the dynamic relationship between occupational class and health varies by gender. Gender, as a social institution, prescribes social roles and occupational behaviors, and in turn affects individual health.

In the past four decades, the population's health status and country's occupational structure have undergone substantive changes in the United States, but the effects of such social changes have been unequally distributed among men and women. For example, self-rated health has improved over time for Americans, whereas men have experienced little to no corresponding improvement in the same period (Cummings and Braboy Jackson 2008). Furthermore, women have made huge progress in education and

employment in the past few decades. Some of the most rapid increases in labor force participation have occurred among married mothers with young children. Meanwhile, entry-level jobs have been moving to developing countries since the 1960s, while high-technology career jobs and service sectors have taken away traditional jobs (Massey 1996). This global information economy presents uncertainty and insecurity for both men and women, but women of all ages are more likely to face job insecurity and instability than their male counterparts, and only middle-aged men win under this new information economy (Blossfeld and Hofmeister 2007; Buchholz et al. 2009). The health consequences of such social changes may be reflected in gender- and class-based health inequalities research.

Health status and occupational trajectories have been two major subfields in life course research. Scholars have made notable efforts on understanding how and why health disparities change over time (Lynch 2003; Shuey and Willson 2008; Willson et al. 2007); while others have observed the trends of working lives through life course (Blossfeld and Hofmeister 2007; Buchholz et al. 2009; Grunow 2006). However, few empirical studies examine the dynamic and longitudinal relationship between these two life course domains simultaneously. Building on established theoretical frameworks and previous research, this dissertation joins together the two broad research fields of life course health disparity and life course occupational trajectory. Moreover, a gender perspective is added to see how gender, which conditions both individual health outcomes and occupational trajectories, interacts with occupational status and therefore affects adult health over time.

Women live longer than men in all developed countries, but they usually report poor health. This "gender health paradox" is often explained by gender differences in the underlying distributions of diseases (Case and Paxson 2005; Crimmins et al. 2002; Gorman and Read 2007). Social causation is the main explanation for the differences in men's and women's health. American women remain economically and socially disadvantaged despite advances in recent decades, placing greater limits on women's access to health-related resources (Phelan et al. 2004; Rose and Hartmann 2004; Ross and Bird 1994). Since women are more likely to work with little personal control and low job security, they also tend to report higher levels of chronic stress and more stressful life events than men (Bebbington 1996; McDonough and Walters 2001; Ross and Mirowsky 2006). More recently—over the last 30 years—women have experienced huge gains in education and employment in the United States, so some researchers predict that gender differences in self-rated health might soon reverse (Schnittker, 2007).

Beyond gender-based health disparities, there is also a well-established relationship between socioeconomic status and health, called the SES-health gradient. Morbidity and mortality are overrepresented in the lower social strata, indicating that better physical and mental health and higher social status generally go together (Bruce and Barbara Snell 2001; Dohrenwend et al. 1992; Holzer et al. 1986b). Socioeconomic status, typically measured by income, education, or occupation, is associated with a wide range of health and illness outcomes, including health and illness behaviors (Lantz et al. 2001; Marmot et al. 1997; Mechanic and Volkart 1961; Roller and Gowan 2010) and health problems, such as low birth weight, cardiovascular disease, and cancer (Blakely et al. 2011; Kreatsoulas and Anand 2010; Myint et al. 2006; Pattenden et al. 1999;

Viswanath and Ackerson 2011). Link and Phelan (1995, 2000, 2004) even call socioeconomic status a "fundamental cause" of health disparities.

Besides social causation, health selection effects also contribute to social class disparities in health. That is, an individual's health status is one of the factors affecting his or her opportunities of social mobility. Recent studies have found that health selection has some moderated effects on individual social mobility (Lundberg 1991a; Manor et al. 2003; Palloni et al. 2009; Power et al. 1998), though it cannot be regarded as a major explanation for inequalities in health, and, furthermore, health selection constrains the differences between classes to some extent (Bartley and Plewis 1997; Blane et al. 1999).

One's occupation has long been used as an indicator of socioeconomic status (SES) for people in the labor market and has been found to have direct and indirect effects on health. The type of occupation someone holds exposes them to the psychosocial and physical dimensions of work arrangements, and provides a range of expected earnings and social network in the form of relative prestige (Krieger et al. 1997; Smith et al. 1998a). Indicators of occupational class are widely used in European countries and have been found to be strong predictors of variations of health outcomes, including both mortality and morbidity, especially among the employed population (Krieger et al. 1997; Marmot et al. 1995; Marmot et al. 1997; Marmot 2003; Morikawa et al. 2004; Sekine et al. 2006). Employment status is an important component in the study of occupation related health inequality. As Arber argued "Researchers using occupation-based measures of class need to decide how to incorporate non-employment and part-time employment in their analyses" (Arber, 1993 p774).

Although wildly embraced in European countries, occupation has long been viewed as problematic and excluded as an effective predictor of health in most U.S. research designs (Robert and House 2000; Sindelar et al. 2007; Willson et al. 2007). Studies in the United States have relied heavily on education and income as predictors of health so as to limit the effect of health selection. As mentioned above, social causation and health selection often co-exist. And more important for this study, the health rewards from educational attainment may differ between men and women. Categorizing population by education does not adequately control for all socioeconomic variations regarding health discrepancies between social groups (Matthews et al. 1999).

Despite advances in recent decades, women remain disadvantaged both socially and economically in American society relative to men. Even though levels of occupational education are the same for men and women, men tend to work in occupations in which people earn higher wages on average, reflecting gendered occupational segregation (Warren et al. 2002). Gendered occupational segregation continues in the new economic structure of the labor market. Women are overrepresented in occupations of care and personal service. Such female-dominated occupations have long been labeled as "boundarylessness," with women selecting (or being limited into) those occupational niches with some degree of time-control (Adams 2010; Blau et al. 2008; Le Feuvre 2009; Le Feuvre 2010).

Although women have improved their educational attainment and labor force participation, historical gender norms remain part of the cultural backdrop and prescribe behaviors and life opportunities for both men and women (Moen and Chermack 2005). As such, unequal domestic arrangements and childcare responsibilities between men and

women have been persistent even in current society when women have the same work load and occupational expectations. Work-family strain tends to make it much harder for women than for men to meet the employer's recruitment and performance criteria, even in countries that have adopted equal opportunity policies (Le Feuvre 2009; Le Feuvre 2010; McNabb and Wass 2006). The dynamic relationship between work and family causes "de-standardization trends" between women and men (Widmer and Ritschard 2009, p28), featuring that life stages and transitions occurring at increasingly dispersed chronological ages among women than among men. Uncertainty has become persistent in women's career trajectories, while it is only temporary in men's career paths (Blossfeld and Hofmeister 2007).

These varying occupational experiences result in different social class gradients in health between women and men, but the evidence is mixed. Class differences are larger among men than women when social class is measured according to individual occupational status (Elo and Preston 1996; Koskinen and Martelin 1994; Sacker et al. 2000a). Using education or household-head status as the social class indicator, there were no obvious differences between the health outcomes of men and women (Erikson 2006; McDonough et al. 1999). When using individual occupational status as a measure of SES, the gender differences of SES gradient health inequality are inconsistent across age and health measures (Matthews et al. 1999). Moreover, the health rewards women received from occupation are more complex than that of men (Schnittker 2007; Waldron et al. 1998; Walters et al. 2002). On the one hand, employment is a good source of health and well-being for women. On the other hand, it creates additional strains and overloads, given women's traditional roles of family responsibilities. This reality explains why

women report more job strain and worse health outcomes even while holding the same occupational status as men (Bosma et al. 1998; Griffin et al. 2002).

From a life course perspective, changes in SES and health and the relationship between the two should be examined over an individual's life time. For the current area of study, this means that the gender-health-SES relationships is dynamic over time at individual, family, and societal levels, and across age groups, cohorts, and time periods (Lynch 2008; Mayer 2009).

A number of life course scholars (e.g., Kohli, 1986; Mayer, 1986; Moen, 1998, 2003; Riley and Riley, 1994) argue that an occupation provides the "organizational blueprint" for a person's life course and contributes to gender inequalities by channeling resources such as power, status, and income that men and women accrue (Moen and Chermack 2005). The order of the traditional education-career-family trajectory has been interrupted by the process of globalization. Research on this theme has found evidence for decreasing stability and increasing insecurity, especially for women of all age groups (Grunow 2006; Hofmeister 2006). Women's lifetime dual participation in paid (employment) and unpaid (family) domains limits their opportunities of occupational mobility and constrains them to the lower- income margin of the aged population (Le Feuvre 2009; O'Rand 1996). For already disadvantaged women, globalization has made the situation even worse (Hofmeister 2006).

Among life course studies, the processes associated with cumulative advantage and disadvantage have been systematically developed to explain disparity trajectories. Both assume magnified trajectories over time. An individual or a group, disadvantaged early in life in the areas of education or health, has great difficulty catching up (DiPrete

and Eirich 2006). In the case of health, cumulative advantage suggests a process whereby the relationship between SES and health initiated in early life becomes magnified over time, with advantaged individuals and groups retaining a permanent and increasing health advantage relative to others who lack these advantages as they age (Willson et al. 2007). Several longitudinal studies support—at least partially—this hypothesis and find more detrimental health developments in later middle age in the lower social strata (Ferraro and Kelley-Moore 2003; Lynch 2003; Ross and Wu 1996; Willson et al. 2007).

Such studies partially determine whether health advantages or disadvantages increase over the life course. Yet most of the research uses the path-dependent modeling and little empirical attention has been given to whether cumulative advantage processes operate the same across groups as people age (George 2005). In the case of gender differences in life-course health, most studies emphasize the relationship of gender and SES control for age rather than integrate age dynamically into an analytic model.

In sum, men's and women's health is shaped by their social lives in a gender-stratified society with associated gender expectations. There are significant gender gaps in health, but men and women are also two heterogeneous groups. Occupational status and other social factors interact with gender across the life course to produce variations in both gender disparity and its health outcomes.

This research aims to reveal the dynamic and longitudinal effects of occupational trajectory on health disparity and how gender conditions these effects. The study is important for several reasons. First, little empirical attention has been given to the dynamic relationship between occupational trajectory and health trajectory across life course. Second, most studies linking occupation and occupational mobility with health

status use data from European countries; few studies explore these links in the United States. Third, even fewer previous studies explore gender differences, for which both the patterns of occupational experiences and health trajectory vary, with women being in disadvantaged status in both occupational experiences and health trajectories. Additionally, little empirical research has been done on whether cumulative advantage processes operate the same across genders as people age, integrating age as dynamic in research models. Finally, the lifelong co-existent root causes of health disparities—social causation and health selection—require further clarification.

This study has four major objectives: 1) to provide a general profile of the link between occupational status and individual health status for men and women; 2) to detect the pertinence of life course stratification on health via occupational status and occupational mobility for both men and women; 3) to examine whether cumulative advantage processes operate the same for men and women over time; and 4) to determine the effect of health status on social mobility for both men and women.

Accomplishing these objectives will (1) add to the knowledge of the general conditions and differences of health disparity cross occupation class among American men and women, (2) clarify whether the process of cumulative advantage works the same or different for men and women, (3) reveal the interaction between SES and gender on cumulated health disparity, and (4) clarify the role of reverse causality (i.e., health selection) on occupational mobility for both genders. This work will also contribute to the health disparities literature by synthesizing two broad research literatures on life course career trajectory and life course health stratification.

Data for this study are drawn from the 1989-2005 wave of Panel Study of Income Dynamics (PSID). The PSID is a representative, longitudinal study of individuals and their families in the United States, and emphasizes the dynamic relationship of household economic and demographic aspects. The PSID contains a wide range of information, including occupation, education, income and health. Five observation points were selected (1989, 1994, 1999, 2001 and 2005) based on when variables of self-rated health and detailed occupations were available. In each wave, data include both individuals who were household heads and spouses or partners (if married or cohabited).

The dependent variables in this study are all time-varying measures. In social causation models, the dependent variable is self-reported health (SRH), ranging from poor to excellent. The independent variables of interest are time-varying measures of career from two aspects: employment status and occupational status score. In health selection models, the dependent variables are employment status, occupation status score and occupational mobility, while independent variable is self-reported health that is measured one wave earlier.

Three research methods are used to explore how gender conditions the process of cumulative advantage on life course disparity through occupational trajectory. First, descriptive analysis explores the overall trend of health and occupational trajectory of the analysis samples from 1989 to 2005. A mobility table and logistic regression are then used to examine the general patterns of occupational mobility and health change during the five waves of survey. Finally, multivariate analyses, including growth curve models, general logistic random-intercept analysis and general linear and latent mixture models, are used to estimate both the social causation and health selection models.

# CHAPTER II

# REVIEW OF THE LITERATURE

## Gender Differences in Health

Health status varies by gender. In general, women live longer than men in every developed country, but they usually report poorer health. Verbrugge and Wingard(1987) describe these gendered patterns of physical health as the "iceberg of morbidity" whereby men's relatively higher mortality comprises the small, top part of the iceberg above water and women's substantial higher rates of chronic, nonfatal disease make the huge, bottom part under the water. Furthermore, women experience higher rates of depressive disorders, although the overall mental health disorder rates are similar for men and women (Kessler et al. 1995; Ross and Mirowsky 2006).

The three leading causes of death for men are heart disease, cancer, and stroke, whereas for women the three leading causes are heart disease, cancer, and injuries (National Center For Health Statistics 2011). Moreover, causes of death also differ considerably by gender and age. Chronic diseases such as cardiovascular disease, lung cancer, and injuries are more likely to be main killers of men at their earlier ages (National Center For Health Statistics 2011, Gorman and Read 2007). However, more women have died of cardiovascular disease (CVD) than men since 1984, particularly after the age of 75 (Jackson 2005).

American women have reported longer life expectancy than men since the early twentieth century. However, after 1980, the gender gap in life expectancy has been reduced as men gain more years, and women gain fewer. In 2007, the U.S. disparity in life expectancy for males compared with females was the smallest ever recorded (National Center For Health Statistics 2008). The U.S. life expectancy pattern is among the worldwide trend of narrowing sex differentials in life expectancies in Western countries (Glei and Horiuchi 2007). Furthermore, men tend to have a relatively longer healthy life expectancy than women, meaning that women live more years in functional disability than men (Crimmins and Saito 2001; Mathers et al. 2001).

Previous studies have consistently shown that gender disparities in physical functioning exist. For instance, Franks and colleagues (2003) have observed that women are more likely to lose physical functioning than men. Using data from the 1997-2001 National Health Interview Survey (NHIS), Gorman and Read (2006) find that gender gaps in functional limitations increase over time, even when controlling for socioeconomic and lifestyle factors. Using the 1992-1994 British General Household Survey (GHS), Arber and Cooper (1999) observed similar patterns regarding gender gaps in physical functioning after socio-demographic factors are controlled.

Moreover, with aging, the development of psychological distress, such as depressive symptoms, is more likely to occur for women than for men (Ferraro and Nuriddin 2006). A study by Dunlop and colleagues(2003) confirms this finding, showing that the odds of being depressed are notably greater among women than among men, even after controlling for socio-demographic and economic status, health conditions, and health behaviors. Even for the health provider group, such as physicians, women

physician are more likely than men physicians to experience stress and burn out (Cossman and Street 2009) The psychological distress of women may lead to further disadvantages through unhealthy coping behaviors, such as eating disorders and smoking, and psycho-immunological responses, leading to psychosomatic illness (Kroenke and Spitzer 1998). Also, women with high levels of chronic distress are more susceptible to cancer mortality than their male counterparts. This is because high levels of distress may interrupt the ability of the immune system to prevent the establishment and spread of neoplasm(Ferraro and Nuriddin 2006; Whooley and Browner 1998).

In contrast to the gender disparities in physical functioning and depression, the findings on gender differences in self-rated health are mixed. For instance, some find that women are more likely to report worse health than men in youth and middle-age (Gorman and Read 2006; Matthews et al. 1999). However, the gap in self-rated health between men and women tends to close over time (Gorman and Read 2006). In the analysis of data from the British General Household Survey (GHS), Arber and Cooper (1991)also find that gender disparities in self-rated health are interwoven with socioeconomic status. After controlling for socioeconomic factors such as income, occupation, and home ownership, there are minimal gender difference in self-rated health while the gender gap in disability remains substantial. Arber and Cooper label this disconnect a "new paradox" (p.61). Using data from the Canadian National Population Health Survey (NPHS), researchers find gender disparities in self-rated health are not statistically significant when social determinants such as age, SES, social support, lifestyles, and psycho-social factors are controlled (Denton et al. 2004; McDonough and

Walters 2001; Walters et al. 2002) and find that gender-based disparities in overall health are highly associated with the different social positions between men and women.

The paradox of women's higher morbidity and lower mortality compared to men is often explained by gender differences in the underlying distributions of disease in research on gender differences in health (Case and Paxson 2005; Crimmins et al. 2002; Gorman and Read 2007). As Verbrugge and Wingard(1987, p137) state, "Men and women essentially suffer the same types of problems; what distinguishes the sexes is the frequency of those problems and the pace of death." For example, heart disease is the leading cause of death for both sexes, but at different ages, but it becomes the leading cause of death for men at 39 and for women at 66. Men and women are equally likely to report poor health when they have the same conditions, but women experience more non-fatal chronic conditions (e.g., migraine headache, arthritis, and anemia), while men experience more fatal chronic health problems, such as more severe and untreatable forms of cancer (Groman and Read 2007, Verbrugge 1982). Moreover, at younger ages men have a much higher level of accidental injuries and homicide, associated with higher rates of smoking, heavy drinking, and illegal drug use (Verbrugge and Wingard 1987; Cockerham 2007, p.47).

Social causation is the main explanation for contemporary differences in men's and women's health. Despite advances in recent decades, women remain economically and socially disadvantaged. As a result, women have less access to health-related resources than their male counterparts (Phelan et al. 2004; Rose and Hartmann 2004; Ross and Bird 1994). In addition, social resources also have a large indirect impact on health through psychosocial characteristics (Denton et al. 2004; Kessler and Zhao 1999;

McDonough and Walters 2001). As women are more likely to work with little personal control and low job security, they tend to report higher levels of chronic stress and more stressful life events than men, and they consistently report higher levels of depressive disorder, especially during the reproductive years (Bebbington 1996; McDonough and Walters 2001; Ross and Mirowsky 2006).

Despite these disadvantages, women have experienced huge gains in education and employment over the last 50 years. From the 1960s to the 1980s, great numbers of women attended college and the rates of employed women grew continuously at all education levels. Conversely, fertility rates decreased and the proportion of adult life spent parenting declined as well (King 1999). In addition to shifting educational gains, some of the most rapid increases of women's labor force participation have occurred among married mothers with young children. The health benefit coming from education and working surpassed the effect of work-family stress. Schnittker (2007) found that from the 1960s to the 1980s, women experienced steady health improvement in each age group, nearly entirely explained by educational attainment. The gender gap of self-rated health also has been reduced, mainly due to trends in employment (Read and Gorman 2010). Scholars have argued that if women had the same level of labor force participation, income, subjective work rewards, and stress as men, their health would be equal to that of men's (Ross and Bird 1994). Some even predict that gender differences in self-rated health might soon reverse since trends are leading women toward education and employment paths that look like historically male patterns (Schnittker 2007).

## Socioeconomic Status and Health Disparity

For this study there are three important considerations to a time-varying analysis of the gender-occupation-health relationships as they pertain to the SES-health gradient: (1) social causation of the SES-health gradient, (2) health selection and time-varying health status and (3) the importance of occupation—rather than education or income—in understanding the SES-health gradient.

In addition to the health inequality linked with gender, there is a well-established relationship between socioeconomic status and health, called the SES-health gradient. Morbidity and mortality are overrepresented in the lower social strata; better physical and mental health and higher social status generally go together (Dohrenwend et al. 1992; Holzer et al. 1986a; Kessler et al. 1995). Socioeconomic status, typically measured by income, education, or occupation, is associated with a wide range of health and illness outcomes, including health and illness behaviors (Lantz et al. 2001; Marmot et al. 1997; Mechanic and Volkart 1961; Roller and Gowan 2010) , and health problems; such as low birth weight, cardiovascular disease, and cancer (Blakely et al. 2011; Kreatsoulas and Anand 2010; Myint et al. 2006; Pattenden et al. 1999; Viswanath and Ackerson 2011). Lower socioeconomic status is associated with lower life expectancy and higher morbidity/mortality, and the greatest disparities come about at middle age (ages 45-65).

Additionally, socioeconomic disparities in health vary over the adult life course. Previous research has shown that SES-health gradient is small in early adulthood and grows increasingly larger through middle and early old age (House et al. 2005). In later old age, the findings are mixed: some studies find compression of morbidity into last years of life among higher SES level (Crimmins and Saito 2001; House et al. 2005),

while others find no convergence over time in old age groups, or even greater SES gradient health gap among the old-old (Mirowsky and Ross 2008; Pampel and Rogers 2004), likely because people with low socioeconomic status have disproportionately high rates of sample attrition and mortality (Willson et al. 2007).

Health literature thus illustrates the persistence of the association between SES and mortality and morbidity, across space, cohort, and historical time. Link and Phelan (1995) thus call the socioeconomic position a fundamental cause of heath disparity. This perspective asks researchers to be attentive to a variety of health outcomes whose "distribution is shaped by access to knowledge, money, power, prestige, and social connections as well as stress caused by hierarchy" (Link and Phelan 2000, p434). They argue that despite universal health care in welfare countries, socioeconomic status continues to affect health because health-related resources are more readily available to people with a higher socioeconomic status and thus help them to promote health and avoid health risks. Therefore the socioeconomic position itself has been a “fundamental cause” of health and continues to affect health over time as well as at any one time.

Besides social causation, health selection has long been viewed as another important process that contributes to social class disparity in health. The notion is simple. An individual’s health status is one of the factors affecting his or her opportunities of social mobility (Blane et al. 1993). Individuals in poor health are more likely to move down the social ladder while those with good health are much more likely to move up. This health-related social mobility is viewed by some as a mechanism of causing social mobility and health disparity.

Although health selection theory cannot be regarded as a major explanation for inequalities in health (Holland et al. 2000; McDonough and Amick 2001), to some extent health selection constrains the differences between classes (Bartley and Plewis 1997; Blane et al. 1999), and it still has some moderated effects on individual social mobility (Lundberg 1991b; Manor et al. 2003; Palloni et al. 2009; Power and Matthews 1997) which is consistent with conventional wisdom. Some other studies find that mobility between occupational classes among the employed is not selective for health (Elstad and Krokstad 2003; Power and Matthews 1997), while others find that transitions into and out of employment were strongly health-selective (Elstad and Krokstad 2003).

A third issue that is important in understanding the SES-health gradient, particularly as it pertains to the gendered nature of the SES-health gradient is the importance of using a measure of occupation for SES indicators. Occupation is an important indicator of one's socioeconomic status in social stratification study (Blau and Duncan 1967). An occupation is "an abstract category used to group and classify similar jobs," which involves similarities in typical activities, working sites, job tenure forms, job requirements of knowledge and skills, or products or services resulting from the job (Hauser and Warren 1997, p177-178). As participation in the labor market has become nearly universal for both men and women, employment has become one of the most important social roles for most adults outside their families. Furthermore, employment predicts current and future economic situations so that it has become possible to classify individuals regarding their own current or past jobs.

In health literature, occupation has long been used as an SES indicator for people in the labor market with both direct and indirect effect on health. Working is beneficial

for health and well-being of both men and women. Occupation exposes individuals to the psychosocial and physical domains of work arrangements and provides a range of expected earnings and social network in the form of relative prestige (Krieger et al. 1997; Smith et al. 1998a). Also, people in different occupations may face different hazards from work(Borg and Kristensen 2000).

Indicators of occupational social class are widely used in European countries and have been found to be strong predictors of variations of health outcomes, including both mortality and morbidity, especially among the employed population (Krieger et al. 1997; Marmot et al. 1995; Marmot et al. 1997; Marmot 2003; Morikawa et al. 2004; Sekine et al. 2006). As Whitehead has stated (1990), The less-favored occupational classes have much higher death rates than the favored ones; they also "experience higher rates of chronic sickness and their children tend to have lower birth-weights, shorter stature and other indicators suggesting poorer health status" (p 352).

Studies in Europe have shown that occupational social class is a better predictor of SES-related health differentials than is education in mortality and risk behaviors (Smith et al. 1998b). Data from the United States also provide evidences of SES-gradient disparities in health status and mortality by occupational groups (Collins 1991, Hardings 1995, Krieger 1997, Duncan et al 2006). Recent longitudinal studies in Europe also show the effect of occupation on health disparity over the life course (e.g. Hemingway et al. 1997, Power et al. 1998; Power et al.1999, Elstad and Krostad 2003, Elstad 2003).

Some argue that using occupation as an SES indicator is inappropriate for subgroups such as teenage mothers and others with little labor market experience (see Krieger1997 and Smith 2006 for details). Unlike education, occupation is problematic

because individuals who are in the latter part of their career are subject to the health selection effect since poor health may lead to declines in occupational status (Elstad and Krostad 2003; Power et al. 1998). Thus most U.S. studies exclude occupation, relying heavily on education and income as predictors of health (Robert and House 2000; Sindelar et al. 2007; Willson et al. 2007).

Nevertheless, some studies show that research on the link between occupation and health can include unemployed groups in the analytic model and find that the unemployed report worst health status and experience even more negative health changes than those in the labor market (Elstad and Krokstad 2003). Interestingly, class mobility (or lack thereof) may also influence health because mobile people feel estranged from a norm of enduring class identity (Krieger et al. 1997; Ryan and Sackrey 1995). Occupation-based studies are largely excluded from the research that only considers education and income as measurement of social-economic status. Furthermore, social causation and health selection often co-exist (Elstad 2004; Power and Matthews 1997), which means a reversible cause-effect relation between health and SES status. Yet the process of health selection is deliberately excluded from the studies using education as the measurement of SES (e.g. see Willson et al 2007, Kim and Durden 2007, Elo and Preston 1996), since education very frequently is only an early life process.

Of more importance to this study, the health rewards from educational attainment differ from group to group, and vary from cohort to cohort. Previous studies have found that Blacks receive less health benefits from education than Whites do; the health inequalities between Blacks and Whites are greater at higher levels of education than at lower levels(Crimmins and Saito 2001; Farmer and Ferraro 2005; Shuey and Willson

2008). The disparate returns on health that Blacks receive from education interact with age, resulting in the health of Blacks declining at a faster rate compared to that of Whites (Shuey and Willson 2008).

Similarly, a number of studies have documented smaller SES-morbidity and mortality gradients for women than for men by levels of education (Crimmins and Saito 2001; Elo et al. 2006; Elo and Preston 1996) , whereas others have found the associations to be similar (Duncan et al. 2002; McDonough et al. 1999). The gender differences of SES gradient health inequality are inconsistent across age and health measures (Matthews et al. 1999) to the extent that categorizing population by education does not adequately control for all socioeconomic variations (Crimmins and Saito 2001), and other factors contribute to the discrepancies between social groups(Matthews et al. 1999).

Recently, researchers in the United States have begun to take occupation as a major predictor of health status. Sindelar  and colleagues (2007) proposed viewing occupation as a determinant of health. In a study comparing the effect of occupation, education, and income on mortality with the longitudinal data PSID, Duncan and colleagues(2002) found that occupation is as strongly associated with mortality as education and income, if not stronger. Warren and colleagues (2008) advocate working conditions as a mediating factor between SES and health outcomes. Occupation has different effects on health across social groups(Gueorguieva et al. 2009; Sindelar et al. 2007)—not just social class groups, but also across genders.

## Gender Disparity in Occupation

Sociological theory frames gender as a social construction of social norms, values, and sanctions that define male and female behavior, roles, and life chances and in

turn affect health (Rieker and Bird 2005). Gender is also viewed as a social institution rooted in social conflict over limited resources and power (Martin 2004). Studies of gender have elucidated the ways in which social structure impinges into individual lives of both male and female, shaping their resources and restrictions (Doyal 2000). Men and women make career and family choices in face of unequal resources and expectations, which reproduce gender roles and gendered behavior. Under current circumstances, men and women are unequal in their opportunities regarding occupation and social behaviors that cumulatively affect their well-being. There are two large components to the relationship between gender and occupation that are relevant here: gendered occupational segregation and gender role expectations that result in work-life balance conflicts.

Despite advances in recent decades, women remain socially and economically underprivileged in American society relative to men, as in other developed countries. Women occupy fewer positions at the top levels in most occupations, especially prestigious ones, and are less likely to be key leaders in governments, whether local, state, or federal (Milgrom and Petersen 2004). Their average earnings and security are less than that of men in the labor market, even for the same jobs. They are also more likely to work part-time and engage in entry-level occupations or domestic positions (Smith 1999, Arber 1997). For example, using 15-year longitudinal study from the Panel Study of Income Dynamics (PSID), Rose and Hartmen (2004) showed that, from 1983 to 1998, women earned only 38 percent of what men earned. And even among adults who were strongly attached to the labor market, less than 10 percent of women earned more than $50,000 per year, compared with nearly 45 percent of men. Because of this consistent earning gap, Rose and Hartmen said it is "still a man’s labor market" (p. 1).

This observation echoes what Haug (1977) observed three decades ago: occupation is still constructed from classification schemes that employ prestige, education, or income shaped by male occupational characteristics in the labor force.

Even from the beginning of their careers, men typically find jobs in occupations that pay better than the occupations in which women typically work. Studies show that even when levels of occupational education are the same for men and women, men tend to work in occupations in which people earn higher wages on average (Warren et al. 2002). This gap largely reflects the gendered occupational segregation(Petersen and Morgan 1995). Gender is a major factor for occupational earnings and not just at career entry. According to Loprest (1992), the female-to- male ratio of income for young, full-time workers declines over time, leading to further economic gendered inequality.

A new form of gender occupation segregation emerges in the global economic structure of the labor market. The proportion of the labor market employed in the tertiary sector (care and personal service occupations) has increased steadily (Hanappi and Bernardi 2010). These new service jobs were previously carried out by women at home on a non-professional basis. Now these activities are outsourced to reduce welfare state spending on care for dependant social groups, such as young children, the elderly, and the handicapped (see Hanppi and Bernardi 2010 for details). Occupations of care and personal service are not traditional employment, but can be compared with various forms of self-employment, high rates of part-time work, and sub-contracting. Compared to male occupational patterns, the female occupational pattern has long been labeled as "boundarylessness" with women selecting (or being limited into) those occupational

niches with some degree of time-control (Adams 2010; Blau et al. 2008; Le Feuvre 2009; Le Feuvre 2010).

While women improve their educational attainment and labor force participation, cultural schemas and social role expectations should change accordingly. The historical gender norm is associated with two mystiques: the feminine mystique and the career mystique (Moen and Chermack 2005). The feminine mystique assumes that the roles and responsibilities of being wives and mothers are keys to women's fulfillment. On the contrary, the career mystique assumes that the keys to men's achievement are the roles of employee and breadwinner. Thus the gender norm supports a stereotype of men working full-time and continuously, and another stereotype of women working part-time and discontinuously (Widmer and Ritschard 2009). Although both mystiques are false myths (Moen and Chermack 2005), they remain part of the cultural landscape and prescribe behaviors and life opportunities for both men and women.

With the uncertainties and insecurity produced by the competitive, new global economy (Buchholz et al. 2009), these cultural doctrines are being challenged (Moen 2003). As women increase their education and labor market participation, the timing of major family events, such as getting married or having children, no longer depends solely on men's career trajectory, but also depends on women's occupational practice and expectations (Blau et al. 2008; DiPrete and Grusky 1990; Goldin 2002; Grunow 2006; Grunow et al. 2006; Kalmijn and Luijkx 2007). However, the reconciliation of demands related to family work is still deemed to be the burden of women (Grunow et al. 2006; Hofmeister 2006).

Previous studies have found that the consistency of uneven domestic arrangement and childcare responsibilities between men and women tend to make it much harder for women than for men to meet the employer's recruitment and performance criteria and objectives, even in the countries that have adopted equal opportunity policies (Le Feuvre 2009; Le Feuvre 2010; McNabb and Wass 2006). Cultural beliefs about the tension between the motherhood and "ideal worker" roles still affect potential employers' or clients' interpretation of similar domestic situations. Having a baby may increase the career opportunities for the father while decreasing those for the mother and resulting in "motherhood penalty" (Correll et al.). These socially produced gender variations of opportunity in career structure tend to result in a gender gap in defining "professional success" and "career satisfaction" (Carr et al. 1998; Hofmans et al. 2008). These, in turn, will lead to "gender-differentiated" career trajectory at different levels through the occupational ladder (Falter 2007; Ferro-Luzzi and Silber 1998).

The dynamic relationship between work and family causes the so-called de-standardization trends between women and men. Widmer and Ritschard (2009) find that men's occupational trajectories have been fairly stable and linear throughout cohorts, keeping an ordered life course transition of education - work - retirement. However, women's occupational trajectories demonstrate great diversification, showing a de-standardized life course transition of frequent switching between work and family. This unequal life course transition makes the gender divide persist. Moreover, uncertainty has become persistent in women's career trajectories, while it is only temporary in men's career paths (Blossfeld and Hofmeister 2007).

## Gender, Occupation and Health

When examining a three-fold relationship it is important to discuss them in turn; so what are the gendered differences in occupational gradients of health and what are the occupational differences in gendered gradients of health? Both men and women in the labor market enjoy better health outcomes than those not in the labor market, and people with higher occupational status have better health than those with lower status. But how gender conditions the association remains a question. Who benefits most from employment, or a higher social status—men, women, or both equally?

Besides living longer with poor health, women experience somewhat different social class gradients in health. Occupation gradient health differences are more marked among men than among women. Sacker et al (2000b) find that occupational status was the strongest predictor of mortality in men; yet in women, gradients of occupation showed only a weak effect. Using the 1984 and 1994 PSID data, Duncan and colleagues (2002) find that individual occupational status has an inverse effect on men's, but not women's, mortality. A number of other studies in Western countries illustrated smaller SES-mortality gradients for women than for men by education and income (Elo and Preston 1996; Koskinen and Martelin 1994).

No obvious differences between the health outcomes of social class gradient of men and women are found when using education or household-head status as the social class assignment (Erikson 2006; McDonough et al. 1999). In fact, using data from the Wisconsin Longitudinal Study (WSL) and the National Surveys of Family and Household (NSFH), Marmot and colleagues (1997) find that, for all the health measures,

the health gradient is similar for women and men, whether education is used (as in the NSFH) or individual occupation (as in the WLS).

For mental health and some specific health measures, previous studies even show stronger socioeconomic-health gradients for women than for men. For example, Ross and Mirowsky (2006) test gender differences in the effect of education on depression using data from the Aging, Status, and the Sense of Control (ASOC) in 1995, 1998, and 2001. The results showed among people with some college and higher education, the patterns of depression among men and women are similar across the life course, but among people with less than a high school degree, the depression level among women is significantly higher than that of men over the life course. Using the First National Health and Nutrition Examination Survey, Thurston and colleagues (2005) even find that the link between socioeconomic status and coronary heart disease is stronger in women than in men: women with less than high school education are associated with stronger risk of coronary heart disease than men with the same education level. A higher SES status is correlated with improved psychological well-being, and more so for women than for men, whereas low SES levels were associated with greater social and psychological risks of heart disease for women than men.

Thus findings from previous studies are mixed on gender differences of socioeconomic-health gradients, whether for physical health, mental health, or mortality. Moreover, the gender differences of SES gradient health inequality are inconsistent across age and health measures (Matthews et al. 1999). Therefore some researchers suggest that categorizing population by education does not adequately explain all socioeconomic related health variation (Crimmins and Saito 2001), and different factors

contribute to the health discrepancies between social groups (Matthews et al. 1999). If education is not a preferred means to understand the SES-health gradient and how it varies by gender, why haven't researchers turned to occupation more readily?

Understanding the gendered nature of occupational health benefits is quite complex. Women working for pay fare better than those not in the labor force, but it is unclear whether work must be full-time to be beneficial (Schnittker 2007; Waldron et al. 1998; Walters et al. 2002). In spite of exposure to both job strain and more social life conflict, employed women reported better health than their non-employed counterparts (Arber and Lahelma 1993; McDonough and Walters 2001; Waldron et al. 1998). The same is true for women living with their children; mothers experience less depression and fewer long-term health problems than childless women, even though they report problems with their children and are exposed to more life strain (Schnittker 2007; Waldron et al. 1998).

The role accumulation hypothesis suggests that multiple roles associated with marriage and employment are beneficial to health because they provide additional resources and opportunities to improve an individual's life purpose and sense of control (Pavalko and Woodbury 2000; Waldron et al. 1998). However, empirical testing suggests that women's experiences are more complex than this simple dichotomy interpretation. On the one hand, employment is a good source of health and well-being for both men and women; at the same time, it creates additional strains and overloads, especially for women, given their traditional roles of family responsibilities.

Over the past 30 years, married women, especially mothers with young children, have increasingly joined the workforce. Working mothers with children under age 5

soared from 30 percent in 1970 to 65 percent in 1995 (Blau 1998: 117). These growing demands of combining work and parenting (especially for women) cause work-family conflict, leading to individual stress and frustration. Therefore, the potential health benefit from women's employment may be lessened by counter effects of the work-family conflicts. For example, Shields(1999) finds that women working long hours have a high probability of experiencing depression, and switching from standard to long hours was associated with an increase in drinking and smoking. Professional women, as women physicians and managers, tend to report higher level of stress and burn out than their male counterparts (Cossman and Street 2009; ...). Moreover, caregiving to a young child or elderly parent, which is usually the responsibility of women, not men, has a strong effect on psychological distress and a weaker effect on physical health (Pavalko and Woodbury 2000). Using 1974-2004 GSS data, Schnittker (2007) found that mothers with children under age 6 reported worse self-rated health if they work full-time. Having young children reduced the health benefit of employment for women, not for men. Roxburgh (2004) thus suggests that the gender difference in depression indicates the different time pressures men and women face in their daily lives.

An additional complication in understanding the role of occupation on gender disparities in health comes from differential levels of job strain. Although working for pay is beneficial to health, the health rewards from employment are dependent upon the type of job one has (Griffin et al. 2002). According to Karasek (1990), job strain is defined by the demand–control model: the combination of high psychological job demands and low job control. Job strain has been found to be a risk factor for health, especially for heart disease. Both women and men who have little control at work tend to

have a higher level of depression and anxiety and a higher risk of cardiovascular disease(Fremont and Bird 2000; Johnson and Hall 1988). Lack of social support at work, which happens more often in job positions lacking autonomy, appears to increase the possibility of cardiovascular mortality. At nearly all occupational levels, increasing levels of job control could reduce risks of cardiovascular disease (Bosma et al. 1998). The health benefits of employment on men have been studied extensively, but comparable work on women is sparse, despite the fact that women are much more likely to work in conditions of high job stress than their male counterparts do (Karasek 1990).

Studies of sense of control at work as related to health and gender demonstrate that even holding the same occupational status as men, women report more job strain and worse health. For example, using the White Hall II Study, Griffin and colleagues (2002)find that women in the lowest or middle employment sectors are at most risk for depression and anxiety. Men in the middle sectors with low work control are at risk for depression while those in the lowest sector are at risk for anxiety. Strain at home interacts with strain at work, with men in the middle and highest sectors, however, reporting highest risk for both depression and anxiety if they also experience high strain at home. One possible explanation for this is the variation of social support that men and women have when facing occupational stress (Bosma et al. 1998; Theorell and Karasek 1996).

In sum, the gendered nature of occupational health benefits is complex. women have enjoyed health benefit from employment as their male counterparts. However, higher levels of job strain and work-family conflict reduce the health benefit of employment for women, especially women with young children. Furthermore, the occupation-health gradients are smaller for women than for man, indicating women

receive less health rewards from occupational hierarchy than men. Gender, as an social institutional, conditions the heath rewards from Occupation for men and women, and obvious, it favors one gender—men.

**A Life Course Perspective on the Gender-Occupation-Health Disparity Relationship**

Although both gender differences in health and socioeconomic inequality in health by gender have been studied for decades, a life-course perspective in such studies is fairly recent. Life course theory provides a systematic link between individual biographic similarities within a given, shifting historical, institutional, and normative context (birth cohort membership). Within this framework, individual biographies and life course events are analyzed against the specific historical and spatial context within which they proceed(Elder et al. 2003).

The life-course perspective explicitly recognizes that changes in individual characteristics and transitions between states have happened over the scope of a lifetime (Mayer 2009). For the case of gendered occupational-gradient health inequality, changes in personal characteristics of occupation and health and transitions between health states should be examined over an entire lifetime. Moreover, the relationships between these characteristics of gender, occupation, and health exist dynamically over time at individual, family, and societal levels, and across age groups, cohorts, and time periods (Lynch 2008; Mayer 2009).

At the individual level, disparities may increase or decrease as individuals age (House et al. 2005; Shuey and Willson 2008). Similarly, between-individual differences may change over time, as measured by cohort or period time (James 2009; Lynch 2003; Shuey and Willson 2008). Under the broad rubric of life course sociology, major

advances have recently been made in two subfields: health disparities across the life course and the importance of institutional contexts on life course outcomes, mostly on trends in the stability (or instability) of working lives (Mayer 2009).

Kohli (1986) has argued that life courses in modern societies are structured around the occupational system, implying a specific occupation/career-centered mode of institutions that organize individual biographies. The occupational system and occupation careers have always been at the center of life course research and related disciplines. Echoing Kohli and others, Moen (2003, p237) has called the interplay between individual biographies and employment-relevant institutions the "life course career regime": social rules, routines, and regulations, as well as the adult life course, are all institutionalized according to occupational trajectories and transitions (of men at least).

A number of life course scholars(e.g., Kohli, 1986; Mayer, 1989; Moen , 1992, 2003; Riley and Riley, 1994) argue that occupational careers provide the "organizational blueprint" for the individual life course. As an organizational blueprint, occupation contributes to gender inequalities in channeling resources, such as power, status, and income unequally between men and women (Moen and Chermack 2005). Occupations are created from classification schemes upon which prestige, education, or income characteristics are derived from the traditional male career formula(Haug 1977). Gender-based income variations within occupations and different patterns of occupational segregation have led sociologists to ask about to what extent such occupational hierarchy is representative of women's occupational systems. Economic resources, such as salary, health insurance, unemployment insurance, and Social Security all rest on the structure of the male occupation relevant life course (Moen 2003).

For decades, there has been an ongoing concern over occupational trajectory under modernity and globalization, as the order of the traditional education-career-family has been interrupted by the process of globalization. For example, recent research focuses on the erosion of normal work biographies, that is, the instability and insecurity that an individual experiences through occupation/career across the life course (Blossfeld and Hofmeister 2007; Blossfeld et al. 2007; Mayer 2009). The findings are mixed and vary by country and gender. Some have found impressive stability of firm tenure and occupation in Western and Northern Europe for both men and women (Biemann et al. 2009; Grunow and Mayer 2007; Korpi and Tahlin 2006), whereas others find evidence for decreasing stability and increasing insecurity in European and North American countries, especially for women at all ages (Grunow 2006; Hofmeister 2006). In general, under the global economy, only men in mid-career are the winners; young women (and young men as well) are the losers, and middle aged women are marginalized under the globalization process (Buchholz et al. 2009; Kalmijn and Luijkx 2007).

Along these lines, O'Rand (1996) argues that patterns of disparity between and within cohorts emerge over time, resulting from the interaction between individual biography and social institutional arrangements. Women are excluded from those occupational and industrial sectors with the greatest retirement protections provided by pensions and related benefits because of their lifetime dual participation in the family (care giving) and employment domains. As a result, women are overwhelmingly relegated to the lower income margin of the aged population. Aged inequality is significantly affected by women's lifelong disadvantage (O'Rand and Shuey 2007).

Thus globalization has led to a worldwide trend of rising uncertainty for women's careers, and the United States is no exception. Despite women's advances in educational attainment and labor force participation, occupational inequality has increased between men and women across the life course (Buchholz et al. 2009). Hofmeister (2006) even argues that the situation of the most deprived women is getting worse because American society is failing them in systematic ways. Under the context of an increasing risk to women from globalization, it is now more important than ever to examine the gender differences of occupation related health disparity.

Early research in social mobility focused mostly on intergenerational mobility—whether men followed in their father's footsteps, mostly (Blau and Duncan, 1967). With the persistent development of the life course approach, the study of within-person mobility has become an important theme in its own right (DiPrete 2002).

The United States is a market-oriented society with a comparatively weak welfare state, the lowest level of employment protection and highest level of mobility (Esping-Andersen 1990), and—as a result—more uncertainty in comparison with other developed countries (Hofmeister 2006). This combination creates high mobility in the job market; however, people who are socially marginalized are basically unaffected by this mobility trend (DiPrete 2002).

The classic studies of social mobility in United States began with Blau and Duncan's (1967) research on intergenerational occupational mobility which found that despite the ideology of the American Dream, in 1960s only 6 percent of Americans moved upward from their original family position with their educational attainment, resulting in a vicious cycle of class stagnancy. They concluded that family positions still

played a determinate role on individual position at large. This mobility model of social reproduction has been repeatedly confirmed by other studies, both in the United States and in other developed countries (Hauser 1978; Jonsson et al. 2009).

However, this trend of social reproduction seems to have changed recently. Following the Blau-Duncan tradition, a study on Norwegian men found that in the 1990s, 40 percent of the population had experienced upward mobility and 18 percent had been downwardly mobile, compared to their fathers (Elstad 2004). This shows a different trend from what Blau and Duncan observed in the 1960s. Studies on intra-generational (or within-person) mobility are consistent with that of the inter-generational mobility. For example, using 2001 PSID data, Sindelar and colleagues (2007) found that 42 percent of people experienced upward mobility from their first job, 19 percent experienced downward mobility, and 39 percent had no change. This within-person mobility trend is consistent with studies in other developed countries (Elstad and Krokstad 2003; Manor et al. 2003), with growing white-collar groups, and a shrinking blue-collar and unemployed population.

Women show more disadvantages in occupational mobility. Women are more likely to move out of the labor force than men across the same time period, and young women workers frequently shift from full-time to part-time jobs (Hofmeister 2006). Furthermore, young women are more likely to start their occupations via low-level jobs than their male counterparts and are more likely to be "trapped" into these low positions (Bukodi and Dex 2010; Petersen and Morgan 1995). Even if they moved upwards, a large portion of the shifts are from the lowest level to the next lowest level of the occupational hierarchy (Bukodi and Dex 2010). On the contrary, for those young men who start their

career at the lowest level, most are able to get out of these positions and maintain more advanced positions in their early careers (Bukodi and Dex 2010). Thus low level entry jobs serve as "stepping-stones" for young men but as "traps" for young women.

Under globalization, gendered occupational inequality has increased across the life course even though women's educational attainment and labor force participation have both increased (Buchholz et al. 2009). Generally, men have better chances of upward mobility, fewer risk factors for unemployment, and better opportunity of job re-entry than women (Widmer and Ritschard 2009). Career rewards from education are also greater for males than for females (Grunow 2006).

In this worldwide trend of rising uncertainty for women's careers, the United States is not an exception. Using the National Longitudinal Study of Young Women, Hofmeister (2006) find that having labor market involvement over time, as measured by job tenure and work experience, is harmful for women's upward mobility and staying in the labor market. Interruptions to jobs are risky for women's occupation across the cohort. Moreover, the consequences of class stratification have severe effects on the most disadvantaged groups over time. Women entering the work force without a high school degree have a diminished opportunity to prosper compared with their better educated counterparts (Rose and Hartmann 2004). These women tend to have low-level entry jobs at a higher proportion than earlier cohorts and experience fewer opportunities for advancement (Bukodi and Dex 2010). As such, Hofmeister(2006) argues that American society is failing the most disadvantaged women in systematic ways—in the educational system, through occupational structure, and with social policies.

Studies on life course health trajectory are among the fastest growing research areas in life course medical sociology and epidemiology, particularly concerning the linkage between early SES conditions and later life health, and the age-cohort-associated differences of health behaviors by socioeconomic status (Mayer 2009; O'Rand 2006). In a detailed review, Mayer (2009) found more than 100 publications referring explicitly to health and the life course just since 2000. Most of the studies deal with age-specific health risks and their effects in later life. The findings indicate that social gradient disparities in health are pervasive and enduring across the life course (Chen et al. 2006; Elstad and Krokstad 2003; House et al. 2005; Huguet et al. 2008; Willson et al. 2007).

Among the life course sociology studies, research is now being focused on the mechanisms explaining these lifelong disparities. The processes associated with cumulative advantage and disadvantage have been systematically developed and are being tested. The concept stems from Robert Merton's classic essay, "The Matthew Effect in Science." The concept of cumulative advantage is that the "advantage" of one individual or group over another accumulates over time, meaning that inequality in this advantage increases over time (DiPrete and Eirich 2006). The so called "advantage" is mainly a key resource or reward, such as academic fame, wealth, or health. Such disparity is produced by the social institution and displayed over the life course through the social stratification process.

In the process, as Ferraro (2009, p 415) argues, "Disadvantage increases exposure to risk, but advantage increases exposure to opportunity." The concept of cumulative advantage and disadvantage resonates with popular clichés, such as "The rich get richer; the poor get poorer", but also goes beyond it (Dannefer 2003). A cumulative advantage

process enlarges small differences over time and makes it difficult for an individual or a group disadvantaged in early life in educational attainment or health status to catch up (DiPrete and Eirich 2006). So, early life disparities in educational development and other social resources affect subsequent occupation, income, and wealth accumulation in a dynamic process, which may place a disadvantaged group at a permanent or ever increasing disadvantage relative to an advanced group. This phenomenon can also be observed in persistent inequalities between races (O'Rand 1996).

Diprete and Eirich (2006) describe two major forms in which cumulative advantage has been used in the stratification research in an extensive review. The first one, called **strict form or path-dependent cumulative advantage***,* is identified with Merton's theory of scientific careers, and emphasizes inequality within a group or within an entire population. The second form, called **persisting direct and interaction effects of a status variable***,* can be traced to Blau and Duncan's (1967) work of status attainment that is focused on group differences. Thus the first form of cumulative advantage is rooted in the individual, and the second form is rooted in the individual's group membership.

For the second form of cumulative advantage, the interaction effects of status variables indicate group differences in the reward from socioeconomic resources. For example, according to Blau and Duncan (1967), being Black led to a cumulative disadvantage because race affects returns from other social factors directly and indirectly at different stages along the life span. In their study, highly educated Blacks received lower occupational status returns than did their White counterparts, which they referred to as "perverse" equality from interaction effects of race and education.

In the case of health, cumulative advantage suggests a process whereby the relationship between SES and health initiated in early life becomes magnified over time, with advantaged individuals and groups retaining a permanent and increasing health advantage relative to others as they age (Wilson et al 2007). Several longitudinal studies support this hypothesis and have found more detrimental health developments in later middle age in the lower social strata. For example, measuring health with self-reported health, physical functioning, and physical well-being; Ross and Wu (1996) found that the health gap increases with age between people with high and low educational attainment.

A review from House and his colleagues (2005) partially supports the cumulative advantage process. They examined a number of studies based on longitudinal data from American's Changing Lives Study and found that socioeconomic inequality in health is small in early adulthood, grows increasingly larger through middle and early old age, and declines in later old age, when controlling for sample attrition (House et al. 2005). Using longitudinal data from the PSID, Wilson et al (2007) examined the longitudinal relationship between health and multiple dimensions of socioeconomic resources and economic history and found cautious support for cumulative advantage in health.

These studies partly answer the question of how and why health advantages or disadvantages increase over the life course. Yet most of the research uses the path-dependent model, and little empirical attention has been given to whether cumulative advantage processes operate the same across groups as people age (George 2005). An excellent exception is Shuey and Willson's (2008) study using the concept of cumulative disadvantage as a mechanism generating health inequality among Blacks and Whites in the United States. In the case of gender differences in life-course health, most of the

previous studies emphasize the relationship of gender and SES, and control for age, rather than integrate age dynamically into an analytic model.

## Research Questions and Hypotheses

Previous studies demonstrate that the reproduction and accumulation of socioeconomic disparities in self-rated health across the life course are largely due to how socioeconomic position itself. Moreover, men's and women's health is the product of both their social lives in a stratified society and the gender expectations that they play out. Although on average there are significant gender gaps in health, men and women are two heterogeneous groups. Occupational status and other social factors interact with gender across the life course to produce variations in both gender disparity and its health outcomes. Under the new global economy, women's careers become more vulnerable and face higher levels of insecurity and instability, which in turn may worsen women's already poorer health status.

Figure 2.1 shows the longitudinal and dynamic relationship between gender, career trajectories and health. Career trajectories, including life course changes in employment and occupation, have dynamic causal relationships with health. Meanwhile, gender, as a social institution, leads to gendered occupational stratification and gendered health disparity. Other important social domains, as individual life course and family responsibilities, also affect individual health trajectory and occupational stratification directly. The social domains of life course processes, family responsibilities, as well as career development, are all conditioned by gender and interact with gender, causing health disparity between genders and occupational classes. The arrow from career to

health highlights a social causation hypothesis, while the arrow from health to career highlights the health selection hypothesis.

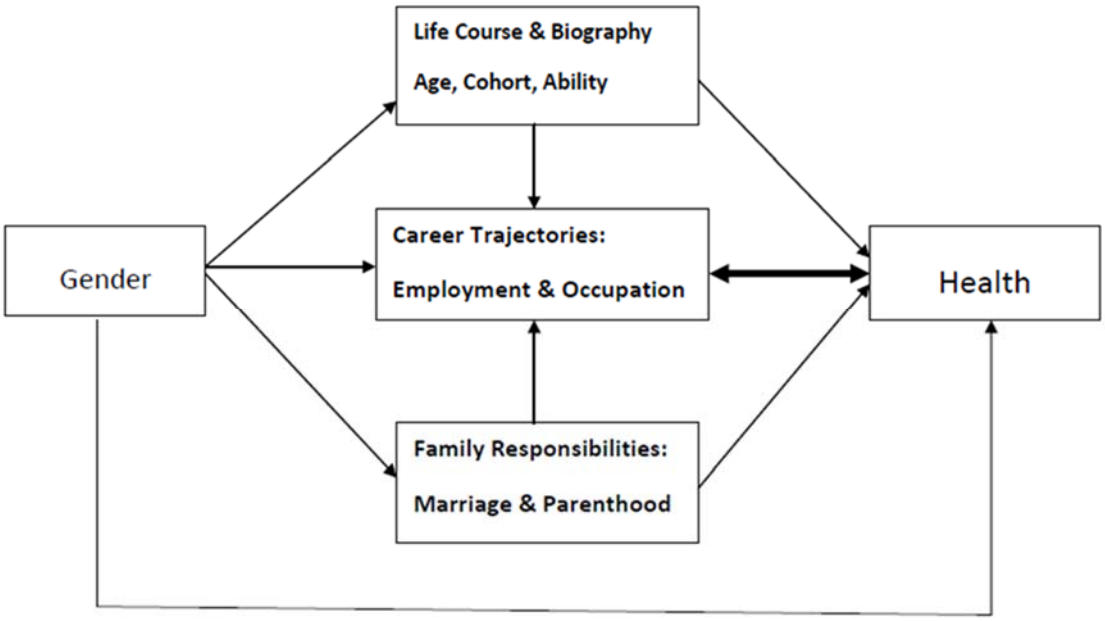



Figure 2.1 The Gendered Relationship of Career Trajectories and Health Change

The aim of the current study is to further examine these issues and answer the following research questions:

1. What is the general profile of the link between occupational gradient and individual health status for both genders and the difference between genders?
2. What are the effects of life course stratification on health through employment and occupational status on both genders?
3. Do cumulative advantage processes operate the same across gender over time?

4. What are the effects of health status on social mobility on both genders through the life course?

Specifically, this dissertation examines two sets of hypotheses: one concerns cumulative advantage process and the other concerns health selection.

The first set of hypotheses address the process of cumulative advantage and disadvantage.

- Hypothesis 1a: The association between employment and health grows stronger as people age.
- Hypothesis 1b: The association of employment and health is stronger among men than among women across life course.
- Hypothesis 1c: The association of occupation and health grows stronger as people age.
- Hypothesis 1d: The occupation-related health gradients are more evident among men than among women across life course.
- Hypothesis 1e: The health gap between men and women increases as they age.

The second set of hypotheses concern health selection theory.

- Hypothesis 2a: Poor health selects people out of the labor force.
- Hypothesis 2b: Men are more likely than women to be selected out of the labor force by poor health.
- Hypothesis 2c: Poor health causes lower occupational status.
- Hypothesis 2d: Women are more likely than men to experience lower occupational status when reporting poor health.

- Hypothesis 2e: Poor health is related to downward occupational mobility.
- Hypothesis 2f: Women are more likely than men to experience downward mobility when reporting poor health.
- Hypothesis 2g: Better health causes upward occupational mobility.
- Hypothesis 2h: Men are more likely than women to experience upward mobility when reporting better health.

# CHAPTER III

# METHODS: DATA, MEASURES, AND ANALYTICAL STRATEGY

In this chapter, first I provide a detailed description of the data sets used in current study before introducing the measurement of dependent variables and independent variables according to different theoretical concepts. I close by explaining the statistical strategies that will be used to test the hypotheses.

## Data and Sample

Data for this study are drawn from the 1989-2006 wave of Panel Study of Income Dynamics (PSID). The PSID is a representative, longitudinal study of individuals and their families in the United States. The emphasis of the survey is on the dynamic and interactive relationship of household economic and demographic aspects of individuals' lives. The PSID contains a wide range of individual-level data, including occupation, education, income, and health. Beginning with a nationally representative sample of approximately 4,800 families in 1968, the PSID has expanded to more than 9,000 families in 2007 (PSID 2011). Due to low attrition rates and success in following family descendents when they form their own households (Duncan et al. 2002), data of several thousands of families and more than 70,000 individuals have been collected over the past 40 years (McGonagle and Schoeni 2006). The PSID data were collected on an annual

basis from 1968 to 1997 and the interview schedule shifted to a biennial design after 1997 (PSID 2011).

The response rate in the PSID initial wave in 1968 was 76 percent. Sample loss was 11 percent between 1968 and 1969, declined to 3.7 percent in 1970, and has remained 2~3 percent after 1970 (Fitzgerald et al. 1998). According to Duncan and colleagues (2002), among the still living original sample, 55 percent of them were interviewed in the survey year of 1995. Studies evaluating the representativeness of the PSID sample at different points have found very limited biases by ignoring attrition (Becketti et al. 1988; Fitzgerald et al. 1998; Lillard and Panis 1998). Previous research has suggested using probability-of-selection weights to adjust for variety of sample attrition not related to death, as well as for the probability of certain weighted groups of the original sample (Duncan et al. 2002); weighted least squares are suggested to estimate the attrition equations as well (Case et al. 2003; Moffit et al. 1999). Such methods of dealing with sample selection and attrition make it possible to generate results for the whole population in the United States.

For this study I limit the sample on several conditions. I select five observation points as 1989, 1994, 1999, 2001 and 2005 (when variables of self-rated health and detailed occupation were available), and include both individuals who were household heads and spouses (if married or cohabited) in these time points. All respondents in the study were interviewed in at least three of the five waves of data collection—the analytic model is flexible and does not require the data of a respondent in every wave (Singer and Willett 2002); therefore, the analytic sample vary across waves of data.

## Variable Measurement

Variable names and operational definitions for social causation models are listed in Table 3.1. Dependent variable is individual health status, and independent variables are grouped into three categories: occupation, gender and controls. In models testing health selection theory, occupation related variables are dependent variables while health is the independent variable. However, the definition and measurement remain the same for these variables.

### Dependent Variable

Following the health literature, I use self-reported health (SRH) as the dependent variable to measure individual health status. Although self-rated health is a subjective measure, it is highly correlated with objective measures as mortality and morbidity (Idler and Benyamini 1997; Welin et al. 1985) and other health measures (Ferraro and Farmer 1999). A large number of studies that use data from both developed and developing countries indicate that self-reported health is a robust predictor of subsequent mortality, even after controlling for objective health measures, health behaviors (such as smoking), functional status, and depression level (DeSalvo et al. 2006; Idler and Kasl 1995). This fact leads Ferraro and Farmer (1999) to argue that individuals know more details about their health that are hard for others, including doctors, to observe. They further argue that SRH is itself an independent variable of mortality and longevity--people with positive self-image tend to live longer.

Regardless of age and socioeconomic status, SRH is capable of measuring health variations across populations (see a detailed illustration from Deaton and Paxon 2001). Objective measures, such as illness specific variables, can be misleading for the purpose

of understanding the effects of SES on health. SES, as the "fundamental cause" of health disparity, has the power and mystery to affect a broad range of health outcomes (Deaton and Paxson 1998; George 2005; Link and Phelan 1995).

Moreover, SRH accurately reflects gender differences in health and health reports. Gender differences reflect real differences in the kinds of conditions men and women face (Case and Paxson 2005). In addition, measuring SRH over time reflects health changing trajectories, and thus fits well with my goal of measuring health growth model instead of specific health issues (Shaw et al. 2004).

In all five time points of PSID, respondents were asked a question: “Would you say your health in general is ‘excellent,’ ‘very good,’ ‘good,’ ‘fair,’ or ‘poor’?” Health is measured at the five time points included in analysis. In mobility table analysis, I construct a dichotomized health status with one referring to self-rated health below good and zero referring to good or excellent health status. In the growth curve models, which are multivariate, health is treated as a continuous variable, and 1 represents excellent health and a 5 represents poor health.

**Independent Variables**

Gender is included as a dummy variable where 1 = female and 0 = male.

Other independent variables are occupation related. Occupational structure is measured from two aspects: employment status occupational status score. Occupational mobility is measured through change of prestige value.

The PSID data provides details for the measurement of occupation title. It is consistently asked in the PSID as an open-ended question: What is the occupation of the head of the household (and the spouse if married)? If the head (or the spouse) is

currently unemployed, what was his or her occupation with the last employer? This question measures the current occupation of the household head and spouse, or the most recent occupation in two years, if one is non-employed by that time.

Table 3.1 Variable Names and Operational Definitions for Social Causation Models

| Variable | Description | Time Varying |
|---|---|---|
| **Dependent Variable** | | |
| Health Status | Self-rated health | Yes |
| **Independent Variables** | | |
| Gender | Male or Female | No |
| Occupation | | |
| Ordered occupation title groups | Collapsed 4 Nam-Power scores groups | Yes |
| Employment status | Non-employment is the reference group | Yes |
| Occupational score | Nam-Power scores range from 0 to 100 | Yes |
| Occupational mobility | Occupational scores change more than 10 score | Yes |
| **Control Variables** | | |
| Age | The age of respondent | Yes |
| Cohort | Five 5-year cohorts | No |
| Education | Completed years of schooling | No |
| Household income | Total household income | Yes |
| Marital status | Currently not married as reference group | Yes |
| Number of children | Number of children under 18 | Yes |
| Having young children | Having children under 6 as reference group | Yes |
| Race | Black or White | No |
| Region | Living in south or not | No |

However, since 20003, the PSID occupational coding system has been changed from 1970 census coding system to 2000 census coding system, which makes it hard to trace individual occupation cross years. To make the occupational status more comparable cross waves, I recode the occupational titles into Nam-Power scores. To avoid cells with few respondents in mobility tables, I follow others (Elslad 2004; Powers

et al 1997; Houser 1978) to collapse the original categories into four groups, that is four ordered Nam-Power score groups (Rogers et al, 2000). For multivariate analysis, I keep using these ordered Nam-Power score groups.

The Occupational Socioeconomic Scores (OSS) were developed at the census Bureau by Nam and his colleagues at the late 1950s (Nam and Powers 1983: 42). The OSS scores were designed to reflect "the average education and income of incumbents of each detailed occupation" and thus represent a level of living for people in a certain occupation (Nam and Boyd 2004: 330, Haug 1977). The OSS scores range from 0 to 100 and shows the percentage of persons in an occupation having combined average levels of income and education lower than the given occupation.

The original OSS formulation was for men only (Nam and Powers 1968) and then calculated for women (Curtis 1970). In the 1970s Nam and colleagues updated them for men, women and both sexes (Nam et al. 1975). For 1980, 1990 and 2000, the OSS scores were updated for both sexes only (Nam and Terrie 2000, Nam and Boyd 2004). Although other major occupational scales such as Duncan's SEI scores also had been updated for decennial years, only the OSS was updated for 2000 census occupational code. This is the major reason that I choose OSS instead of SEI as occupational status measurement, as the PSID has changed the occupational coding from 1970 census coding to 2000 census coding ever since 2003.

I measure occupational mobility—movement from one job to another—in terms of upward, downward, or lateral occupational mobility (Hauser 1978; Hofmeister 2006). In the mobility table, I collapse occupation into four OSS groups: unemployed, low (0-44

Nam-Power scores), medium (35-69), and high (70-100). Job movement across the four categories will be viewed as mobility.

In multivariate analysis, job changes are determined by a change in the occupational score or a move into or out of the labor market cross waves. When a new job's OSS score is at least 10 points higher than the previous job, I identify it as upward mobility. When the new job's SEI score is at least 10 points less than the previous job, I count it as downward mobility. When the difference of occupational scores between the new and previous jobs is within 10 points, it is lateral mobility(Ganzeboom 1996; Hofmeister 2006). For an instance, a woman working as a child care worker scores 34 on SEI prestige value. She would have an upward mobility if her next job is a data-entry keyer (SEI score 47); a downward move if she works as a private household cleaner (SEI score 23) for the next job. A lateral mobility would be a move to a job with a SEI score between 24 and 44.

**Control Variables**

Education is defined in terms of completed years of schooling. Since general education occurs well before the age of 25, it also measures characteristics related to occupational attainment at earlier ages. Thus it serves as a control for unobservable selectivity into occupation and health.

Household income has been widely used as robust predictor of SES in the U.S. Since education and occupation only measure individual dimensions of SES, household income captures the family dimensions of SES as shared life chances that family members live through shared goods and services.

Household income is measured in terms of total household income. The PSID has measured total household income in each survey year and represents taxable income per year for household head and spouse (if married), including income from assets, earnings, and net profit from a farm or business in dollars, and transfers contributed by other household members in the previous tax year. This variable was generated by Lillard (2011) at the ICPSR, Institute for Politic and Social Research Center. All of the income measures are based on total household income adjusted for household size and inflation in American dollars for the year 2000 (Bureau of Labor Statistics2005; Michael 2004). Also, to correct its skewed distribution, the measure of income is included as log transformation.

Age is measured in years at each time point and is censored between 25-49 in 1989 so that the respondents had mostly finished their education by the first wave and had been among the working-age population in most of the waves. Because PSID records individual occupation in the past 2 years, I can still use retirees' occupational status before their retirement for those are 48 and 49 in 1989. In this way, I won't face big sample lose on occupation because of retirement. Age is also treated as a quadratic because age may have a curvilinear effect on individual health trajectory (Willson et al. 2007). For the multivariate analysis, I center age at the mid-point of five-year age categories ranging from 25 to 49 years. For hierarchical models, I center age at the grand mean.

To control for cohort effects in the multivariate analysis, I compute a continuous variable of cohort by using a respondent's age of entry into the first survey (Lynch 2003; Shuey and Wilson 2008). This variable is constant and is included at level 2 of the

growth curve model. For descriptive purposes, the sample is divided into five 5-year cohorts.

Table 3.2 Cohorts

| | Birth Year | Wave 1: 1989 | Wave 5: 2005 |
|---|---|---|---|
| Most recent cohort | 1950-54 | 25-29 | 42-46 |
| | 1945-49 | 30-34 | 47-51 |
| Middle cohort | 1940-44 | 35-39 | 52-56 |
| | 1935-39 | 40-44 | 57-61 |
| Earliest cohort | 1930-34 | 45-49 | 62-66 |

Marital status and family structure are two other important factors affecting health. Compared to their non-married counterparts, married couples experience considerable health advantages (Rogers et al. 2000). However, the health benefit from marriage is also gendered. Husbands overwhelmingly enjoy more health rewards from marriage than wives do (Hardinge 2009; Monin and Clark 2011). Marital status is coded as one (1) for currently married and zero (0) for currently unmarried, which includes single, divorced, and widowed. The number of children and the age of the youngest child also affect men's and women's health differently. The variable of the young child is dichotomized as zero (0) for no child under 6, and one (1) for having at least one child under 6.

Finally, all analyses included controls for variations in self-rated health that are associated with race (1=black, 0=white) and primary region of residence. Region is a dummy variable that represents whether the respondent lived in the South in the majority of the analytic waves.

## Analytical Strategy

My analytical strategy includes weighted descriptive analysis, a mobility table, and multivariate causal analysis. The descriptive analysis explores the overall health and occupational trajectories of the analytic samples from 1989 to 2005. A mobility table and logistic regression are then used to examine the general patterns of occupational mobility and health change during the five waves of survey. Growth curve models are used to estimate the mean health change rate of the analysis sample and individual variation around the mean. Following Wilson et al (2007), I use multivariate models to examine systematic variation in health trajectories as a function of background variables (e.g. socio-economic status).

### Weighted Descriptive Analysis

For descriptive analysis in this study, I follow others to weight the data to make it more nationally representative (PSID 2009a) (Case et al. 2003; Handcock et al. 2005). With statistical description, I compare self-rated health, occupational titles, work status, and prestige of male and female respondents in each analytic wave. T-tests will also be used to examine the gender differences in each wave, and the variation of occupational status that average men and women hold. Overall, the bivariate analyses will illustrate a picture of inequalities for gender in occupation and health that changes over the life course.

### Mobility Table and Logistic Regression

I use a mobility table to explore the co-variation of occupation and health mobility from 1989 to 2005. The mobility table is the contingency table developed by

Hauser (1978) to examine intergenerational occupational mobility. Hauser's mobility table is a 5 x 5contingency table, with occupations ranked from low to high, including farm, lower manual, upper manual, lower non-manual, and upper non-manual (Hauser 1978). In this study, I combine Hauser's mobility table with Nam-Power occupational prestige scores, so that the occupational status are comparable cross waves. Using 1989 and 2005 PSID data, I will construct a (5 x 5 =) 25individual mobility table, with occupational status ranked as not working for money, 0-24 Nam-Power score, 25-49 Nam-Power score, 50-74 Nam-Power score, and 75+ Nam-Power score (Rogers et al 2000, p 149).

In the mobility table, I estimate the effect of various occupational transitions on self-rated health in 2005, adjusted for self-rated health in 1989 (Elstad and Krokstad 2003). As previously mentioned, self-reported health is measured on a five-point scale: "excellent,""very good," "good," "fair," and "poor."In the mobility table, answers of "excellent,""very good," and "good," are collapsed into a “good health” category, and responses of "fair" and "poor" are grouped as "below good health" category.

Logistic regression is then applied to assess to what extent health changes from 1989 to 2005 could be explained by occupational status trajectory. Only the net change of observations from 1989 to 2005 will be used in logistic regression. In the examination of how occupational mobility and health selection work, I will develop an odds ratio table of health change based on occupational mobility table (Elstad and Krokstad 2003).

**Multivariate Models for Change**

In multivariate analyses, I use five full waves of PSID data to explore the multivariate, dynamic, and longitudinal relationship between individual career and health.

First, growth curve model are employed to examine the systematic variation in health trajectories as a function of occupational and other social and economical factors). Then, general logistic random-intercept analysis and general linear latent models are used to study the reversal causal relationship from health to career. The reason for applying different statistical models is that the dependent variables vary from continuous variables to categorical variables.

Growth curve models, logistic random-intercept analysis, and general linear latent models are all multi-level models applied to longitudinal data to model change in individual measures over time (Raudenbush and Bryk 2002; Singer and Willett 2002). Repeated measurements of an individual are assumed to have a "hierarchical structure," in which the measures from different waves are “nested” within individuals (Willson et al. 2007). Thus using multi-level analysis allows me to address within-person and between-person health change simultaneously. In the following section I mainly use growth curve models as an example of the multivariate models for change, and illustrate the equations f growth curve models. For the equations of logistic random-intercept analysis, and general linear latent models are presented in appendix A.

The importance of disaggregate levels of effect has been nicely illustrated in medical literature. A good example is the relationship between heart attack and exercise (Curran and Bauer 2010). Empirical evidence has shown that an individual is more likely to suffer a heart attack when exercising than when at rest; this phenomenon is referred to as the within-person effect. Furthermore, people who exercise regularly tend to experience a lower level of heart attack than those who exercise infrequently, known as the between-person effect (from Curran and Bauer 2010). Both the within-person and

between-person findings are logical and well-grounded, and both are relevant to public health (Curran and Bauer 2010). However, an inference error would occur if the between-person relationship is generalized to individuals, for instance, to assume that a person who exercises more frequently would be more likely to experience a heart attack than one who exercises less frequently. Therefore study of only one level of this complicated two-level model would surely restrict the complete understanding of the nature of these relations.

In the field of sociology, the problem of separating within- and between-person differences has long been a focus of concern, as the tradition began from Duncan and Davis's argument (1953) about ecological fallacy. Considering macro-level influences as community or school on individuals, survey data are often collected in which individuals are "nested" within many groups (Raudenbush and Bryk 2002). Examples of such hierarchical data include children within classrooms, individuals within neighborhoods, and spouses within marriages. Another type of data nesting comes from longitudinal design. In longitudinal data, repeated measures of a person can be regarded as having a multi-level structure in which the measures at each wave are nested within person (Curran and Bauer 2010).

Growth curve modeling is a hierarchical linear modeling that developed to resolve such problems as of separating within- and between-person differences. A growth curve model is composed of a pair of subsidiary models; a level-1 model shows how each person changes over time, and a level-2 model shows how these changes vary from person to person (Signer and Willet 2003). The model assumes a trajectory that certain characteristics can modify (Raudenbush and Bryk 2002). Individual growth models begin

from different start points (intercepts) and change at different rates. That is, the values of intercepts and slopes differ randomly across individuals. For the current study, some individuals might have better health status (higher intercepts) and others have worse health status (smaller intercepts), and some individuals' health might change more rapidly while others' health changes slowly.

Besides the dependent variable, the major predictor of occupational status varies by individual and time as well; these are known as time-varying covariates (TVCs). Occupational status therefore contains both within-person and between-person variability (Raudenbush and Bryk 2002). The within-person effects of time and between-person effects of time on occupation should also be disaggregated.

The level-1 component of the growth curve models, also known as the individual growth model, "represents the change we expect each individual of the population to experience during the time period under study" (Signer and Willet 2003:49). In a linear growth model, time has a simple linear function on repeated measures. A level-1 model is organized around the observation, and captures the within-person differences over time.

The level-2 model expresses "systematic inter-individual differences in the change trajectories and time-invariant characteristics of the individual" (Signer and Willet 2003:57). The level-2 model shows that the values of the intercept and slope parameters vary across people randomly. This model represents between-person differences in within-person change (Curran and Bauer 2010). The level-2 model must be written in separate parts, one for intercept and others for slope parameters in the level-1 model. Furthermore, each part must express a relationship between the growth parameter

(intercept or slope) and its predictor. The level-1 and level-2 models can be combined into a full model (Signer and Willet 2003:58).

For models of the effect of occupational measures alone, the hierarchical models for the health of individual $i$ at time $t$ are as followed.

Level 1:

$$Health_{ti} = \pi_{0i} + \pi_{1i}Age_{ti} + \pi_{2i}Occupation_{ti} + \pi_{3i}Employment_{ti} + \pi_{4i}Occupation_{ti} * Age_{ti} + e_{ti} \quad (3.1)$$

For $i$ =1,..., N individuals in the sample. In this model, $\pi_{0i}$is the starting point health status for a specific person. For individual$i$ at time $t$, $\pi_{1i}$ is the growth rate and represents person-mean change in health for each year of age; $\pi_{2i}$ is the expected health change rate when occupation status increases 1 unit; $\pi_{3i}$ is the expected growth rate when prestige status increases 1 unit; $\pi_{4i}$ is the expected growth rate when occupational status increases 1 unit; and $e_{ti}$ is the time- and individual-specific residual.

To estimate the effects of individual characteristics on individual health trajectory, I estimate the influence of characteristics of the person on the slope and intercepts ($\pi_{0i,}\pi_{1i}, \pi_{2i}, , \pi_{3i}, \pi_{4i},$ ). The equations for level-2 models are the following:

Level-2:

$$\pi_{0i} = \beta_{00} + \beta_{01}\text{Cohort}_i + \beta_{02}\text{Female}_i + \beta_{03}\text{Black}_i + \beta_{04}\text{Education}_i + \gamma_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}\text{Female}_i + \gamma_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21}\text{Female}_i$$

$$\pi_{3i} = \beta_{30} + \beta_{31}\text{Female}_i \quad (3.2)$$

In these equations, the coefficients $\beta_{pq}$ are the effects of individual characteristics on the intercept $\pi_{0i}$ and slope parameters $\pi_{pi}$, and $r_{pi}$ are random terms of individual $i$ that represent unobserved factors during the period of study.

The combined level 1/level 2 equation of this two-level model is a more parsimonious representation. The components within the first set of parentheses are the fixed effects, and the parameters within the second set of parentheses are the random effects.

$$\begin{aligned}\mathrm{Health_{ti}} = [&\beta_{00} + \beta_{10}\mathrm{Age_{ti}} + \beta_{20}\mathrm{Occupation_{ti}} + \beta_{30}\mathrm{Unemployed_{ti}} + \\ &\beta_{40}\mathrm{Occuapation_{ti}} * \mathrm{Age_{ti}} + \beta_{01}\mathrm{Cohort_i} + \beta_{02}\mathrm{Female_i} + \\ &\beta_{03}\mathrm{Black_i} + \beta_{04}\mathrm{Education_i} + \beta_{11}\mathrm{Female_i} * \mathrm{Age_{ti}} + \\ &\beta_{21}\mathrm{Female_i} * \mathrm{Occupation_{ti}} + \beta_{31}\mathrm{Female_i} * \mathrm{Unemployed_{ti}} + \\ &\beta_{41}\mathrm{Female_i} * \mathrm{Occupation_{ti}} * \mathrm{Age_{ti}}] + [\gamma_{0i} + \gamma_{1i} * \\ &\mathrm{Age_{ti}}+\mathrm{e_{ti}}] \end{aligned} \quad (3.3)$$

CHAPTER IV

# DESCRIPTIVE STATISTICS AND MOBILITY TABLES

## Descriptive Analysis

This chapter begins with a general description of the health and occupational trajectories of the analytical samples from 1989 to 2005, culminating with a mobility table of both occupational and health trajectory (1989 and 2001, when the respondents had not yet arrived at full retirement age). The mobility table is then tested with logistic regression. Data are weighted for descriptive analysis for the appropriate survey period (McGonagle and Schoeni 2006) but not for the mobility table and logistic regression because wives (and cohabiters) are excluded from the weighting process. Unweighted descriptive tables are presented in appendix tables B1-B4.

Table 4.1 Valid Cases (N) of Each Variable at Each Wave

| | 1989 | 1994 | 1999 | 2001 | 2005 |
|---|---|---|---|---|---|
| Age (25-49) | 4,215 | 4,187 | 4,109 | 4,047 | 3,820 |
| Health status | 4,203 | 4,177 | 4,102 | 4,037 | 3,798 |
| Employment status | 4,215 | 4,177 | 4,103 | 4,037 | 3,802 |
| Income | 4,215 | 4,199 | 4,134 | 4,065 | 3,842 |
| Occupation score* | 4,208 | 4,184 | 4,095 | 4,031 | 3,803 |
| Occupation score** | 3,776 | 3,743 | 3,658 | 3,555 | 3,183 |
| Not-working**** | 4,208 | 4,184 | 4,095 | 4,031 | 3,803 |
| Marital status | 4,215 | 4,187 | 4,109 | 4,047 | 3,840 |
| Number of Children at home | 4,215 | 4,199 | 4,134 | 4,065 | 3,842 |
| Having young child under 6 | 4,215 | 4,199 | 4,134 | 4,065 | 3,842 |

* Occupation score " not working for money "as 0.
** Occupation score "not working for money" as missing.
*** Not-working for money in the past two years.

As shown in Table 4.2, there are 1,320 men and 2,295 women in the 1989 sample, and the weighted gender ratio is 47 percent male versus 53 percent female, close to the general population gender ratio. The weighted race ratio is 88 percent white versus 12 percent black, also close to the population ratios. From 1989 to 2005, 28.5 percent of the weighted sample has lived in the South for at least three waves. As shown here, women, black respondents, and people residing in the South are all overweighted, as people being younger and with lower SES status (not shown here, Appendix 1 shows details). This overweighted sample is good for mobility table and multilevel analysis because it makes the analysis on those very small group (e.g. keeping unemployed men) possible (McGonagle and Schoeni 2006).

Table 4.2 Demographic Variables in 1989 (N=4215)

| | | N | Mean (unweighted) | Mean(weighted) |
|---|---|---|---|---|
| Gender | Men | 1,320 | .456 | .47 |
| | Women | 2,295 | .544 | .53 |
| Race | White | 2,977 | .706 | .879 |
| | Black | 1,238 | .294 | .121 |
| Education (mean of years of school) | | 13.26 | | |
| Living in the south (more than 3 waves) | | 1,774 | .357 | .285 |

**The Trend of Health, Occupation, and Other Variables 1989-2005**

*Health status*, measured as self-reported health, is the dependent variable used in this research. The survey question asks, "Would you say your health in general is 'excellent,' 'very good,' 'good,' 'fair,' or 'poor'?" (1= excellent health, 5= poor health). Average weighted health was 2.09 in 1989 close to "very good" health, and 2.46 in 2005, when the sample was 17 years older (Table 4.3). Also, in 1989, only 31.6 percent of

respondents reported their health as good and below (a combination of "good", "fair" and "poor"). This number increased to 36.7 percent in 1994, 40.4 percent in 1999, 41.8 percent in 2001, and 46.3 percent in 2005. Both mean *health status* and the percent *good and below* showed the general pattern of health decline while people age.

The weighted average age of respondents was 36.3 in the first wave, a young sample even compared with the working population, but effective for tracing the 17-year occupation change, as mentioned in Chapter III. The mean age of the sample was 52 in the most recent wave. From 1989 to 2005, the mean sample age did not increase exactly 17 years, because of sample attrition. Fifty-seven respondents were 65 or 66 years old in 2005, which meant that 1.4 percent of the sample in the last wave, were beyond the full retirement age (Office of Social Security Administration 2003).

Table 4.3 Means of Variables (Weighted) from 1989 To 2005

| | 1989 | 1994 | 1999 | 2001 | 2005 |
|---|---|---|---|---|---|
| Age (25-49) | 36.23 | 40.16 | 46.09 | 48.05 | 52.00 |
| (SD) | (6.75) | (6.75) | (6.75) | (6.73) | (6.71) |
| Health status | 2.09 | 2.22 | 2.30 | 2.35 | 2.46 |
| (SD) | (0.93) | (0.97) | (1.00) | (1.01) | (1.03) |
| Health good and below | .316 | .367 | .404 | .418 | .463 |
| Employment status (currently working) | .841 | .831 | .838 | .811 | .780 |
| Income * | $23,458 | $26,507 | $31,988 | $34,594 | $37,793 |
| (SD) | (54,561) | (30,221) | (33,535) | (38,899) | (117,322) |
| Occupational score ** | 56.34 | 56.38 | 56.42 | 56.31 | 49.49 |
| (SD) | (29.54) | (29.98) | (30.33) | (30.60) | (31.98) |
| Occupational score*** | 57.72 | 62.31 | 62.63 | 63.82 | 59.06 |
| (SD) | (25.18) | (24.98) | (25.46) | (24.1) | (25.60) |
| Not working for money | .084 | .095 | .099 | .118 | .163 |
| Marital status (currently married) | .724 | .736 | .731 | .729 | .717 |
| Number of Children at home | 1.24 | 1.16 | 0.90 | 0.76 | 0.54 |
| (mean) | (1.20) | (1.21) | (1. 13) | (1.07) | (0.96) |
| Having young child under 6 | .323 | .247 | .152 | .111 | .072 |

*: mean household income adjusted for both household size and inflation of American Dollars for the year of 2000. There are some cases of negative numbers from 1994-2005. I keep these cases and don't recode them up to 0.
**: occupational status score with not working for money as 0.
***: occupational score with not working for money as missing.

The average weighted education was 13 years of schooling across waves. The weighted household income (adjusted to American dollars in 2000) consistently increased across waves. In 1989, the average income was $23,458. This figure rose to $26,507 in 1994, $31,998 in 1999, $34,594 in 2001 and $37,793 in 2005. Although this general rising pattern of income might have masked the income declines of early retirees in the earlier cohort (Wilson et al 2007), this pattern largely stands true for this age group because the respondents had been among the working-age population in most of the waves. Income inequality increases across the survey years, as reflected in the rising pattern of standard deviation of household income.

*Employment status* was recoded into a dichotomous variable as currently working or not. In 1989, 84.1 percent of the respondents were employed, declining to 83.1 percent in 1994, increasing to 83.8 percent in 1999, and then declining again to 81.1 percent in 2001, and 78.0 percent in 2005. While the drop of employment rates from 2001 to 2005 reflects the impact of retirement (and early retirement) on individual employment, the unstableness of employment rates from 1989 to 1999 mirrors the overall economic change during the period of 1993 to 1994, when the unemployment rate was higher than the years before and after it (US Bureau of Labor).

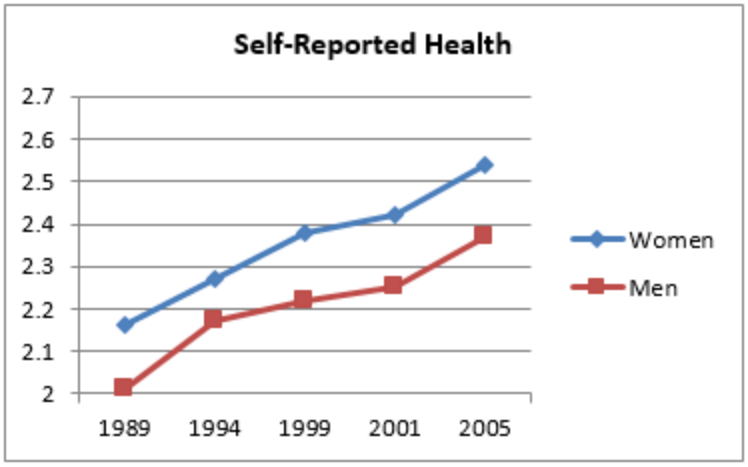
Using three-digit Occupation Codes from the Census of Population, the most recent occupation of respondents is calculated into Nam-Powers-Boyd Occupational Status Score (*OSS*). Two *occupational status* scores have been calculated. The first one includes those not working for money for 2 years (OSS=0). The second one excludes those not working for money for 2 years. In the following tables, the group of not-working-for-money-for-2-years is named as non-employed 2 yrs to make it more concise. For those who had a job for at least 3 waves, the mean *OSS* increased with age, then

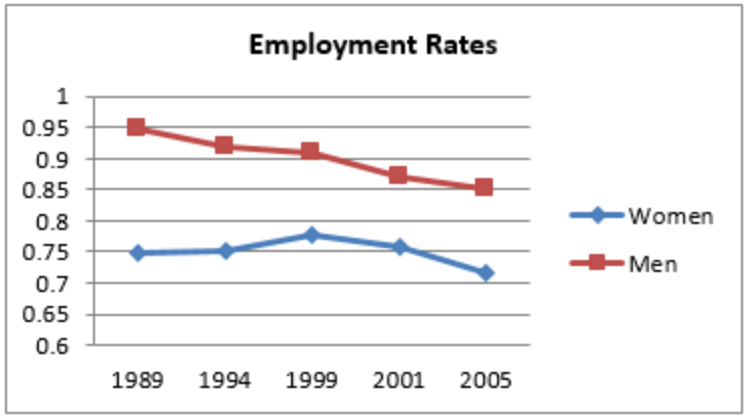
slightly decreased before retirement (Table 4.3). This is the major reason that 2001 is used in the mobility table, instead of year 2005: the occupational decline before retirement is largely age-related, not health-related (Dannefer 1987).

The trends of *marital status*, number of *children at home*, and having very *young children at home* are consistent with the life course patterns of family change. With aging, some respondents may experience divorce, or loss of spouse, which decreases the marriage rate. With advancing age, people also tend to have fewer children at home and are less likely to have children under age 6.

**Compared Means of Selected Variables for Men and Women**

Table 4.3 compares the self-rated health, employment, occupation, education, income, and marital status of men and women respondents in each analytical wave. Significant gender differences are masked in the descriptive analysis of the general respondents and, therefore, are observed separately here. Women respondents, who were younger than men respondents, reported significantly poorer health than men in all five waves; this gap increases in later waves. On average, women were less educated and reported lower household income than men. Meanwhile, women had much lower employment rates and much higher rates of unemployment than men. The *OSS* of working women is around 10 points lower than that of working men at almost every study point. Regarding occupational mobility, women experienced higher rates of both upward and downward mobility, and a lower rate of horizontal mobility than men. In addition, women respondents reported lower rates of marriage than men and this gap grew over the course of the analysis. Figure 1.1 depicts gender gaps in health, employment status, and occupation. Overall, the bivariate analyses present a picture of inequality for women in health, occupation, and family structure that grows larger over time.



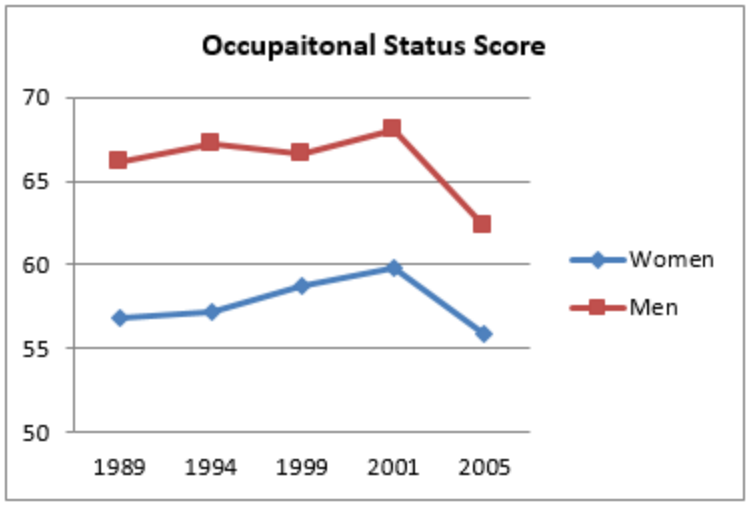




Figure 4.1 Compared Means for Selective Variables, 1989-2005

Table 4.4 Means for Selective Variables (Weighted), Men and Women, 1989-2005

| | 1989 | | 1994 | | 1999 | | 2001 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Women | Men | Women | Men | women | Men | Women | men | women | men |
| Education | 13.58*** | 13.89*** | | | | | | | | |
| | (2,295) | (1,920) | | | | | | | | |
| Age | 36.12** | 36.36** | 41.04** | 41.35** | 45.92** | 46..01** | 47.90** | 48.05** | 51.85 | 51.91 |
| | (2,295) | (1,920) | (2,285) | (1,902) | (2,240) | (1,869) | (2,216) | (1831) | (2230) | (1690) |
| Health Status | 2.16*** | 2.01*** | 2.27*** | 2.17*** | 2.38*** | 2.22*** | 2.42*** | 2.25*** | 2.54*** | 2.37*** |
| | (2,283) | (1,920) | (2,275) | (1,902) | (2,236) | (1,867) | (2,207) | (1830) | (2110) | (1688) |
| Health good and below | .346*** | .281*** | .394*** | .336*** | .431*** | .373*** | .452*** | .389*** | .491*** | .430*** |
| Employment status | .747*** | .947*** | .750*** | .921*** | .776*** | .909*** | .759*** | .870*** | .716*** | .852*** |
| (employed=1) | (2,295) | (1,920) | (2,285) | (1,902) | (2,236) | (1,867) | (2,207) | (1830) | (2113) | (1689) |
| Marital status | .700*** | .752*** | .694*** | .783*** | .696*** | .775*** | .691*** | .773*** | .672*** | .768*** |
| (married=1) | (2,295) | (1,920) | (2,285) | (1,902) | (2,240) | (1,869) | (2,216) | (1831) | (2130) | (1690) |
| Family income | 22,417*** | 24,630*** | 25,488*** | 27,649*** | 31,039*** | 33,069*** | 32,722*** | 37,757*** | 32,673*** | 43,649*** |
| ($ in yr 2000) | (2,295) | (1,920) | (2,286) | (1,902) | (2,250) | (1,884) | (2,228) | (1837) | (2143) | (1699) |
| Occupational score | 44.46*** | 65.20*** | 48.26*** | 65.49*** | 50.22*** | 63.50*** | 50.26*** | 63.34*** | 44.24*** | 55.47*** |
| (not working as 0) | (1,898) | (1,978) | (2,283) | (1,901) | (2,235) | (1,960) | (2,210) | (1821) | (2118) | (1685) |
| Occupational score | 56.79*** | 66.12*** | 57.22*** | 67.25*** | 58.77*** | 66.59*** | 59.76*** | 68.07*** | 55.85*** | 62.30*** |
| (not working as missing) | (1,898) | (1,878) | (1,902) | (1,841) | (1,885) | (1,773) | (1,881) | (1704) | (1881) | (1704) |
| Not working | .147*** | .014*** | .156*** | .026*** | .145*** | .046*** | .159*** | .070*** | .208*** | .111*** |
| | (2,292) | (1,916) | (2,283) | (1,901) | (2,283) | (1,901) | (2,210) | (1821) | (2115) | (1671) |

* p<.05
** p<.01
***p<.001

## Mobility Table and Regression Analysis

### Gender and Occupational Health Gradient 1989-2000

In 2001, the proportions of both high occupational status (OSS) and not-working for two years in the sample were higher than in 1989 (Table 4.5), reflecting both post-industrial changes in the occupational structure toward an increase in higher occupations, career developments among the respondents (Elstad and Kraskad 2003), and exits from the labor market, particularly for early retirement and disability. The proportion of women respondents of high OSS is much lower than that of men in both study points, while the proportions of women in low OSS and unemployment is higher than that of men. However, during the past 12 years, the net change of women respondents moving into high OSS is 5 percent, but only 1.2 percent for men respondents. Also, the unemployment rates for women dropped by 0.6 percent, while it increased 4.4 percent for men; so women respondents experienced somewhat more upward mobility than men when the sample advanced by 12 years. The net changes in the occupational distributions and gross mobility and their gender differences are analyzed in the following mobility tables.

Reporting *health status "*good and below" increased 11 percent during the study period (from 33 percent to 44 percent), and this figure was 10 percent for women and 12 percent for men (Table 4.5). In all, 30 percent of all respondents (both men and women) changed their reports of health from 1989 to 2001. The reason for the overall rise in reporting health "good and below" was that negative changes from "above good" to "good and below" were more numerous than positive changes in the other direction (20.6 percent and 9.9 percent, respectively). Regarding gender, the negative changes from

"above good" to "good and below" were 20 percent for women and 21 percent for men, and the positive changes from "good and below" to "above good" were 10 percent and 9 percent, respectively. Thus although men report general better health than women at both time points, they experienced slightly less positive health change and slightly more negative change than women during the study period.

Table 4.5 Comparison of Means of Health and Occupation (Unweighted) for Year 1989 and 2001， Men and Women

| | 1989 | | | 2001 | | |
|---|---|---|---|---|---|---|
| | Total (4,003) | Women (2,187) | Men (1,816) | Total (4,003) | Women (2,187) | Men (1,816) |
| Self-rated health (1 = good & below) | .328 | .365*** | .283*** | .435 | .463*** | .401*** |
| Health change | | | | | | |
| positive | -- | -- | -- | 9.9% | 10.3% | 9.1% |
| negative | -- | -- | -- | 20.6% | 20.4% | 21.1% |
| Occupational status | | | | | | |
| high OSS (70-100) | 34.8% (1395) | 26.3%*** (574) | 45.2%*** (821) | 38.3% (1533) | 31.3%*** (686) | 46.6%*** (857) |
| medium OSS (35-69) | 36.0% (1439) | 34.7% (760) | 37.4% (679) | 34.6% (1384) | 35.2%*** (770) | 33.8%*** (614) |
| low OSS (1-34) | 19.2% (770) | 22.4%*** (490) | 15.4%*** (280) | 15.5% (620) | 17.5%*** (382) | 13.1%*** (238) |
| not-working* | 10.0% (399) | 16.6%*** (363) | 2.0%*** (36) | 11.6% (466) | 16.0%*** (349) | 6.4%*** (117) |
| Health of each OSS Group (1 = good & below) | | | | | | |
| high OSS | .212 | .239 | .194 | .316 | .346 | .293 |
| medium OSS | .331 | .338 | .323 | .446 | .440 | .452 |
| low OSS | .458 | .494 | .396 | .557 | .602 | .483 |
| not-working* | .474 | .449 | **.722** | .633 | .593 | **.752** |

*: those haven't work for more than 2 years.

Table 4.5 shows the health disparity that arose as the respondents aged from 25-49 at the beginning of the period to their ages of 37-61 at the end of the period. In both years, reporting "good and below" increased when occupational status went down from high to low to unemployment, with relatively small differences between the low OSS and not-working. These occupation- related health gradients stand true for men in both years,

with extremely high rates of poor health for men not in the labor force for more than two years. On the other hand, for women, the occupation-related gradients only stand true for those who are working. Women respondents unemployed for two years reported lower rates of "good and below "health than working women with low OSS in both years, indicating that women who do not work experience better health than working women with low OSS. Among the working respondents, the differences between high, medium, and low OSS were greater among women than among men in both 1989 and 2001. This finding is inconsistent with previous studies that find the occupation-related health inequality is more evident among men than among women (Elo 2009).

All occupational groups had higher rates of health "good and below" in 2001 than in 1989. The differences between high OSS and the other groups were larger in 2001 than in 1989, except among men unemployed for 2 years, whose health was already poor in 1989. Regarding the gender differences of occupation-related health gradients, Table 4.5 illustrates working women respondents reported poorer health than men at each occupational status in both years, except that women of medium OSS in 2001 report better health than men of the same OSS group. Among those unemployed for 2 years, women reported better health than men in both years, although those women experienced more negative health changes. These findings raise certain questions. Do the increasing health disparities among occupational classes imply that disparities grew over the study period? And just how is gender related to these disparities? These issues will be addressed in more detail in the mobility tables and in the discussion section.

Table 4.5 further shows that all occupational groups had higher rates of health "good and below" in 2001 than in 1989. The differences between high OSS and the other

groups were larger in 2001 than in 1989, except non-employed men, whose health were already poor in 1989. Regarding the gender differences of occupation related health gradients, Table 4.5 illustrates working women respondents reported poorer health than men at each occupational hierarchy in both years, except that women of medium OSS in 2001 report better health than their male counterparts. However, among those non-employed for 2 years, women reported better health than men in both years, although those women experienced more negative health changes. Thus whether this increasing health disparity among occupational classes implies that disparities grew bigger during the studies period and how gender is related to this issue will be addressed in more details in the mobility tables and will be further discussed in the discussion section.

Table 4.6 Odds Ratio for Health "Good and Below" in 1989 and 2001 for Men and Women

| | 1989 | | 2001 | |
|---|---|---|---|---|
| | women | Men | women | men |
| high OSS | 1.00 | 1.00 | 1.00 | 1.00 |
| medium OSS | 1.17 | 1.30 | 1.07 | 1.37* |
| low OSS | 1.74*** | 1.67** | 1.42** | 1.32 |
| not-working | 1.36 | 4.97*** | 1.44** | 3.75*** |

Reference category: Men and women in high OSS.
Odds ratio controlled for age, education and income.
*** $p < 0.001$, , ** $p < 0.01$ * $p < 0.05$.

Table 4.6 illustrates how various occupational classes affected self-reported health "good and below" is. Controlling for other variables, the odds of a woman in low OSS reporting health "good and below" were 74 percent higher in 1991 and 42 percent higher in 2001 than that of a woman in high OSS in 1991. The odds of a man in low OSS reporting health "good and below" were 67 percent higher in 1991 and 32 percent higher (not statistically significant though) in 2001 than that of a man in high OSS in 1991.

However, the odds of a man unemployed for 2 years reporting health "good and below" were almost 4 times higher in 1989, and 2.75 times higher in 2001, than that of a man in high OSS, while the odds of an unemployed woman reporting health "good and below" were only 36 percent higher in 1989, and 44 percent higher in 2001, than that of a women man in high OSS.

Table 4.6 thus shows a general pattern of occupational health gradients. Specifically, for working men and women, the individual health rating was inversely associated with one's occupational status and the health gaps between occupational groups decreased with age. The only exception was men with medium OSS, whose health was even poorer than men with low OSS in 2001. In both years, the health gaps between high OSS and low OSS were greater among women than among men. Among those men and women who were unemployed for more than 2 years, unemployment was strongly associated with men's poor health in this group for both years, but just slightly associated with women's health in 2001.

The finding that occupational health gradients are greater among working women than working men is *inconsistent* with previous studies that argue the occupation-related health inequality is more evident among men than among women (Elo 2009). As such, the health gaps, which are decreasing over time between high and low OSS, and between high OSS and not-working men, requires further examination. Does this mean health status is converging across occupational classes? The following mobility table on both occupation and health change will help illustrate the trend of occupational health gradients and the gender differences related to it.

**Mobility Tables on Health and Occupation**

The pattern of socioeconomic health disparities for both men and women changed as the respondents aged by 12 years. This transformation became even more complex when tracing the stayers and movers in the occupation/employment structure during the study period. Table 4.7 shows the number of stayers and movers of men and women from 1989 to 2001. Gross mobility was substantial: 42 percent of the respondents changed occupation/employment status during the study period (49 percent for women and 29 percent for men). Such occupation/employment mobility affected every occupational group, so that the occupation structure was composed of a different set of men and women in 2001 than in 1989.

From 1989 to 2001, the net change was 3.4 percent for the high OSS group, negative 2.6 for medium OSS, negative 1.3 percent for lower OSS, and 1.6 percent for those unemployed. However, these numbers mask the gender differences in occupation/ employment mobility. As regards the high OSS group, 210 women left and 322 women entered, while 164 men left and 190 men entered. Thus the number of high OSS increased from 574 to 686 for women, and from 821 to 847 for men. The net change in high OSS is 5.1 percent for women and 1.4 for men. The number of medium OSS increased slightly for women, but dropped by 6.3 percent for men. The number of low OSS decreased for both genders, with 5.4 percent for women and 2.4 percent for men. Finally, the number of non-employed women dropped slightly (0.7 percent), but the number of non-employed men increased by 7.5 percent. These trends show that during the study period, women respondents generally experienced more upward occupational mobility than men respondents, while men experienced more downward mobility.

Table 4.7 also shows the percentages reporting "good and below" in 1989 and 2001 in each occupational mobility group. The percentages of reporting "good and below" rose for each mobility group of both genders during the 12 years period, except for men who were low OSS in 2001 and entered the workforce from the unemployment group in 1989; their health had been the worst among all other mobility groups in 1989. Men who stayed in high OSS during the study period reported the lowest proportions of "good and below" in both years, while men unemployed for 2 years in 2001 reported the highest proportions of "good and below" in 2001, regardless of mobility. Men who were working in 1989, but were non-employed for 2 years in 2001 all reported poorer health than their working counterparts in 2001. Men who were in high OSS in 1989 and later became unemployed reported 57 percent of "good and below." This change represents the largest negative health change: 30 percent.

Women who remained in high OSS reported better health than most of the other women mobility groups in both years, but not as good as those women who entered into high OSS in 2001 from the category of non-employment in 1989. Comparing negative health changes of different groups of women, those women who moved from low to high OSS experienced the smallest change of 1.7 percent, followed by women who moved from high to low OSS and from low to medium OSS. Women who moved from medium OSS to non-employment or low OSS experienced the most notable negative health change, 25 percent and 23 percent, respectively.

Table 4.7 Occupational Mobility 1989-2005 and Self-Rated Health "Good and Below" (%) In 1989 and 2001 for Women

| OSS 1989 | N of respondents | OSS 2001 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Women | | | | | Men | | | | |
| | Health 1989 and 2001 | High | Med | Low | Not work | All | High | Med | Low | Not work | All |
| High | (N) | (364) | (139) | (20) | (51) | (574) | (657) | (96) | (35) | (33) | (821) |
| | Good and below 89(%) | 23.3 | 23.7 | 40.0 | 21.6 | 23.9 | 17.8 | 26.0 | 22.9 | 27.3 | 19.4 |
| | Good and below 01(%) | 31.9 | 36.7 | 45.0 | 39.2 | 34.1 | 27.5 | 42.7 | 45.7 | 57.6 | 31.3 |
| Med | (N) | (215) | (391) | (74) | (80) | (760) | (157) | (402) | (85) | (35) | (679) |
| | Good and below 89(%) | 27.9 | 36.3 | 37.8 | 33.8 | 33.8 | 20.4 | 33.3 | 38.8 | 57.1 | 32.3 |
| | Good and below 01(%) | 37.2 | 44.8 | 60.8 | 58.8 | 45.7 | 31.2 | 46.5 | 48.2 | 82.9 | 45.1 |
| Low | (N) | (58) | (156) | (209) | (67) | (490) | (29) | (109) | (112) | (30) | (280) |
| | Good and below 89(%) | 43.1 | 41.7 | 56.0 | 52.2 | 49.4 | 41.4 | 32.1 | 38.4 | 70.0 | 39.6 |
| | Good and below 01(%) | 44.8 | 46.8 | 62.2 | 67.2 | 55.9 | 48.3 | 40.4 | 47.3 | 80.0 | 48.2 |
| Not work | (N) | (49) | (84) | (79) | (151) | (363) | (4) | (7) | (6) | (19) | (36) |
| | Good and below 89(%) | 18.4 | 36.9 | 50.6 | 55.0 | 44.9 | 50.0 | 57.1 | 83.3 | 78.9 | 72.2 |
| | Good and below 01(%) | 30.6 | 47.6 | 58.2 | 62.9 | 54.0 | 100.0 | 85.7 | 83.3 | 84.2 | 86.1 |
| All | (N) | (686) | (770) | (382) | (349) | (2,187) | (847) | (614) | (238) | (117) | (1,816) |
| | Good and below 89(%) | 26.1 | 35.2 | 50.5 | 44.7 | 36.4 | 19.2 | 32.2 | 37.4 | 55.6 | 28.3 |
| | Good and below 01(%) | 34.6 | 44.3 | 60.2 | 59.3 | 51.9 | 29.3 | 45.2 | 48.3 | 75.2 | 45.6 |

In sum, from 1989 to 2001, 49 percent of the women respondents and 33 percent of the men experienced occupational mobility; 30 percent of women and men reported health change. Roughly one-third of women (35%) and nearly half of all men (46%) reported that they did not experience any change in health or occupation. Therefore, as the respondents aged from their beginning ages of 25-49 to their ages of 37-61 at the end of the study period, the sample as a whole experienced considerable occupational mobility and health changes. As a result, the pattern of gender-related socioeconomic health disparities changed accordingly. A major theme of this dissertation is to what degree occupational status and occupational mobility affects individual health and the differences between genders, and to what degree health status affects social mobility and the gender difference of such effects. Table 4.6 provides a detailed profile of occupational trajectory and health change and suggests some answers to the research question; however, a more appropriate way to analyze social causation and health selection is the following logistic regression.

Table 4.8 Odds Ratio for Health "Good and Below" in 2001 According to Occupational Trajectories 1989-2001for Men (N=1816) and Women (N=2187).

| OSS 1989 | OSS 2001 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| | High | Medium | Low | Not-work | High | Medium | Low | Not-work |
| High | 1 | 1.27 | 1.4 | 1.48 | 1 | 1.85* | 2.07* | 3.19** |
| Medium | 1.22 | 1.49** | 3.08*** | 2.87*** | 1.21 | 2.03*** | 2.02** | 8.21*** |
| Low | 1.36 | 1.53* | 2.43*** | 3.31*** | 1.98* | 1.60* | 1.95** | 6.32*** |
| Not-work | 1.06 | 1.71* | 2.25** | 2.48*** | | 12.8** | | 6.89** |

Reference category: stayers in High OSS for men and women respectively
Odds ratios control variable: self-rated health in 1989 and age.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 4.8 shows the effects of occupational trajectories on negative change in self-reported health in 1989 and 2001, relative to those who remained in the high OSS group of men and women. In order to make it easier to compare the odds ratios between different mobility groups, the mobility matrix has been used to present the results.

According to cumulative disadvantage theory, social and environmental burdens exacerbate as people age, especially for those remaining in the lower rung of the social ladder. The persistent, unfavorable class environments aggravate the already poor health of those in the lower social class (Wilson et al, 2007; James 2009). Therefore, the odds ratios would be higher the lower one was located in the occupational hierarchy. As shown in table 4.8, the odds ratios for those who remained in the same occupational /employment status in both 1989 and 2001 (the upper left, lower right diagonal) are consistent with this assumption, for both men and women.

Consequently, for those who have stayed in the same socioeconomic level, it clearly indicates that more negative health changes developed in medium OSS (OR=1.49 for women and 2.03 for men) and low OSS (OR=2.43 for women and 1.95 for men) than among high OSS (i.e. reference groups) from 1989 to 2001, and even more negative changes among men who were non-employed for 2 years (OR=6.89).

Although it shows a similar occupational health change pattern for men and women, Table 4.8 demonstrates gender differences on the occupational health gradients. First, men that moved from employment categories to non-employment experienced more negative health changes than their female counterparts, with men having much higher odds ratios in each occupational class (ORs 3.19 vs. 1.48 for high OSS, 8.21 vs. 2.87 for medium OSS, and 6.32 vs. 3.31 for low OSS); men that remained non-employed

also reported more negative health changes than women who were non-employed in both years (ORs 6.89 vs. 2.48). Thus for each occupational category, the association between declined health and mobility from non-employment was stronger among men than among women. Additionally, being non-employed across the study period worsened men's health more so than women's health.

Second, among working respondents who stayed in the same occupational class, the health gradients are more evident among women than among men. The health gradient is larger between high and low OSS women than between high and low OSS men (2.43 vs. 1.95). Moreover, women in low OSS developed more negative health changes than women in medium OSS, while men in low OSS reported less negative health changes than men in medium OSS (though not statistically important). Thus among the working population, women in low OSS not only reported the poorest health in 1989 (see Table 4.6) among men and women in all other working occupational groups, they also experienced the most negative health changes as they aged. These changes in health patterns in low OSS support the cumulative disadvantage theory; that is, women who remained in low OSS, were among the group reporting worst health in 1989, and they further experience worst health change than all the other respondents who remained in their occupational group. In short, low OSS women experience double jeopardy.

Regarding the off-diagonal cells in Table 4.8 -- those who change occupation/ employment status --the odds ratios are in most cases consistent with the social causation theory. As shown in Table 4.8, moving up is associated with lower odds ratios of developing negative health change, and moving down is associated with higher odds ratios. There are quite a few deviating cells as well, especially among men.

An interpretational difficulty should be noted in regards to the off-diagonal cells. If a respondent changed both health and occupational class, it is hard to determine which change happened first, because the survey did not ask when changes occurred. The social causation argument requires that occupational trajectories are not dependent upon health changes, but for the off-diagonal cells that contain respondents who moved up or down the occupational/ employment classes, it cannot be determined to what extent their occupational mobility happened before, or were an outcome of, their health changes. For example, the table demonstrates that men who moved from high OSS to unemployment experienced more negative health changes than those who remained in high OSS (ORs 3.19 vs. 1.00). This could result from transition from high OSS to not-working is more detrimental to health than continuously staying in high OSS; however, health selection would imply that declined health triggered downward mobility.

There are also gender differences in the off-diagonal cells. When men descended from high OSS to other occupation/employment, the odds of developing more negative health rise double or triple. However, this pattern of occupation-descending-related health change does not exist among women who were in high OSS in 1989. As a woman's occupation descended from high to medium, or to low OSS, or even to unemployment, the odds ratios increased a little, but were not statistically significant.

Also, men who moved from medium OSS to non-employment developed the biggest negative change (OR=8.21) among all gender and occupation/employment mobility groups. The only exception was the group of men who did not work in 1989 and later moved up into high and medium OSS (ORs=21, not shown in table). Men who were non-employed for 2 years in 1989 had very high odds of developing negative health

change, no matter into which occupational group they moved. Men moving from non-employment to work have been combined into one group in Table 4.8 because the cases of men moving to high, medium, and low OSS were small (4, 7, 6 respectively), which doesn't meet the requirement of mobility table having no more than 20 percent of the cells with frequencies less than 5 (Powers and Xie, 2008).

Table 4.9 examines whether health selection works in groups of people, that is, whether previous health status was associated with subsequent career mobility. The four columns to the left analyze upward and downward occupational mobility for men and women who were employed in both 1989 and 2001. The four columns to the right examine transitions into and out of the labor force for men and women. The dichotomy of employment / unemployment is used here instead of the dichotomy of working /not-working-for-money-for-2-years because the case of men not-working for 2 years in 1989 was only 39; this sample size was not large enough for a logit regression (Powers and Xie, 2008). $\Delta G^2$ and Pseudo $R^2$ are used to measure the goodness-of-fit of introducing the variable of health to the models.

Table 4.9 Odds Ratios for Upward and Downward Occupational Mobility, and for Entering and Leaving Employment 1989-2001, According to Health Change 1989-2001

| | | Occupational mobility among those employed in both years | | | | Transitions into and out of work 1989-2001 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Upward mobility [a] | | Downward mobility [b] | | Enter employment 01[c] | | left employment 01[d] | |
| | | Women | Men | Women | Men | Women | Men | Women | Men |
| Health 89-01 | Very good both | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Improved health | 0.57** | 0.44*** | 1.5 | 1.06 | 0.791 | 0.922 | 1.11 | 1.4* |
| | Declined health | 0.56*** | 0.76 | 1.96*** | 1.38 | 0.617* | 0.394 | 1.42* | 2.1*** |
| | Good & below both | 0.51*** | 0.82 | 1.45 | 2.07*** | 0.374*** | .205** | 1.42* | 3.1*** |
| Age | | 0.87* | 0.97 | 0.95 | 1.07 | 0.718*** | .564*** | 1.12 | 1.41*** |
| Occupation 89 | High | N/A | N/A | 1.00 | 1.00 | Not relevant | Not relevant | 1.00 | 1.00 |
| | Medium | 1.00 | 1.00 | 0.255*** | 0.716* | | | 1.3 | 1.12 |
| | Low | 2.38* | 4.02*** | N/A | N/A | | | 1.23 | 2.19*** |
| N | | 1,103 | 894 | 1,203 | 1,432 | 602 | 98 | 1585 | 1718 |
| $\Delta G^2$ (df=3) | | 22.33*** | 16.00** | 12.85** | 32.7** | 23.3*** | 8.9* | 6.04 | 32.7*** |
| Pseudo $R^2$ (health model only) | | 0.015 | 0.014 | 0.005 | 0.005 | 0.043 | 0.114 | 0.006 | 0.02 |
| Pseudo $R^2$ (full model) | | 0.061 | 0.098 | 0.069 | 0.068 | 0.082 | 0.191 | 0.01 | 0.047 |

Note: Models are all adjusted by 5-year age group and occupation in 1989.
a Samples: most recent occupations in medium and low OSS in both 1989 and 2001 for men and women respectively.
b Samples: most recent occupations in high and medium OSS in both 1989 and 2001 for men and women.
c Samples: not employed in 1989 for men and women.
d Samples: employed in 1989 for men and women.
ΔG2 =G2(full-model)-G2(control-model), to measure the goodness-of-fit of introducing health change.
Pseudo R2 is the Cox and Snell R2
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

# CHAPTER V

# MULTIVARIATE ANALYSIS FOR AGE

A continuation with Chapter IV, this chapter explores the multivariate, dynamic, and longitudinal relationship between individual career and health, using five full waves of PSID data and more advanced statistic models. First, Growth Curve Models are employed to examine the systematic variation in health trajectories as a function of occupational and other social and economical factors. The statistic package used here is HLM 6.0 developed by Raudenbush and Bryk (2009). Then, general logistic random-intercept analysis and general linear latent models are used to study the reversal causal relationship from health to career. The statistical package used here is STATA 11.0. As with mobility table and logistic regression analysis in chapter IV, data are unweighted for multivariate analysis because wives (and cohabiters) are excluded from the weighting process.

## Variation of Sample Sizes and Observations

Table 5.1 shows that sample sizes and observations vary as different dependent variables and independent variables are used in the models. When testing the social causation hypothesis, health status is the dependent variable. When using employment status as the independent variable, the sample size is 4,215, including both employed and non-employed respondents, and there are 22105 observations (See table 5.1) across all

five waves. When using occupational status as the independent variable to predict health, the sample size is 4104, and the number of observations is 17895, including only those reporting an occupation in two years and excluding those non-employed for two and more years.

When testing health selection theory, occupation and employment statuses are dependent variables, and health is the independent variable. To exclude social causation effect, health status is measured one wave earlier. That is, health is observed from 1989 to 2001; other variables are observed from 1994 to 2005. Because only four waves of data are used, both sample sizes and number of observations of health selection models are smaller than that of social causation models when five waves of data are used.

Table 5.1 Sample Sizes and Observations for Individual Growth Models

| Theoretical model | Dependent variable | Independent variable(s) | Sample size | Observations |
|---|---|---|---|---|
| Social causation | Health | Employment status | 4215 | 22105 |
| | | Occupational status | 4101 | 17895 |
| Health selection | Employment | Health | 4214 | 15918 |
| | Occupation | | 4008 | 13959 |
| | Occupational mobility | | 3893 | 13368 |

## Social Causation: Growth Curve Models

In growth curve models, I first analyze a model that examines the dynamics of gender differences of health over time. Then I add other important controls, such as race, education, income and family-related factors. Next, I examine the relationship between the occupation-related variables (employment status and occupational status score) and self-reported health in three steps. For each independent variable, I first measure the fixed effects. In subsequent models, interaction effects between gender and employment and

occupation are added to determine whether the overall health rewards of employment and occupation differ for women and men across the life course. Last, I separate the samples and observations into two sum-samples: (1) observations of those reporting employment and a particular occupational status, (2) observations of those reporting non-employment at any wave. As in the first two models, nested hierarchical linear models are run for these two sub-samples.

**Employment Status as the Independent Variable**

Model 1 of Table 5.2 includes only the dummy variable gender and two interactions, female*age and female*age$^2$ to demonstrate the changing effect that gender has on health with aging. Women experienced significantly poorer health than men, but this gap got smaller as the respondents aged. However, even at the oldest working age (64 years), women still reported poorer health than men.

Model 2 of Table 5.1 adds in education, income, and race. Consistent with previous research, both higher education and household income brought about improved health. Furthermore, race had a marked effect on results. After controlling for education and income, blacks reported poorer health than whites. After introducing education, income, and race to the model, the effect of being female on health declines (from 0.167 to 0.097), meaning that part of the female health disadvantage results from education, income and race. Neither education nor income has interaction effect with gender on health (coefficients not shown here), indicating that both education and income are equally beneficial for the health of men and women.

Findings show that neither cohort nor region is associated with health status. Since cohort is found to be a robust predictor of health in a number of previous studies

(e.g. Wilson et al 2007, Shuey and Wilson 2008, Weise 2009), one possible reason for the current finding is that the respondents in the current study are relative young (25-49 in 1989), so that the cohort effect is not as significant as in more diverse age groups (see from 25-75).

Consistent with previous studies, married people reported better health than those currently not married after controlling for other variables (Model 3, Table 5.1); the health rewards from marriage were similar for men and women, which is inconsistent with some previous research (Hardinge 2009; Monin and Clark 2011). Having young children (<6) was weakly associated with poorer health for both genders, while having children improved individual health for both genders across the life course. The later finding, indicating a health reward for child rearing, has not been previously reported.

Table 5.2 Growth Curve Models of Self-Reported Health[a] and Employment Status, 1989-2005 (N=4,215)

| | Baseline | | | Employment Status | | |
|---|---|---|---|---|---|---|
| | Model 1 (SE) | Model 2 (SE) | Model 3 (SE) | Model 4 (SE) | Model 5 (SE) | Model 6 (SE) |
| Intercept | 2.2208*** | 2.1368*** | 2.209*** | 2.407*** | 2.562*** | 2.5888 |
| | (0.0186) | (0.0183) | (0.0236) | (0.0284) | (0.0356) | (0.0371) |
| Age (centered) | 0.0237*** | 0.0247*** | 0.0237*** | 0.0228*** | 0.0220*** | 0.0293*** |
| | (0.0246) | (0.0008) | (0.0008) | (0.0009) | (0.0008) | (0.0015) |
| age$^2$ | 0.0002*** | 0.0002*** | 0.0002*** | 0.0000 | 0.0000 | -0.0005*** |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 |
| Female | 0.1607*** | 0.0984*** | 0.0952*** | 0.0609** | -0.1148** | -0.0911* |
| | (0.0246) | (0.0220) | (0.0211) | (0.0217) | (0.0369) | (0.0373) |
| Black | | 0.4044*** | 0.3892*** | 0.3880*** | 0.3849*** | 0.3860*** |
| | | (0.0252) | (0.0252) | (0.0251) | (0.0251) | (0.0250) |
| Education(centered) | | -0.1039*** | -0.1024*** | -0.0988*** | -.0981*** | -0.0976*** |
| | | (0.0052) | (0.0052) | (0.0051) | (0.0052) | (0.0052) |
| Household income(logged) | | -0.0482*** | -0.054*** | -0.0433 | -0.0424 | -0.0483** |
| | | (0.0059) | (0.006) | (0.0062) | (0.0062) | (0.0173) |
| Marital Status | | | -0.0518*** | -0.0536*** | -0.0486 | -0.0212*** |
| | | | (0.0173) | (0.0173) | (0.0173) | (0.0062) |
| Number of Kids | | | -0.0206** | -0.0246** | -0.0232*** | |
| | | | (0.006) | (0.0061) | (0.0062) | |
| Employment | | | | -0.235*** | -0.3839*** | -0.4250*** |
| | | | | (0.0163) | (0.0298) | (0.0331) |
| Female*Age | -0.0021* | | | | | |
| | (-0.0016) | | | | | |

Table 5.2 (Continued)

| | Model 1 | Model 2 | Model 3 | Model 4 | model 5 | model 6 |
|---|---|---|---|---|---|---|
| Female*Employment | | | | | 0.2068*** | 0.1878*** |
| | | | | | (0.00351) | (0.0368) |
| Age*Employment | | | | | | -0.0076*** |
| | | | | | | (0.0016) |
| $Age^2$*Employment | | | | | | 0.0007*** |
| | | | | | | (0.0002) |
| Female*Age*Employment | | | | | | (-0.0026) |
| | | | | | | 0.0017 |
| Variance Components | Model 1 | Model 2 | Model 3 | Model 4 | model 5 | model 6 |
| Level-1 residual | 0.5432 | 0.4122 | 0.4077 | 0.3944 | 0.39231 | 0.3899 |
| Deviance[b](heterogeneous model) | 48892.5 | 47937.6 | 47914.3 | 47707.3 | 47672.7 | 47625.55 |
| # of Parameter | 11 | 13 | 15 | 16 | 17 | 19 |

Note: N=4215 individuals; 22105 observations. Standard errors in parentheses.

a. Health is coded as 1 represents *excellent health* and 5 represents *poor health*.
b. Significance tests indicate that for each model, model fit is significantly improved compared to less nested models. The differences between the deviance statistics for models is chi square distributed.
* p<.05. ** p<.01. *** p<.001.

Consistent with previous research, those currently employed reported much better health than those non-employed (Table 5.2, Model 4). Employment status did not completely explain the gender differences in health; controlling for employment status, women still reported significantly worse health than men. In addition, the health effect of having a young child (<6) was no longer significant, indicating that the association between health and having young children is mainly explained by employment status. In Model 5, an important interaction between gender and education indicated that women experienced significantly fewer health rewards from employment than men did. After controlling for the interaction of gender and employment status, the gender health disparity even reversed (from 0.06 to -0.11). The reversal of gender health gap suggests that if employed women (of average education/income) enjoyed the same health benefit of employment as men, they would experience better health than men.

Model 6 adds interaction terms between age, employment, and gender. The interaction between employment and age was significant and negative, indicating that employment health benefits increase with age, although the increasing rate decreased slightly in late age. However, the three-way interaction between gender, employment status, and age is positive but not significant, suggesting that the increasing health return with age is similar for men and women.

**Employment Status and Occupation as the Independent Variables**

Table 5.3 demonstrates the gendered health inequality among those reporting an occupation at least two years ago, using both employment status and occupational status score as the independent variables. Compared to Table 5.2, the sample size reduces to 4101, and the number of observations is 17895.

Model 1 to Model 6 in Table 5.3 are comparable nested models to the ones in Table 5.2. Most of the coefficients in these two tables are similar, and include education, income, race, family structural factors, and employment. However, it is worth noting some differences between these two tables. First, those who report a recent occupation typically experience better health than those who do not. Second, the coefficient of employment is smaller in Table 5.3 than in Table 5.2 (-0.43 vs. -0.28, in Model 6). Third, after introducing the interaction of gender and employment, the gendered health gap disappeared (Model 6, Table 5.2), but was not reversed as in Table 5.2. Moreover, the coefficient of this interaction is also smaller in Table 5.3.

Last but importantly, the three-way interaction of gender, age, and employment is positive and significant, meaning that, for those who reported a recent occupation, men received increasingly greater health returns from employment with age than women. In addition, the coefficient of the interaction of gender and age decreases dramatically (from -0.004 to -0.015), meaning that the decline in health that women experience with age is just half that of men (coefficient of age = -0.032). Specifically, comparing Model 1 and Model 6, the coefficient of age for men increases from 0.0207 to 0.0324, while it remains similar for women (0.017 in both models). Thus the health advantage that men enjoy are mainly from their higher SES status, higher employment rate and higher health return to employment. Even with these health facilitating advantages, the average health status of men still declines faster with aging than that of women. If men and women have similar SES and enjoy similar health return to employment, the health declining rate of men is going to be twice as that of women, reversing the gender health gap at middle age, and reporting increasing health disadvantage each year toward the oldest observing age of 65.

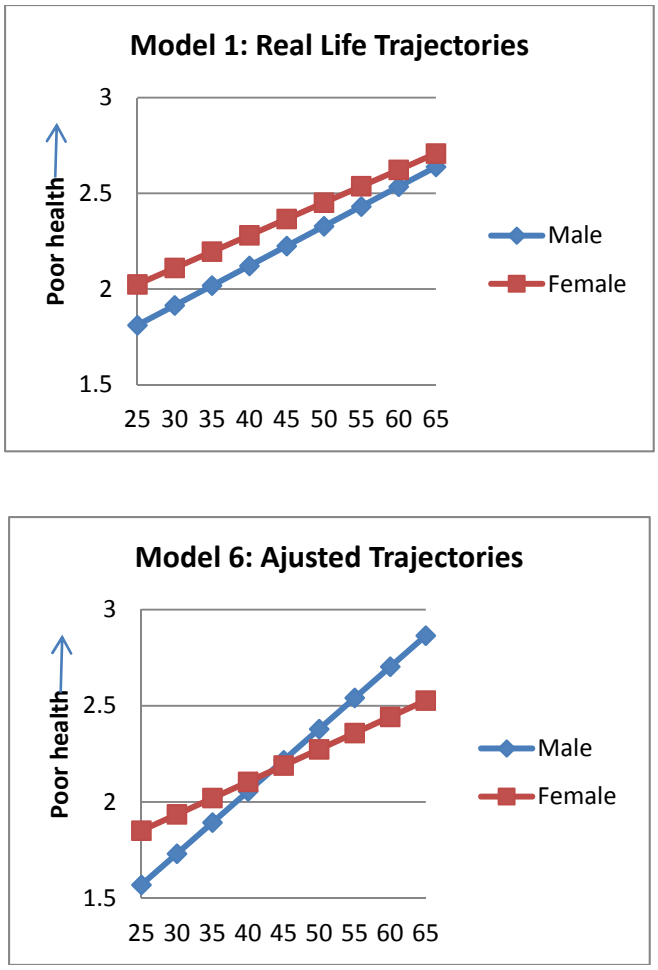



Figure 5.1 Predicted Trajectories of Self-Reported Health by Gender: Model 1vs. Model 6

Including interactions in the model, the fixed effects compared employed men women of average age, education, and income, indicating that that women would have better health than men if they got the same health rewards from employment across time; the health declining rate of women would also be much smaller than that of men. Figure 1 visualizes the gender gap of health declining rates before and after adding all the controls, dependent variables and interactions, showing a trend from convergence to

reversal of gendered health gap with aging if women enjoy same health return to employment.

Model 7 of Table 5.4 adds occupational status score to the model. Consistent with previous research, higher occupational status improved health status for both men and women. The interaction between occupation and age was significant and negative, although small, indicating that occupational health benefits increase slightly with age. In addition, the interaction between gender and occupation is not statistically significant, indicating that the health benefit of occupation is similar for men and women. This result is inconsistent with some previous research that finds the occupation-related health inequality is more evident among men than among women (Elo 2009).

**The Gendered Health Gap among Those Employed and Those Non-Employed**

To test whether individual occupation is the factor that causes the health deficit of employed women, I separate the sample into two sub-samples. One sub-sample consists of the working respondents: those who were employed and reported their occupation for at least one wave. The sample size for the employed is 4020, and the number of observations is 14646. Another sub-sample consists of the non-employed respondents, those who reported non-employment for at least one wave. The sample size for the non-employed is 1744, and the number of observations is 3803.

Table 5.3 Growth Curve Models of Self-Reported Health and Occupation, 1989-2005 (N=4,101)

| | Baseline | | | Employment | | | OSS |
|---|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
| | (SE) | (SE) | (SE) | (SE) | (SE) | (SE) | (SE) |
| Intercept | 2.1869*** | 2.0941 | 2.1856*** | 2.3221*** | 2.413*** | 2.440*** | 2.438*** |
| | (0.0177) | (0.0180) | (0.02287) | (0.0306) | (0.0356) | (0.0322) | (0.0447) |
| Age (centered) | 0.0207*** | 0.0229*** | 0.0225*** | 0.0221*** | 0.0224*** | 0.0324*** | 0.0318*** |
| | (0.0246) | (0.0012) | (0.0012) | (0.0012) | (0.0008) | (0.0038) | (0.0039) |
| $age^2$ | 0.0012*** | 0.0002*** | 0.0000 | | | 0.0008*** | 0.0009*** |
| | 0 | 0.0000 | 0.0000 | | | (0.0002) | (0.0002) |
| Female | 0.148*** | 0.0942*** | 0.0896*** | 0.0814** | -0.0522 | -0.0533 | -0.0555 |
| | (0.0246) | (0.0220) | (0.0215) | (0.0215) | (0.0462) | (0.0419) | (0.0435) |
| Black | | 0.3830*** | 0.3681*** | 0.3645*** | 0.3652*** | 0.3652*** | 0.3540*** |
| | | (0.0249) | (0.0251) | (0.0251) | (0.0251) | (0.0250) | (0.0251) |
| Education(centered) | | -0.0900*** | -0.0885*** | -0.0874*** | -0.0872*** | -0.0871*** | -0.0800*** |
| | | (0.0052) | (0.0052) | (0.0052) | (0.0052) | (0.0052) | (0.0054) |
| Household Income(logged) | | -0.0388*** | -0.0441*** | -0.0433*** | -0.0429 | -0.0427*** | -0.0392*** |
| | | (0.0069) | (0.0072) | (0.0062) | (0.0072) | (0.0072) | (0.0073) |
| Marital Status | | | -0.0597*** | -0.0536*** | -0.0537** | -0.0529** | -0.0502** |
| | | | (0.0179) | (0.0173) | (0.0179) | (0.0179) | (0.0178) |
| Number of Kids | | | -0.0206*** | -0.0246** | -0.0211** | -0.0191** | -0.0196** |
| | | | (0.006) | (0.0061) | (0.0064) | (0.0066) | (0.0066) |
| Having kid(s) <6 | | | 0.0325* | 0.0285 | | | |
| | | | (0.0160) | (0.0156) | | | |
| Employment | | | | -0.1447*** | -0.2436*** | -0.2284*** | -0.3135*** |
| | | | | (0.0208) | (0.0366) | (0.0207) | (0.0411) |

Table 5.3 (Continued)

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
|---|---|---|---|---|---|---|---|
| OSS | | | | | | | -0.0014*** |
| | | | | | | | (0.0003) |
| Female*Age | -0.0036** | -0.0037* | -0.0044** | -0.0039** | -0.0037* | -0.0148** | -0.0155** |
| | (0.0017) | (0.0016) | (0.0016) | (0.0016) | (0.0016) | (0.0048) | (0.0048) |
| Female*Employment | | | | | 0.1445*** | 0.09812*** | 0.1387*** |
| | | | | | (0.0445) | (0.0207) | (0.0207) |
| Age*Employment | | | | | | -0.0113** | -0.0110** |
| | | | | | | (0.0039) | (0.0039) |
| $Age^2$*Employment | | | | | | 0.0010*** | 0.0010*** |
| | | | | | | (0.0002) | (0.0002) |
| Female*Age*Employment | | | | | | 0.0117* | 0.0117* |
| | | | | | | (0.0002) | (0.0002) |
| Female*OSS | | | | | | | -0.0001 |
| | | | | | | | (0.0005) |
| Age*OSS | | | | | | | -0.00006* |
| | | | | | | | (0.00003) |
| Variance Components | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
| Level-1 residual | 0.4662 | 0.3703 | 0.3658 | 0.3636 | 0.3634 | 0.3630 | 0.3603 |
| Deviance(heterogeneous model) | 42142.3 | 41392.9 | 41368.6 | 41320.8 | 41313.59 | 41285.0 | 41262.8 |
| # of Parameter | 11 | 14 | 16 | 17 | 17 | 21 | 23 |

Note: N=4101 individuals; 17895 observations. Standard errors in parentheses.
a. Health is coded as 1 represents excellent health and 5 represents poor health.
b. Significance tests indicate that for each model, model fit is significantly improved compared to less nested models. The differences between the deviance statistics for models is chi square distributed.
* p<.05. ** p<.01. *** p<.001.

Table 5.4 shows the growth curve models of health status for the employed and non-employed separately. The first four columns of Table 5.3 show the nested models for the employed, and the last two columns are for the non-employed. Model 1 of Table 5.3 shows that employed women reported significantly poorer health than men, but this gap became smaller with age. Even at the oldest working age (64 years), this gendered health gap is still evident.

Table 5.4, Model 2 adds all the control variables and shows a reduced gender effect on health. Consistent with the models in Table 5.2, race, education, income and family structure factors all have significant effects on individual health status. Model 3 of Table 5.3 adds occupation to the model and further reduces the gender gap of health. Consistent with previous study, higher occupational status is associated with better health. The beneficial effect of occupation works the same for men and women as they age.

A comparison of Model 3 in Table 5.4 with Model 7 in Table 5.3 reveals that the individual health growth model of the employed is similar to that of those who reported an occupation (that includes both the employed and non-employed). However, for the employed population, after controlling for all other variables, women still reported poorer health than men. This finding indicates that, there are latent factors besides occupation that are working to make the gender differences of health return from employment.

Table 5.4 Growth Curve Models of Self-Reported Health of the Employed and the Non-Employed, 1989-2005

| | Employed[a] | | | | Non-Employed[b] | |
|---|---|---|---|---|---|---|
| | Baseline | | | OSS | | |
| | Model 1 (SE) | Model 2 (SE) | Model 3 (SE) | Model 4 (SE) | Model 5 (SE) | Model 6 (SE) |
| Intercept | 2.1577*** | 2.1426*** | 2.1485*** | 2.1478*** | 2.8229*** | 2.6702*** |
| | (0.0176) | (0.0240) | (0.0240) | (0.0240) | (0.013) | (0.0499) |
| Age (centered) | 0.0195*** | 0.0208*** | 0.0205*** | 0.0205*** | 0.0282*** | 0.0366*** |
| | (0.0012) | (0.0012) | (0.0012) | (0.0012) | (0.0042) | (0.0025) |
| age2 | 0.0002** | 0.0002** | 0.0002* | 0.0002* | 0.0004** | 0.0004** |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 |
| Female | 0.141*** | 0.0928*** | 0.0850*** | 0.0850*** | -0.1712** | -0.1523** |
| | (0.0236) | (0.0215) | (0.0217) | (0.0217) | (0.0573) | (0.0505) |
| Black | | 0.3675*** | 0.3554*** | 0.3556*** | | 0.3912*** |
| | | (0.0251) | (0.0254) | (0.0254) | | (0.0505) |
| Cohort | | | | | | -0.0500* |
| | | | | | | (0.0223) |
| Education(centered) | | -0.0853*** | -0.0776*** | -0.0778*** | | -0.1246*** |
| | | (0.0053) | (0.0056) | (0.0056) | | (0.0106) |
| Household Income(logged) | | -0.0395* | -0.0356*** | -0.0356*** | | -0.0591*** |
| | | (0.0076) | (0.0076) | (0.0076) | | (0.0117) |
| Marital Status | | -0.0508** | -0.0482** | -0.0482** | | |
| | | (0.0183) | (0.0183) | (0.0183) | | |
| Number of Kids | | -0.0187** | -0.0190** | -0.0191** | | |
| | | (0.006) | (0.0068) | (0.0068) | | |
| Having kid(s) <6 | | 0.0325 | | | | |
| | | (0.0160) | | | | |
| OSS | | | -0.0014*** | -0.0012*** | | |
| | | | (0.0003) | (0.0004) | | |
| Female*Age | -0.0033 | -0.0037** | -0.0034** | -0.0033** | -0.0174 | |
| | (0.0017) | (0.0017) | (0.0017) | (0.0017) | (0.0047) | |
| Female*OSS | | | | -0.0005 | | |
| | | | | (0.0006) | | |
| Variance Components | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Level-1 residual | 0.4491 | 0.3579 | 0.3550 | 0.3549 | 0.7387 | 0.5425 |
| Deviance[c] (heterogeneous model) | 38017.3 | 37557.0 | 37539 | 37538 | 10612.0 | 10300.2 |
| # of Parameter | 11 | 16 | 17 | 18 | 11 | 14 |

a: Sample size= 4020, observation=16464

b: Sample size=1744, observation=3803

c: Significance tests indicate that for each model, model fit is significantly improved compared to less nested models. The differences between the deviance statistics for models is chi square distributed.

* p<.05. ** p<.01. *** p<.001.

The non-employed (Model 5 and 6 of Table 5.4) reported poorer health than the employed. Nevertheless, non-employed women enjoyed better health than non-employed men, controlling for all other variables. Furthermore, this gendered health gap lasted across the life course, neither increasing nor decreasing with age. Also, cohort was inversely associated with health. That is, for the non-employed, the older cohorts reported better health. For the non-employed population, there was no interacting effect between gender and other predictors.

Thus the gendered health gaps are quite different among the employed and the non-employed observations. Compared to employed women, employed men reported better health and enjoyed greater health rewards from employment with age. On the contrary, non-employed men reported poorer health than non-employed women, and this health gap did not change across the life course. Moreover, the older cohorts of the non-employed reported better health than the younger cohorts for both men and women. The poor health status of young, non-employed men may result from health selection. Because health and employment status used in the hierarchical models are from the same years, it is difficult to distinguish the health selective effects from the social causation models. In the next section, health selection models will be presented, using health one wave earlier to predict one's employment and occupational status, clarifying how these measures are related.

Therefore, the general indicators of SES, occupation, education, and income, influence health status the same for men and women as they age, as do family-related factors. However, these factors cannot completely explain the gender differences in health, even when adding another important factor of employment status. After

controlling the significant interactions between gender, employment status and age, the health gap between men and women disappears, or even reverses, among those reporting of most recent occupational status. This suggests that working women receive significantly fewer health rewards from employment than working men, and also experience a health deficit from employment that increases with age.

## Health Selection: General Logistic Modeling and General Linear Modeling

To test the health selection hypothesis, I run many different statistical models because the dependent variables vary from continuous variable to categorical variables. First, I run general logistic random-intercept models to examine the effects of health on employment status, a dichotomous dependent variable. Next, I run the hierarchical linear models to test the health selective effects on occupational status, a continuous variable. Last I use general linear latent models to study the selective effects of health on occupational mobility, which is a nominal variable. For all the analyses in this section, health is measured one wave earlier to exclude social causation effects. Therefore, health is observed from 1989 to 2001; other variables are observed from 1994 to 2005. The only exception is occupation in the general linear latent model, which is also observed one wave earlier so as to control the effect of previous occupation on subsequent occupational mobility.

### General Logistic Random-Intercept Models

The models presented in Table 5.5 address health selective effects on employment status among respondents who were between 30-54 years of age in 1994. Model 1 in Table 5.5 includes only age, cohort, and their interaction with gender. After controlling

for age and cohort, the odds of a woman to be employed were 12 percent of that of a man. Moreover, the interaction between female and cohort showed that the chances of employment for women of older cohorts were even lower than that of younger cohorts. The odds of being employed decreased with age for man, but increased for women. However, even at the oldest working age (64 years), women still reported lower employment rates than men.

Model 2 of Table 5.5 adds education, household income, and race to the analysis. The gender gap on employment status increased after adding the controls, as the odds of women being employed were 9.2 percent as that of men. Consistent with previous studies, higher education and higher household income were associated with higher chances of being employed. However, the association between income and employment status can be explained this way: employment leads to higher household income. There was no joint effect between education and gender, nor between income and gender on employment status. Race was a robust predictor of individual employment status and also interacted with gender on employment. The odds of being employed for a black male were 37 percent of that of a white male. However, the odds of employment for a black women, were three times that for a black men. The cohort effects and the interaction between female and cohort disappeared after introducing SES and race, suggesting that the employment disadvantage that was experienced by older cohorts (especially older females) can mainly be explained by their lower level of education.

Table 5.5 Odds Ratios of General Logistic Random-Intercept Models of Employment Status and health[a], 1989-2005 (N=4214)

| | Baseline Models | | | Health | |
|---|---|---|---|---|---|
| | Model 1 (SE) | Model 2 (SE) | Model 3 (SE) | Model 4 (SE) | Model 5 (SE) |
| Age (centered) | 0.9227** | 0.9195*** | 0.9198*** | 0.9315*** | 0.9315*** |
| | (0.0126) | (0.0093) | (0.0099) | (0.0102) | (0.0102) |
| $Age^2$ | 0.9928*** | 0.9934*** | 0.9939*** | 0.9937*** | 0.9937*** |
| | (0.0005) | (0.0005) | (0.0005) | (0.0005) | (0.0005) |
| Cohort | 1.1200 | 1.1352 | | | |
| | (0.1180) | (0.1097) | | | |
| Female | 0.1173*** | 0.0924*** | 0.8520 | 0.7135 | 0.7133 |
| | (0.0152) | (0.0139) | (0.1925) | (0.2151) | (0.2151) |
| Black | | 0.3657*** | 0.5041*** | 0.5587** | 0.5436** |
| | | (0.0717) | (0.0922) | (0.1001) | (0.1001) |
| Education(centered) | | 1.2331*** | 1.2478*** | 1.1893*** | 1.1873*** |
| | | (0.0321) | (0.0322) | (0.0302) | (0.0302) |
| Logged Income (centered) | | 1.6653*** | 1.6636*** | 1.6352*** | 1.6352*** |
| | | 0.0594 | (0.0605) | (0.0605) | (0.0605) |
| Marital Status | | | 3.7801*** | 3.3778*** | 3.3778*** |
| | | | (0.6269) | (0.5164) | (0.5164) |
| Kid_under6 | | | 0.6759*** | 0.6820*** | 0.6820*** |
| | | | (0.0689) | (0.0690) | (0.0690) |
| Number of Kids | | | 1.1466 | 1.1578 | 1.1578 |
| | | | (0.0844) | (0.0843) | (0.0843) |
| Female*Age | 1.0741*** | 1.0815*** | 1.0456*** | 1.0420** | 1.0420** |
| | (0.0124) | (0.0125) | (0.0127) | (0.0125) | (0.0125) |
| Female*Cohort | 0.7837* | 0.8187 | | | |
| | (0.0943) | (0.9646) | | | |
| Female*Black | | 3.2038*** | 2.053** | 2.0402** | 1.9871** |
| | | (0.7631) | (0.4940) | (0.4234) | (0.4234) |
| Female*Marital Status | | | 0.1035*** | 0.1101*** | 0.1070*** |
| | | | (0.0171) | (0.0179) | (0.0193) |
| Female*Kid6 | | | 0.6621 | | |
| | | | (0.1578) | | |
| Female*Number of Kids | | | 0.6815*** | 0.6705*** | 0.6676*** |
| | | | (0.0570) | (0.0555) | (0.0561) |
| Health | | | | 0.6588*** | 0.6331*** |
| | | | | (0.0265) | (0.0378) |
| Female*health | | | | | 1.0239 |
| | | | | | (0.0643) |
| Female*health*age | | | | | 0.9905 |
| | | | | | (0.0054) |
| Variance Components | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| Level 2 variance | 7.0172 | 5.8830 | 5.5474 | 5.1677 | 5.1626 |
| level 1 & 2 Covariance | 0.4635 | 0.4113 | 0.3940 | 0.3733 | 0.3731 |
| Log likelihood | -6024.69 | -5808.54 | -5724.13 | -5671.80 | -5670.33 |
| Wald Chi-Square[b] | 529.28 | 784.76 | 902.49 | 984.10 | 984.80 |
| df | 6 | 10 | 14 | 14 | 15 |

N=4214 individuals; 15918 observations. Standard errors in parentheses.
Significance tests indicate that for each model, model fit is significantly improved compared to less nested models. The differences between the deviance statistics for models is chi square distributed.
* p<.05. ** p<.01. *** p<.001.

Model 3 introduces family structural factors, such as marital status and number of children. After adding the family structural factors and their interactions with gender, the gender gap of employment status disappeared. Being married, having more children, and having young children (<6) all significantly reduce women's chances of being employed. Conversely, these factors had no effect on men's employment status. As such, low employment rates of women are mainly explained by their traditional family responsibilities.

Model 4 in Table 5.5 adds health to the nested model. Poor health strongly decreased the likelihood of being employed. The odds of employment for those who reported very good health (health=3) were 40 percent of the odds of those who reported excellent health (health=1); the odds of employment for those who reported poor health (health=5) were only 16 percent of the odds of those with excellent health. Model 5 of Table 5.5 adds the interaction of gender and health, and the three-way interaction of gender, health, and age; none was significant.

Thus, an analysis of the effect of earlier waves' health on employment status shows that poor health status selects individuals out of employment, across both genders and all ages and cohorts. Poor health and SES are the major predictors of men being selected out of the labor force. However, for women, family responsibilities largely contribute to select them out of the labor force, besides health and SES. This finding also helps to explain the health disadvantage of unemployed men in Model 5 and 6 of Table 5.4.

**Hierarchical Linear Modeling**

The models presented in Table 5.6 address health selective effects on the occupational status score among respondents who were between 30-54 years of age in 1994. Model 1 in Table 5.6 included only age, gender, and the interaction between age and gender. It shows that, on average, women reported lower occupational status than men. With aging, men's occupational status decreased slightly, while women's occupational status increased slightly.

Control variables were added in Model 2: cohort, race, education, and income. With controls, blacks, on average, reported 10 points lower on occupational status scores. Higher education was associated with higher occupational status: a male college graduate reported an occupational status score 24 points higher than a male high school graduate. However, the negative value of the interaction between education and women indicated that women did not enjoy the same occupational rewards from education as men. Women college graduates reported an occupational status score only 20.5 points higher than women high school graduates. Higher household income was also associated with higher occupational status, although it was hard to confirm the causal direction. Men of older cohorts reported higher occupational status scores, while there were no cohort occupational differences among women. After controlling for these variables, the gender gap on the occupational status score diminished and was no longer statistically significant, indicating that education, in concern with the interaction between gender and cohort, mainly explain the female disadvantage on occupational status. This finding is different from the findings of gender gap on employment status, which is mostly explained by family structural factors, instead of education or cohort effects (see Model 3 of Table 5.5).

Table 5.6 Growth Curve Models of Occupational Status and Self-Reported Health[a], 1989-2005 (N=4008)

| | Baseline Models | | | Health | |
|---|---|---|---|---|---|
| | Model 1 (SE) | Model 2 (SE) | Model 3 (SE) | Model 4 (SE) | Model 5 (SE) |
| Intercept | 63.5190*** | 60.9115*** | 57.0276*** | 57.0756*** | 57.0762*** |
| | (0.5345) | (1.2538) | (0.7277) | (0.7274) | (0.7274) |
| Age (centered) | -0.1582** | -0.4043*** | -0.4097*** | -0.3972*** | -0.3983*** |
| | (0.4206) | (0.0475) | (0.0457) | (0.0459) | (0.0460) |
| $Age^2$ | -0.0240*** | -0.0217*** | -0.0216*** | -0.0216*** | -0.0216*** |
| | 0.0025 | 0.0024 | 0.0024 | 0.0024 | 0.0024 |
| Female | -7.4642*** | -3.3342 | -1.7473 | -1.6857 | -1.6540 |
| | (0.7143) | (1.841) | (1.9401) | (1.841) | (1.841) |
| Black | | -9.7536*** | -7.6799*** | -7.4617*** | -7.4537*** |
| | | (0.6485) | (0.6379) | (0.6405) | (0.6410) |
| Education(centered) | | 5.8820*** | 5.6300*** | 5.5748*** | 5.5821*** |
| | | (0.1326) | (0.1326) | (0.1831) | (0.1846) |
| logged Income (centered) | | 1.8490*** | 1.9731*** | 1.9721*** | 1.9737*** |
| | | (0.2408) | (0.2413) | (0.2413) | (0.2413) |
| Employment status | | 0.1401 | 0.1796 | 0.1209 | 0.1198 |
| | | (0.9499) | (0.8547) | (0.8547) | (0.8547) |
| Cohort[b] | | 1.4931*** | 2.7775*** | 2.2674** | 2.2654** |
| | | (0.2772) | (0.3318) | (0.3313) | (0.3314) |
| Marital Status | | | 4.2288*** | 4.1456*** | 4.1547*** |
| | | | (0.7023) | (0.7025) | (0.7025) |
| Female*Age | 0.2290*** | 0.2426*** | 0.1657*** | 0.2618*** | 0.2618*** |
| | (0.0588) | (0.0666) | (0.0412) | (0.0614) | (0.0615) |
| Female*Education | | -0.9107** | -0.8546** | -0.8491*** | -0.8491*** |
| | | (0.2595) | (0.2582) | (0.2577) | (0.2577) |
| Female*Income | | 2.1739*** | 2.0209*** | 2.0172*** | 2.0133*** |
| | | (0.3540) | (0.3560) | (0.3560) | (0.3561) |
| Female*Employment | | 2.8818*** | 2.7130*** | 2.7406*** | 2.7406*** |
| | | (1.1680) | (0.9786) | (0.9782) | (0.9782) |
| Female*Cohort | | -1.7940*** | -1.9844*** | -1.9832*** | -1.9800*** |
| | | (0.5320) | (0.3806) | (0.3802) | (0.3804) |
| Female*Marital Status | | | -3.0665*** | -3.0456** | -3.0602*** |
| | | | (0.9056) | (0.9050) | (0.9062) |
| Health | | | | -0.5900* | -0.5276 |
| | | | | (0.1967) | (0.2808) |
| Female*Health | | | | | -0.1215 |
| | | | | | (0.3906) |
| Variance Components | | | | | |
| Level-1 residual | 444.31 | 228.00 | 225.00 | 223.64 | 223.65 |
| Deviance[c] | | | | | |
| (heterogeneous model) | 1322360.1 | 120149.1 | 120114.14 | 120105.18 | 120105.08 |
| # of Parameter | 10 | 19 | 20 | 21 | 22 |

Note: : N=4008 individuals; 13959 observations. Standard errors in parentheses.

a. Cohort is center at the youngest age of entry into the sample, age 25.

b. Significance tests indicate that for each model, model fit is significantly improved compared to less nested models. The differences between the deviance statistics for models is chi square distributed.

* p<.05. ** p<.01. *** p<.001.

Model 3 in Table 5.6 introduces family structural variables and shows that married men, on average, reported higher occupational status scores (4.2 points), but the interaction between marital status and gender was negative 3, indicating that women enjoyed fewer occupational benefits from marriage than men. Other family structural factors, number of children and having a child or children under 6, were not associated with individual occupational status for either men or women.

Model 4 in Table 5.6 adds health to the nested model and shows that poorer health is negatively associated with occupational status score; the association is weak, though. For those who reported poor health (=5) in a certain year, their average occupational status score was 2.4 points lower than those with excellent health (=1) in the same year after controlling for other variables. Similarly, for a respondent who had experienced the worst health change (i.e. those who reported excellent health at 1989 and then poor health in 2001), his/her occupational status score was 2.4 points lower in 2005 than that in 1994 after controlling for other variables. Considering the occupational status score ranged from 0 to 100, 2.4 points out of 100 did not make any difference. It could not even be considered as occupational mobility, which was defined in Chapter III as a 10-point change of occupational status score. Model 5 in Table 5.7 brought together the interaction between health and gender and found no statistically significant difference between men and women.

Thus health has a significant but very weak effect on individual occupational status for both genders. The gender gap of occupational status is mainly explained by education, marriage status, and the interactions of gender with education, marriage, and cohort. On average, women are less educated and report lower rates of marriage.

Moreover, occupational facilitators, such as education, marriage and older cohorts, benefit men and women unequally. Women receive significantly fewer occupational benefits from education, marriage, and cohort than men do.

**General Linear Latent and Mixed Models**

Table 5.7 illustrates the health selective effects on occupational mobility among respondents who were between 30-54 years of age in 1994 and reported an occupation in each wave from 1994 to 2005. The sample size is 3893, and the number of observations is 13368. The reference group is people of lateral occupational mobility from 1994 to 2005.

*Downward Occupational Mobility*

Models 1 to 3 of Table 5.7 examine the selective effects on downward occupational mobility. Model 1 includes only age, gender, and the interaction between age and gender. It shows that the odds for women to experience downward instead of lateral mobility are almost 40 percent greater than that of men. With aging, both men and women faced increasing odds of downward mobility, and the increasing rates sped up at later ages. There was no interaction effect between gender and age on downward mobility.

Model 2 in Table 5.7 adds all other control variables, such as cohort, race, education, income, occupation in the previous wave, family structural factors, and the interaction between gender and all these controls. Cohort had a powerful effect on individual downward mobility; recent cohorts faced much higher risk of downward mobility than earlier cohorts. For example, the odds of downward, instead of lateral,

mobility for the most recent cohort are five times higher than the earliest cohort. Blacks were disadvantaged and faced higher odds of downward mobility than whites.

Consistent with previous research, education and household income were both negatively associated with downward mobility. Education strongly contributed to prevent downward mobility. The odds of downward mobility for respondents with only high school diplomas were two times greater than respondents with four years of college, after controlling for other variables. Previous occupation was positively associated with downward mobility; the higher the occupation, the more chances one has to move downward. The interaction between gender and occupation shows that at the same occupational level, women faced higher risks of downward mobility than men did.

Among all the family characteristics, only marital status affected respondents' downward occupational mobility, and it interacted with gender. Marriage prevented both men and women from moving downward, but marriage benefitted men and women unequally. Compared to married men, the odds of downward mobility for married women were 65 percent higher. Parenthood, measured by number of children and presence of young children, was not associated with downward mobility for either men or women. After adding all these controls, the gender difference of downward occupational mobility was no longer statistically significant; so, women’s greater odds of downward mobility are mainly explained by their lower education, income, and marital status, and by the unequal protective effects from marriage and occupation.

Table 5.7 Odds Ratios of General Linear Latent and Mixed Models of Occupational mobility and Health[a] 1989-2005 (N=3893)

| | Downward Mobility | | | Upward Mobility | | |
|---|---|---|---|---|---|---|
| | Baseline Models | | Health | Baseline Models | | Health |
| | Model 1 (SE) | Model 2 (SE) | Model 3 (SE) | Model 4 (SE) | Model 5 (SE) | Model 6 (SE) |
| Age (centered) | 1.0142** | 1.0788*** | 1.0774*** | 0.9779** | 0.9928*** | 0.9943*** |
| | (0.0044) | (0.0071) | (0.0072) | (0.0041) | (0.007) | (0.0067) |
| $Age^2$ | 1.0019*** | 1.0003*** | 1.0003*** | 1.0017*** | 1.0030** | 1.0011** |
| | (0.0004) | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| Female | 1.3910*** | 1.613 | 1.5291 | 1.6789*** | 0.1393** | 0.1380** |
| | (0.0841) | (0.8783) | (0.833) | (0.0152) | (0.0975) | (0.0960) |
| Black | | 1.1806* | 1.1594* | | 0.7323*** | 0.7456*** |
| | | (0.0886) | (0.0877) | | (0.0557) | (0.0571) |
| Cohort | | 0.6396*** | 0.6192*** | | 0.8720** | 0.8610** |
| | | (0.0302) | (0.02499) | | (0.0448) | (0.0358) |
| Education | | 0.7592*** | 0.7631*** | | 1.1256*** | 1.1216*** |
| | | (0.0130) | (0.0132) | | (0.0221) | (0.0205) |
| Logged Income | | 0.7750*** | 0.7791*** | | 1.1251* | 1.1203* |
| | | (0.0302) | (0.0302) | | (0.0621) | (0.0610) |
| OSS | | 1.0322*** | 1.0322*** | | 0.9494*** | 0.9494*** |
| | | (0.0023) | (0.0023) | | (0.0021) | (0.0021) |
| Marital Status | | 0.0505*** | 0.0505*** | | 0.9155 | 0.9065 |
| | | (0.0530) | (0.0530) | | (0.1056) | (0.1044) |
| Health | | | 1.0718* | | | 0.9362 |
| | | | (0.0351) | | | (0.0316) |
| Female*Income | | 0.9292 | 0.9188 | | 1.2104* | 1.2042* |
| | | (0.0545) | (0.0529) | | (0.0925) | (0.0893) |
| Female*OSS | | 1.0062* | 1.0061* | | 1.0079** | 1.0077** |
| | | (0.0028) | (0.0028) | | (0.1437) | (0.0028) |
| Female*Mar | | 1.6646*** | 1.6470*** | | 0.9817 | 0.9864 |
| | | (0.2315) | (0.2290) | | 0.9000 | 0.9000 |
| Variance Components | | Downward Mobility | | | Upward Mobility | |
| Level 2 variance | 1.1440 | 1.0053 | 1.0041 | 7.0334 | 5.8830 | 5.1677 |
| Log likelihood | -11916.67 | -10493.61 | -10488.31 | -6026.70 | -5808.54 | -5671.80 |

Note: the reference category is people of horizontal mobility. N=3893 individuals; 13368 observations. Standard errors in parentheses.

a. Significance tests indicate that for each model, model fit is significantly improved compared to less nested models. The differences between the deviance statistics for models is chi square distributed.

* p<.05. ** p<.01. *** p<.001.

Model 3 in Table 5.7 adds health and shows that health contributed to respondents' downward occupational mobility. Others being equal, the odds of downward instead of lateral mobility of a person with poor health were 35 percent greater than that of a person with excellent health. There was no interactive effect between gender and health on downward mobility, supporting my hypothesis that poor health facilitates downward mobility.

In summation, poor health contributes to downward mobility for both men and women. Race, education, previous occupation and family income, and marital status are all powerful predictors of downward occupational mobility. Women's greater odds of downward mobility are mainly explained by their lower SES and marital status, and by the unequal protective effects from marriage and occupation.

*Upward Occupational Mobility*

Models 4 to 6 of Table 5.7 examine the selective effects on upward occupational mobility. Model 4 includes only age, gender, and the interaction between age and gender. It shows that the odds for women to experience upward instead of lateral mobility were almost 68 percent greater than that of men. With aging, both men and women faced decreasing odds of upward mobility, and the decreasing rates sped up at later ages. There was no interaction effect between gender and age on upward mobility.

Comparable to Model 2 in Table 5.7, Model 5 adds all other control variables: cohort, race, education, income, occupation in previous wave, family structural factors and the interaction between gender and all these controls. At that point, the gender gap of upward mobility reversed; the odds for women to experience upward instead of lateral mobility were only 14 percent as that of men.

Cohort had a powerful effect on individual upward mobility, as with downward mobility. Recent cohorts had higher chances of upward mobility than earlier cohorts. For example, the odds of upward mobility for the most recent cohort were twice as that for the earliest cohort. Blacks, again, were disadvantaged and had lower chances of upward mobility than whites.

Education and household income were both positively associated with upward mobility. Previous occupation was negatively associated with upward mobility; the lower one's occupation, the more opportunities s/he had to move up. Women, on average, reported lower occupational status than men; this finding helps explain why women experienced more chances of upward mobility. The interaction between gender and occupation showed at the same occupational level, women had greater chances to move upward. The interaction between gender and income showed that at the same household income level, women had greater chances of upward mobility than men did. Unlike in the case of downward mobility, none of the family structural factors were associated with respondents' upward mobility.

Model 6 in Table 5.7 adds health and shows that health is not associated with respondents' upward occupational mobility, either for men or women. This finding does not support my hypothesis that better health contributes to upward mobility.

In sum, better health does not contribute to upward mobility for either men or women. Previous occupation, education, family income, and cohort are the main predictors of upward occupational mobility. After introducing all these controls and interactions, the gender gap in upward occupational mobility reversed. This gender gap reversal of upward mobility indicates that women's advantage on upward mobility is

mainly explained by their generally much lower occupational status, and by the greater rewards of upward mobility from occupation and income. After controlling all these variables and interactions, women's chances of upward mobility are much lower than that of men's.

A comparison of both downward and upward mobility groups with the reference group of lateral mobility shows that poorer health leads to downward mobility, but better health does not lead to upward mobility. With age, the chances of upward mobility decrease, while the chances of downward mobility increase. Cohort is a powerful predictor of occupational mobility. The occupation of earlier cohorts are relatively stagnate, with people having fewer chances to move up or move down, while the more recent cohorts have more chances to experience both upward and downward mobility. Race plays a significant role as well. Blacks have an increased likelihood of downward mobility, and a decreased chance of upward mobility.

Education and household invcome are other robust predictors of both upward and downward mobility: both facilitate upward mobility and prevent downward mobility. Furthermore, while education benefits men and women similarly in both downward and upward mobility, women experience more beneficial effects of income on upward mobility.

Previous occupation is positively associated with downward mobility while negatively associated with upward mobility. The lower one's occupation, the more opportunities s/he has to move up; the higher one's occupation, the more risks one faces to move down. Because women averagely reported lower occupational status than men, this finding helps explain why women experienced more chances of upward mobility.

Moreover, women experienced more beneficial effects of previous occupation on upward mobility, but they also experienced more unfavorable effects of previous occupation on downward mobility.

Marital status is the only family structural factor that affects occupational mobility. Marriage protects both men and women from downward mobility, but this protective effect is much greater for men than for women. Marital status has no effect on upward mobility. Parenthood is not associated with upward or downward mobility.

The gender gap on downward mobility, that is, women's higher risks of downward mobility are mainly explained by their lower SES and marital status, and by the unequal protective effects from marriage and occupation. The gender gap on upward mobility, that is, women's greater chances of upward mobility are largely explained by their generally much lower occupational status, and by the greater rewards of occupation and income on upward mobility. After controlling all these variables and interactions, women's chances of upward mobility are much lower than men’s.

# CHAPTER VI

# DISCUSSION AND CONCLUSIONS

## Summary

Health, occupation, and gender are three vital dimensions of life in American society. Health care has long been among the most controversial institutions in the United States and remains one of the hottest political debates three years after the Patient Protection and Affordable Care Act was passed in Congress (2010). Occupation, on the other hand, provides an "organizational blueprint" to adult life, in which social disparity and social inequality, including health inequality in the United States (Moen and Chermack 2005, Warren et al. 2002), are rooted. Higher occupational status is usually accompanied with better health (Macintyre 1997; Smith et al. 1990), while individual health moderately affects career in later life. The dynamic relationship between occupational class and health is conditioned by gender, which prescribes social roles and occupational behaviors, and in turn affects individual health.

Health status and occupational trajectories have been two major subfields in life course research. On the one hand, scholars have made notable efforts in understanding how and why health disparities change over time (Lynch 2003; Shuey and Willson 2008; Willson et al. 2007); previous studies also demonstrate that the reproduction and accumulation of socioeconomic disparities in self-rated health across the life course are largely due to how socioeconomic position itself contributes to a more deteriorated health

with aging in the lower social strata. On the other hand, some other life course scholars have observed the trends of working lives through life course and argued that under the new global economy, women's careers become more vulnerable and face higher levels of insecurity and instability (Blossfeld and Hofmeister 2007; Buchholz et al. 2009; Grunow 2006).

Despite the achievements researchers have made in life course health disparity and life course career trajectory, few empirical studies examine the dynamic and longitudinal relationship between these two life course domains simultaneously. Building on established theoretical frameworks and previous research, this dissertation joins together the two broad research fields of life course health disparity and life course occupational trajectory. Moreover, a gender perspective is added to see how gender, which conditions both individual health outcomes and occupational trajectories, interacts with occupational status and therefore affects adult health over time. This dissertation examines two sets of hypotheses: one concerns cumulative advantage process and the other concerns health selection.

**Main Findings**

This dissertation examines the life-course dynamic between gender, career, and health. Results demonstrate that although women initially report poorer health than women, this gender related health gap decreases with aging. Women experience significantly poorer health than men, but this gap narrows each year. Both men's and women's health deteriorate as people age, while the health of men declines at a slightly greater rate than that of women. Consistent with previous research, women's low SES status and low marriage rates largely contribute to their health disadvantage. The general

indicators of SES of occupation, education, and income had similar health effects on men and women as people age, so do family-related factors. However, these factors cannot completely explain the gender differences in health, even after adding another important factor: employment status.

After controlling the significant interactions between gender, employment status, and age, the health gap between men and women disappears, or even reverses, among those reporting most recent occupational status. This disappearance of the gendered health gap suggests that working women receive significantly fewer health rewards from employment than working men and also experience a health deficit from employment that increases with age. In addition, after adding the three-way interaction of gender-employment-age, the health declining rate of women is nearly half that of men, showing a trend of reversed gender-related health gap with age, if women enjoy similar health return to employment as men across the life course.

This study also investigates reverse causation from health to career trajectories. An analyses of the effect of earlier waves' health on employment status shows that poor health status selects individuals out of employment, across both genders and all ages and cohorts. Poor health and SES are the major predictors of men being selected out of the labor force. However, for women, family responsibilities largely contribute to their selection out of the labor force, besides health and SES. This finding also helps to explain the poor health reported by unemployed men.

Results also show health has a significant but very weak effect on individual occupational status for both genders. The gender gap of occupational status, that is, women's lower OSS score,  is mainly explained by education, marriage status, and the

interactions of gender with education, marriage, and cohort. Comparing selection effects on employment and occupation, unequal occupational returns to education and marriage mainly explain the female disadvantage on occupational status, while the gender gap on employment status is mostly explained by women's traditional family roles as wife and mother.

Regarding occupational mobility, women report higher rates of both upward and downward occupational mobility, and hence a lower rate of occupational stability compared to their male counterparts. Poor health contributes to downward mobility for both men and women, while better health does not contribute to upward mobility. Women's higher risks of downward mobility are mainly explained by their lower SES and marital status and associated unequal protective effects from marriage and occupation. Women's greater chances of upward mobility are largely explained by their generally much lower occupational status and by the greater rewards of occupation and income on upward mobility.

## Discussion

### Cumulative Advantage and Disadvantage Hypotheses

Cumulative advantage and disadvantage are estimated and viewed here as processes that generate an increasing disparity of health return to employment/ occupational resources with age. An investigation of whether men and women receive the same health returns to occupation and employment across the life course is also included. The result for employment is consistent with a process of cumulative advantage and disadvantage whereby the temporal compounding of early disadvantages in employment-related resources produce trajectories of health that diverge with age between men and

women. The results for occupation also support the assumption of cumulative advantage and disadvantage, as occupational health benefits increase slightly with aging. However, occupation is equally beneficial for the health of men and women across life course. More importantly, the gender gap of health diminishes with age, showing a gender-health convergence tendency and even a reversed gender-health tendency as men and women age, instead of cumulative disadvantage process.

The primary concern in this study is whether there are gender differences in the health returns to occupation/employment resources across life course. Work is increasingly important for maintaining health as people age; however, employment does not benefit men and women similarly. Women receive markedly fewer health rewards from employment than men—and that is compounded with age. The health benefits from a higher occupational status, on the other side, are similar for men and women. After controlling the three-way interaction of age-gender-employment, the declining health rate of men is nearly twice that of women, pointing to reversed gender health trajectories if women enjoy similar health returns to employment with age.

The results support Hypotheses 1a and 1b, showing an increasing health gap between those employed and non-employed, a greater employment-related health gap among men than among women, and a growing health deficit aging women receive from employment (see Table 7-1). Hypothesis 1c is partially supported, but the situation is complex. Among people reporting a most recent occupation, the association of occupation and health gets slightly stronger as people age, which is supported by results from both mobility table and growth curve modeling. However, among those currently employed, the health rewards from higher occupation do not cumulate with aging. One

possible explanation for this inconsistency is that some early retirees are excluded from the later analysis, and this causes the disappearance of the weak interaction between age and occupation. Hypothesis 1d is rejected, because occupation-related health gradients are similar among men and women. Finally, Hypothesis 1e is rejected as well, for women would report similar, if not better, health as men if they have similar SES status and enjoy equal health return to employment. More importantly, the rate of health decline in women will be much lower than that of men, pointing to reversed gender-gap health trajectories, all else being equal.

Table 6.1 Testing Hypotheses of Cumulative Advantage and Disadvantage

| Hyp.# | Hypothesis Statement | Accept | Reject |
|---|---|---|---|
| 1a | The association between employment and health gets stronger as people age. | ✓ | |
| 1b | The association of employment and health is stronger among men than among women across the life course. | ✓ | |
| 1c | The association of occupation and health gets stronger as people age. | ✓ | |
| 1d | The occupation-related health gradients are more evident among men than among women across the life course. | | ✓ |
| 1e | The health gap between men and women increases as people age. | | ✓ |

One possible explanation of the health deficit that working women receive from employment might be the types of jobs that women tend to hold. The major health-enhancing resources from employment, according to empirical records, include income, insurance, social support, and sense of control (Schnittker 2007, McDonough and Amick 2001). As income has already been included in the analytical models, the possible explanation for women's relatively low health return to employment might be that women receive less insurance and less social support, and have less control at work. Women are more likely to work part-time, which are less likely to provide insurance benefits. Also,

women are largely concentrated in occupations of care and personal service, which require emotion regulation and are psychologically demanding (Hochschild 1979, 1983) and problematic for health (Schnallet al 1994). Ultimately, the social support that women have through employment is relatively lower than that of men (Fuherh et al 1999), although the health implication of social capital and support at work is still unclear. In spite of these possible explanations for the unequal health return to employment that men and women receive, future studies are needed to examine the latent variables of the gender inequality on health benefit from employment.

The predicted health trajectory that shows a reversed gender health gap in late working age is a novel finding; however, it is consistent with women's mortality advantage. Why does women's health decline at a rate half that of men after adding all the controls, predictors, and interactions? The possible answers lie in the combination of both biological and social processes.

Biological features that benefit women instead of men include menstruation (Coutinho and Segal 2000; Thomas and Ellertson 2000) and genetic reasons that contribute to lower female infant mortality (Drevenstedt et al 2008). Meanwhile, a wide range of social processes create and maintain the female health advantage; women tend to live a healthier life style with fewer risk behaviors, such as smoking and binge drinking (Courtenay, 2006) and to have stronger social networks that include more relatives and close girlfriends (strong ties according to Lin 2000), while men's networks include more co-workers (weak-ties, according to Bird and Rieker 1999). Women's traditional gendered role of caregiver also contributes to their knowledge regarding health and illness (Cockham 2006). Both biological and social causes of women's health advantage

are under-studied and the interaction of the genetic and social structures has largely been excluded from empirical research and theoretical debates regarding cumulative advantage as it is applied to health (Gravlee 2009; Wilson et al, 2007). These limitations point to a direction of future studies, that is, to examine the combined effects of biological and social forces on men's and women's life course health stratification.

The health benefit from family related factors, such as marital status and parenthood are similar for men and women. The results from childrearing variables do not show any negative effects on women's health compared to men; the coefficients even show that having more children at home benefit men's as well as women's health. To some extent, raising children even promotes parental health; that is not to say that balancing work and family is not with difficulty, especially for women. For some women, one way to resolve the conflict of work and family is simply to give up work, as shown in the health selection tables. Parenthood affects men and women's career trajectories completely differently, with motherhood selecting women out of employment and fatherhood promoting men's employment. Because employment status plays an important role in facilitating health, although motherhood benefits women's health to some extent, it "harms" women's health via mothers' very low employment rate.

**Health Selection Hypotheses**

This dissertation also attempts to examine to what extent health status affects individual employment, occupational status, and occupational mobility, and how health selection is gendered. Results demonstrate that poor health selects individuals out of employment, across both genders and all ages and cohorts, supporting hypothesis 2a but rejecting hypothesis 2b. Also, health has a significant but weak effect on individual

occupational status for both genders (mild support for hypothesis 2c and a rejection of hypothesis 2d). Regarding occupational mobility, poor health contributes to downward mobility for both men and women, while better health does not contribute to upward mobility for either men or women, supporting hypothesis 2e while rejecting hypotheses 2f, 2g, and 2h. Thus poor health affects individual employment and downward mobility to some extent and the health selective effects are similar among men and women across the life course.

Table 6.2 Testing Hypotheses Health Selection

| Hyp.# | Hypothesis Statement | Accept | Reject |
|---|---|---|---|
| 2a | Poor health selects people out of labor force. | ✓ | |
| 2b | Men are more likely than women to be selected out of labor force by poor health. | | ✓ |
| 2c | Poor health causes lower occupational status. | ✓ | |
| 2d | Women are more likely than men to experience lower occupational status when reporting poor health. | | ✓ |
| 2e | Poor health is related to downward occupational mobility. | ✓ | |
| 2f | Women are more likely than men to experience downward mobility when reporting poor health. | | ✓ |
| 2g | Better health causes upward occupational mobility. | | ✓ |
| 2h | Men are more likely than women to experience upward mobility when reporting better health. | | ✓ |

The lack of gender difference in health selection for employment status is inconsistent with previous research that shows men, especially men of younger cohorts, are more vulnerable to the selective effects of poor health (McDonough and Amick, 2001). The major reason for this inconsistency is that lagged health is used as the predictor of employment status in current models and thus excludes the effects of social causation, while other researchers use same year health. In addition, women's traditional family roles as wife and mother, the major contributor of the gender difference of

employment, was not included in most previous health selection and epidemiology literature (Manor et al 2003).

**Evaluating the Gender Differences on Career Trajectories**

The results from the advanced statistical models also illustrate the gender difference of career trajectories in a global economy. Compared to men, women have lower employment rates, report lower occupational status, face higher risks of downward mobility, but experience greater chances of upward mobility; such gender disparities compound with cohort, age, and race. To some extent, these findings are consistent with previous occupational trajectory literature, showing women are more likely to face job instability and insecurity than their male counterparts.

Further analyses illustrate that women's lifetime participation in family domains constrains their career opportunities. Being a wife and a mother largely limits women's chances of employment. Marriage, while it is positively associated with men's occupational status, does not benefit women's occupation. In addition, although marriage prevents both men and women from moving downward, this protective effect is greater for men than for women.

Besides the career barriers resulting from family domain, results illustrate other societal barriers. For example, higher education is associated with higher occupation for both men and women, but the occupational rewards received from education are fewer for women than men. In addition, while men of earlier cohorts report higher occupational status, their female counterparts do not enjoy cohort advantage at all.

Despite all the disadvantages women face in their careers, this study shows that, with aging, the chances of employment decline for men, but rise for women. Also,

occupational status decreases slightly for men, but increases slightly for women; and women demonstrate higher odds of upward mobility than men do. A comparison of the individual career transitions across the life course illustrates a convergent tendency of gendered career trajectories, in contrast to a diverging career gap between genders that has been argued as a cumulative process by some life course scholars (Grunow 2006; Le Feuvre 2009; O'Rand 1996).

**Limitations**

This study's results should be interpreted within the context of its limitations. Although previous research has shown that there is no significant effect of working hours on men and women's health (Arber 1997, Schnittker 2007), combining work and family could indicate more of a burden for women of young cohorts than for men and older women. The current study does not include working hours in the analysis model; this limitation may be responsible for the results.

A second problem related to this study comes from separating health selection from social causation: results show they do co-exist. In social causation models, the independent variables of employment/occupation and dependent variable of health are of the same year, which are not able to exclude health selective effects. In the case of occupation, it is not a big issue because health selection contributes little on individual occupational score. However, in the case of employment, both men and women with poor health are selected out of labor force, but women with better health are also selected out of employment when facing work- family conflict, which is not a case for men. Thus for the finding that employment-related health inequality is more evident among men than among women, both social causation and health selection make contributions, but it

cannot be tell from this research that to what extend employment-related health disparities are caused by social causation, and to what extent they are caused by health selection.

A third problem related to the study is that, although studies of attrition bias in the PSID illustrate that attrition has not distorted the overall representativeness (Case et al. 2003; Fitzgerald et al. 1998), the key relationships of interest might be affected by differential attrition, especially on the shift of health trajectory of men and women.

## Implications

The current research contributes in various ways to the current life course health disparity and occupational stratification literatures, and to society overall. Theoretical, methodological, substantive, and policy implications are evident as a result of the findings from this study. The following section discusses each of these implications.

### Theoretical Implications

From a theoretical standpoint, the assumptions used in this study are cumulative advantage/disadvantage processes, concerning whether the gender health gap increases across life course, and whether there are gendered health differences to occupation/employment returns. Occupation offers very limited support, and shows no gender difference in the occupation-related cumulative health disparities. More importantly, the comparison of men' and women's health trajectories across working age illustrates that the health of men declines much sharper than that of women. This gender difference of age effect tells a complex story that men's health advantage shifts into disadvantages with aging, which is not at all a cumulative advantage process. Social

forces and their interactions reverse women's health advantages into disadvantages, but we must develop health theories to incorporate both biological and social processes to examine the gender differences of life course health disparity.

Another theoretical strength of current study is that health causation and health selection co-exist. PSID's longitudinal design makes the separation of health selection from social causation possible. Both dependent and independent variables are time-variant measures, strengthening the assumptions of life course theories that examine the changing relationship between vital social institutions such as health and occupation. Findings from social causation models, on the one hand, do not support the speculation that the work-family conflict threatens women's health directly, but show that the difficulty of balancing work and family does harm women's health indirectly via wives and mothers' very low employment rate.

In short, when studying the gender difference of health disparity through the life course via occupation and employment, it is not enough to use one dominant theoretical argument. Based on the unique nature of health, it is important for future life course health theories to combine the effects from both genetic traits and societal processes. Rejecting the dualistic conceptions of either health selection or social causation brings a more comprehensive understanding on men' and women's health disparities across the life course, which include a recent concern that the work-family strain might threaten women's health gains from education and employment. These theoretical implications, largely based on the analyses of time-variant measures, are not able to be achieved without the advanced methodology used in this study.

**Methodological Implications**

Analyses conducted here suggest the superiority of longitudinal methods over cross-sectional methods. The gender difference of the age effect on health—women's slower health declining rate—is suppressed in cross-sectional research. Previous studies on gender differences of health have largely taken for granted that women report poorer health than men at each age. Little research has been done to explore the gender difference of health change with aging, and none has discussed the implications of a suppressed relationship of age, gender and health based on research design. It is vital to conduct current research with a longitudinal design as well as to choose appropriate variables to reveal the life course relationship between gender and health.

A second methodological implication of this study is the application of multivariate analyses for disaggregating within-person and between-person differences. Gender difference in the age effect on health is a within-person health change with aging; the accumulated health disparities between employment and occupational classes largely reflect the within-person health changes of time via employment and occupation. Multi-level analyses are necessary to reach the major findings reported above; time-varying independent variables and controls are also critical. Within-person effects and between-person effects of time on variables such as employment and parenthood are all disaggregated. The statistical methods that separating within- and between-person effects of dependent variables and independent variables make a real life course study possible, of which the theoretical basis is the changing nature of vital social institutions such as health and occupation.

Combining longitudinal data set with multivariate analyses permits the separation of social causation from health selection and keeps the analysis sample more representative. The mobility tables and logistic regressions are deliberately designed to separate health selection from social causation, but researchers have to fix the independent variables. The findings from a mobility table can only be generalized to people with fixed occupations in social causation models and to people with no health change in health selection models, leaving the occupation-health relationship unexplained for those people who have experienced changes in both health and employment/occupation. For multivariate analyses, this is not a question, as the models are able to deal with the change of both dependent and independent variables.

Growth curve models, logistic random-intercept models and general linear latent models make the multivariate analyses smooth and productive, no matter whether the dependent variables of interest are continuous, dichotomous, or multinomial. Putting the theoretical and methodological implications together, as Hogan and Goldscheider (2005) suggested, the development of life course studies depends on the development in three dimensions: the theoretical concepts and assumptions of life course perspectives, the availability of longitudinal data sets, and advanced statistics models.

**Substantive Implications**

Substantively, findings from this dissertation contribute to the knowledge of gender health inequality in four ways. First, the study finds that the unequal health return to employment is a major cause of women's health disadvantage, besides women's lower SES status and marriage rate. Women are disadvantaged in all indicators of SES such as education, occupation/employment, and income. Consistent with previous research,

women's low SES status and low marriage rates largely contribute to their health disadvantage. In addition, working women receive significantly fewer health benefits from employment than working men and also experience a health deficit from employment that increases with age. The findings indicate that the gender health gap is completely explained by the sum of women's low SES status, low marriage rates, and fewer health rewards from employment. The continuing trends in education and employment will definitely diminish the gender gap in health in the near future. However, if no policy is designed to address the issue of unequal health return to employment, women's health disadvantage will continue in the future despite their huge gaining in education and employment.

Second, findings illustrate that both men's and women's health deteriorate as people age; the health of men declines at a slightly greater rate than that of women when controlling for only age and gender. However, after adding all the control variables, predictors and interactions, the rate of health decline for women is only half that of men, pointing to a reversed trend of gender health differences. This finding has important implications. It illustrates that women should be able to enjoy better health than men with age, but social forces, such as employment and marriage, and their interaction with gender, have changed women's health advantage into disadvantage. Again, based on the continuous achievements that women have made on education and occupation, if women receive equal health return from employment, they would able to report better health at late working age than men do.

Third, the occupation related health gradients are similar among men and women, when occupation is measured at individual level. This result is inconsistent with some

previous research that finds the occupation-related health inequality is more evident among men than among women, but is in agreement with other studies that find no gender difference of socioeconomic-health gradients. It is still under debate as to what kind of health outcomes are measured, such as mortality, mobility, or self-reported health, or which SES indicator(s) are operationalized such as education or occupation, or whether we should measure a married women's occupation based on her own job or her husband's. This study includes thoroughly the SES indicators, incorporates both individual measures (education and occupation) and household measure (household income), and examines the health change across 17 years. The results that illustrates no gender differences in SES-health gradients by either education, or income, or occupation strongly support the argument that socioeconomic-health gradient are similar for both genders, across age and cohorts.

Last but not least, the study illustrates that health causation and health selection do co-exist. Poor health works the same for men and women in selecting them out of labor force and into downward mobility. Although no gender differences in health selection are found, gender does condition the selective effects in employment transition and occupational mobility through unequal protective effects from marriage and parenthood that benefit career growth of men rather than that of women. In addition, despite all the disadvantages women face in their career, results from the study uncover a convergent tendency of gendered career trajectories, which is inconsistent with certain previous research depicting a diverging career gap between genders as supported by cumulative disadvantage processes.

In summation, this dissertation research adds to the knowledge of gender health disparity in variety ways. The gender health gap is largely explained by the unequal health return to employment, besides the well-known causes of women's low SES and marital status. Based on the continuous trends in education and employment, if women are able to enjoy similar health rewards from employment, they should be able to report better health in late working age. Health selective effects, which co-exist with social causation in shaping health disparity, works the same for men and women in selecting them out of employment and into downward mobility. Findings from the study also contribute to the knowledge of the gender differences of career trajectories, revealing a convergent tendency of gendered career trajectories, instead of a diverging career gap predicted through cumulative disadvantage processes.

**Political Implications**

Health inequalities have been perpetuated in American society, as suggested by other research. These disparities are rooted in the intersection of social institutions of occupation, gender, and family across the life course. The passage of the Patient Protection and Affordable Care Act was intended to reduce health disparities via universal health care, but research from countries with universal access to health care illustrates the persistence of associations between gender, SES, and health. Results from this work could be used to reduce the severity of gender related socio-economic inequality, so as to lessen the effects of "fundamental causes" on gendered health disparity. One policy implication is that family-friendly policies should be able to improve both women's employment and, by extension, their health status. Policies as such better maternity leave, on-site daycare, flexible working hours, and working at home

could all be implemented to increase women's employment and—therefore—their health status.

## Directions for Future Research

This dissertation expands on existing knowledge on the dynamic relationships between gender, occupation and health. Although this study has contributed to health literature on the topic, it has also raised new questions within the body of research pertaining gender disparities, career trajectories, and health inequalities.

First, evidence from the dissertation suggests that, besides women's low SES status, the unequal health return to employment contributes to women's health disadvantage. Future efforts should examine the latent causes of women's health challenges resulting from employment, including work on job structure, work place climate, autonomy, work place networks, and occupational discrimination. At the societal level, women, compared to men, achieve lower occupational status with same education attainments, and get paid less with similar occupations. The gender inequalities in general are caused by structural arrangements, which are highly likely to cause gendered health disparities as well. Future research directions should expand on the theories that are able to bridge health trajectories to broader societal arrangements and historical trends, as suggested by Mills (1959).

Second, the finding that men experience steeper health declines than women calls for the attention of future research to examine the latent health advantages, in line with the longevity advantage, that women enjoy. Specifically, this calls for an interdisciplinary collaboration to examine biological *and* social processes that favor women's health. The interdisciplinary research on gender health disparities will be a prosperous field but will

face challenges in access to data that measure both biological and social influences on health.

A third suggestion for future research focuses on the intersectional effects of race, gender, and SES on health disparities. Blacks report poorer health, lower employment rate and occupational status, face higher risks of downward mobility, and have less opportunities to move upward; therefore, blacks are disadvantaged in both domains of occupation and health, although black women's higher employment rate than white women's makes the situation more complex. In addition, the black-white health gap diverges with aging, illustrating cumulative health disadvantage processes (Shuey and Wilson 2008). Therefore, it is important to study the intersectionality of race, gender, social class and age as is relates to health (Collines, 2000).

Last, future research directions need to incorporate the concept of linked lives, that is, the interdependency of men and women's lives that changes across age, cohort and period (Elder 1996). Linked lives, such as marriage and family, can be both beneficial and detrimental to health, or be beneficial to one gender, but detrimental to another, but previous research on this issue is very limited Combining the concept of linked lives with recently developed hierarchical linear models on dyadic data, it is going to be another promising field in research of gender health disparities. In addition, the concept of linked lives will improve the validity of measuring women's social class. If a married woman's occupational class is defined by the employment and occupational status of both herself and her husband, it will be a more appropriate measurement to gauge household and individual resources and risks (DiPrete 2002). Measuring social

class based on linked lives may lead toward an end in the decades long debate on whether the SES related health gradients are stronger among men than among women.

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# APPENDIX A

# EQUATIONS OF GENERAL LOGISTIC RANDOM-INTERCEPT ANALYSIS AND GENERAL LINEAR LATENT MODELS

Equations of logistic random-intercept models

Level-1:

$$\text{logit}\left\{\frac{\text{Prob}(\text{Employment}_{ij}=1)}{1-\text{Prob}(\text{Employment}_{ij}=1)}\right\} = \pi_{0i} + \pi_{1i}\text{Age}_{ti} + \pi_{ti}\text{Health}_{ti} + \pi_{3i}\text{Health}_{ti} * \text{Age}_{ti} + e_{ti} \quad \text{(A.1)}$$

Level-2

$$\begin{aligned}
\pi_{0i} &= \beta_{00} + \beta_{01}\text{Cohort}_i + \beta_{02}\text{Female}_i + \beta_{03}\text{Black}_i + \beta_{04}\text{Education}_i + \gamma_{0i} \\
\pi_{1i} &= \beta_{10} + \beta_{11}\text{Female}_i + \gamma_{1i} \\
\pi_{2i} &= \beta_{20} + \beta_{21}\text{Female}_i \\
\pi_{3i} &= \beta_{30} + \beta_{31}\text{Female}_i
\end{aligned} \quad \text{(A.2)}$$

General linear latent models

Upward mobility model:

Level-1

$$\text{logit}\left\{\frac{\text{Prob}(\text{Mobility}_{ij}=\text{Upward})}{\text{Prob}(\text{Mobility}_{ij}=\text{Horizantal})}\right\} = \pi_{0i(1)} + \pi_{1i(1)}\text{Age}_{tij} + \pi_{ti(1)}\text{Health}_{tij} + \pi_{3i(1)}\text{Health}_{ti*j}\text{Age}_{tij} + e_{tij} \quad \text{(A.3)}$$

Levle-2

$$\begin{aligned}
\pi_{0i(2)} &= \beta_{00(2)} + \beta_{01(2)}\text{Cohort}_{ij} + \beta_{02(2)}\text{Female}_{ij} + \beta_{03(2)}\text{Black}_{ij} + \beta_{04(2)}\text{Education}_{ij} + \gamma_{0ij} \\
\pi_{1i(1)} &= \beta_{10(1)} + \beta_{11(1)}\text{Female}_{ij} + \gamma_{1ij} \\
\pi_{2i(1)} &= \beta_{20(1)} + \beta_{21(1)}\text{Female}_{ij} \\
\pi_{3i(1)} &= \beta_{30(1)} + \beta_{31(1)}\text{Female}_{ij}
\end{aligned} \quad \text{(A.4)}$$

Downward mobility model:

Level-1:

$$\text{logit}\left\{\frac{\text{Prob}(\text{Mobility}_{ij}=\text{Downward})}{\text{Prob}(\text{Mobility}_{ij}=\text{Horizantal})}\right\} = \pi_{0i(2)} + \pi_{1i(2)}\text{Age}_{tij} + \pi_{ti(2)}\text{Health}_{tij} + \pi_{3i(2)}\text{Health}_{t2j}\text{Age}_{tij} + e_{tij} \quad \text{(A.5)}$$

Level-2:

$$\pi_{0i(2)} = \beta_{00(2)} + \beta_{01(2)}\text{Cohort}_{ij} + \beta_{02(2)}\text{Female}_{ij} + \beta_{03(2)}\text{Black}_{ij} + \beta_{04(2)}\text{Education}_{ij} + \gamma_{0ij}$$

$$\pi_{1i(1)} = \beta_{10(2)} + \beta_{11(2)}\text{Female}_{ij} + \gamma_{1ij}$$

$$\pi_{2i(2)} = \beta_{20(2)} + \beta_{21(2)}\text{Female}_{ij}$$

$$\pi_{3i(2)} = \beta_{30(2)} + \beta_{31(2)}\text{Female}_{ij} \quad \text{(A.6)}$$

# APPENDIX B

# UNWEIGHTED DESCRIPTIVE TABLES

Table B.1 Descriptive Table of Variables (Unweighted) from 1989 to 2005

| | | 1989 | 1994 | 1999 | 2001 | 2005 |
|---|---|---|---|---|---|---|
| Age (25-49) | | 35.04 | 40.05 | 45.09 | 47.05 | 51.04 |
| (mean and SD) | | (6.40) | (6.41) | (6.41) | (6.38) | (6.39) |
| Health status | | 2.13 | 2.26 | 2.33 | 2.38 | 2.51 |
| (mean and SD) | | (0.93) | (0.97) | (1.01) | (1.01) | (1.03) |
| Health below good | | 7% | 9.8% | 11.7% | 13% | 15.8% |
| Employment status (currently working) | | 82.1% | 81.7% | 83.3% | 81.0% | 78.0% |
| Income * | | $20,058 | $22,667 | $27,523 | $30,335 | $33,234 |
| (mean and SD) | | (20,239) | (26,662) | (30,370) | (34,813) | (91,729) |
| Occupational score (mean and SD) | | 57.72 | 58.51 | 59.80 | 60.78 | 56.26 |
| | | (25.64) | (25.74) | (25.46) | (24.9) | (26.00) |
| Ordered | 75+ | 29.2% | 30.2% | 31.6% | 32.2% | 27.7% |
| occupation | 50-74 | 23.2% | 23.3% | 23.5% | 23.8% | 20.8% |
| groups | 25-49 | 25.7% | 24.6% | 24.1% | 23.3% | 23.3% |
| (Nam score) | 0-24 | 11.6% | 11.4% | 10.2% | 9.0% | 11.9% |
| | Not working | 10.3% | 10.5% | 10.7% | 11.8% | 16.3% |
| Marital status (currently married) | | 77.5% | 77.4% | 75.2% | 74.7% | 73.8% |
| Number of Children at home(mean) | | 1.46 | 1.43 | 1.13 | 0.94 | 0.62 |
| | | (1.25) | (1.26) | (1.21) | (1.14) | (0.96) |
| Having young child under 6 | | 42.8% | 30.9% | 18.1% | 13.0% | 7.1% |

*: mean household income adjusted for both household size and inflation of American Dollars for the year of 2000. There are some cases of negative numbers from 1994-2005. I keep these cases and don't recode them up to 0.

Table B.2 Means for Selective Variables (Unweighted), Men And Women, 1989-2005

| | 1989 | | 1994 | | 1999 | | 2001 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | women | men | women | men | women | men | women | men | women | men |
| Education | 13.35*** | 13.57*** | | | | | | | | |
| | (2295) | (1920) | | | | | | | | |
| Age | 34.68** | 35.48 | 39.71** | 40.57** | 44.59*** | 45.36*** | 46.60*** | 47.46*** | 50.23*** | 51.38*** |
| | (2295) | (1920) | (2285) | (1902) | (2240) | (1869) | (2216) | (1831) | (2230) | (1690) |
| Health Status | 2.20*** | 2.04*** | 2.33*** | 2.19*** | 2.40*** | 2.24*** | 2.45*** | 2.30*** | 2.57*** | 2.44*** |
| (Mean) | (2283) | (1920) | (2275) | (1902) | (2236) | (1867) | (2207) | (1830) | (2110) | (1688) |
| Health below good | .078* | .062* | .897 | .909 | .872* | .896* | .860 | .882 | | |
| Employment status | .722*** | .940*** | .732*** | .918*** | .767*** | .911*** | .755*** | .875*** | .725*** | .849*** |
| (employed=1) | (2295) | (1920) | (2285) | (1902) | (2236) | (1867) | (2207) | (1830) | (2113) | (1689) |
| Marital status | .754*** | .800*** | .731*** | .826*** | .711*** | .802*** | .705*** | .797*** | .693*** | .795*** |
| (married=1) | (2295) | (1920) | (2285) | (1902) | (2240) | (1869) | (2216) | (1831) | (2130) | (1690) |
| Family income | 18,894*** | 20,058*** | 21,339*** | 24,254*** | 26,097*** | 29,226*** | 25,523*** | 32,532*** | 29,881*** | 37,463*** |
| (2000$) | (2295) | (1920) | (2286) | (1902) | (2250) | (1884) | (2228) | (1837) | (2143) | (1699) |
| Occupational score | 44.15*** | 60.94*** | 44.86*** | 61.33*** | 47.87*** | 60.10*** | 47.89*** | 60.54*** | 42.23*** | 53.19*** |
| (not working as 0) | (2292) | (1916) | (2283) | (1901) | (2235) | (1960) | (2210) | (1821) | (2118) | (1685) |
| Occupational score | 53.31*** | 62.17*** | 53.85*** | 63.33*** | 56.76*** | 63.05*** | 57.18*** | 64.70*** | 53.56*** | 59.23*** |
| (not working as missing) | (1898) | (1878) | (1902) | (1841) | (1885) | (1773) | (1881) | (1704) | (1881) | (1704) |

* p<.05
** p<.01
***p<.001