**Income, Income Mobility, and Health**

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This study aims to investigate the separate effects of socioeconomic status (SES) and socioeconomic mobility (i.e., changes in SES over time) on health. Using data from the Americans’ Changing Lives Study (ACL), a longitudinal survey spanning more than two decades, and the extended dual change score model (Grimm et al. 2012), we are able to distinguish these two important dimensions of the SES-health linkage. Specifically, we plan to test the effects of income and income mobility on a wide array of physical and mental health measures that are available in the ACL. Also, our analysis will shed new light on the process of health selection by investigating the extent to which health, as well as health decline, affect subsequent income and income mobility.

**Background**

In the previous decades, health scholars have demonstrated SES as a major social condition that can affect health outcomes (Elo 2009; Link and Phelan 1995). The SES-health linkage can be mainly explained by two mechanisms. First, SES, as a fundamental cause of diseases (Link and Phelan 1995), determines both monetary and nonmonetary resources that people can use to engage in preventative health care, get health insurance, and respond to health shocks (Phelan et al. 2004; Rubin, Clouston, and Link 2014). Second, SES may also affect health through social-psychological pathways. As a stressor, it can trigger a series of physiological and behavioral responses that are detrimental to downstream health outcomes (Ross and Wu 1995; Thoits 2010; Turner, Wheaton, and Lloyd 1995).

A major gap in the current literature is that the literature has mainly focused on the health consequences of SES but rarely distinguishes the effects of SES and socioeconomic mobility from each other. However, an emerging field in life course research starts to consider the importance of social mobility as a potential factor that can affect health (Harris and Schorpp 2018). This new perspective conceptualizes changes in SES, namely mobility, as a social phenomenon on its own right and postulates that the effect of mobility on health outcomes is independent of the effect of SES (Hallqvist et al. 2004; Lynch et al. 1994). It predicts that upward mobility may mitigate negative impacts of earlier adversities while downward mobility is detrimental to health (Hallqvist et al. 2004; Harris and Schorpp 2018; Luo and Waite 2005). Given the growth of economic instability in recent decades (Kalleberg 2009), the relationship between social mobility and health deserves more scholarly attention. However, empirically testing this association still faces both data and methodological constraints.

In terms of data, although there is an increasing number of longitudinal surveys with SES and health measures, data sources that can be used to separate the effects of SES and mobility are still limited. To properly distinguish the two factors from each other in empirical research, we need at least three waves of comparable measures for SES and health (Mund and Nestler 2019). Also, the impacts of social adversities like low SES and downward mobility may be latent for years and only manifest in later life stages (Harris and Schorpp 2018; McEwen and McEwen 2017). Evaluating these long-term consequences requires the use of long-lasting longitudinal surveys, which further limits the pool of data sources that researchers can choose from.

On methodological grounds, the impacts of SES and changes in SES (i.e., mobility) are difficult to be separated, even with appropriate longitudinal data. Some longitudinal studies on the SES-health nexus have relied on fixed-effects models (Gunasekara, Carter, and Blakely 2011). These models can effectively control for the confounding effects of unobserved factors that are constant over time, but they only analyze within-individual changes (Hill et al. 2020; Mund and Nestler 2019). In other words, these models only tell us the average change in health for each one-unit increase in SES. Thus, results from these studies should be ideally interpreted as the impacts of mobility and are not necessarily generalizable to health disparities resulting from the between-individual variation in SES.

Another longitudinal approach that has been recently introduced into health research is using trajectory models to capture the variability of SES over the life course and then analyzing the health outcomes associated with each SES trajectory. Using this relatively new strategy, Frech and Damaske (2019) have identified eight trajectories of income between ages 25 and 49 from a nationally representative sample of male baby-boomers. Their analysis also shows a strong association between health and income trajectories. Especially, men who achieved upward mobility during the life course tend to achieve similar physical and mental health as their peers with the highest earnings. This result is consistent with the mobility model that upward mobility can mitigate the detrimental impacts of some earlier adversities. However, as the income trajectories differ in both mobility patterns and cumulated income, this approach still cannot clearly separate the effects of SES and mobility for most of the trajectories.

Health selection can further complicate any analysis of how SES and mobility influence health. The relationship between SES and health can be reciprocal. Poor health earlier in life may restrict labor market activities and consequently constrain prospects of later SES attainment and upward mobility (Elo 2009; Leigh, Jencks, and Smeeding 2009; Miech et al. 1999). This problem can be partially addressed by the fixed-effects model approach as it eliminates time-invariant confounders. However, this approach cannot partial out the potential influence of previous declines in health on subsequent labor market decisions and performances. Just like those with health problems, people who have experienced rapid health declines may also have diminished job performance and face discrimination from their employers. Thus, it is important to consider both previous health conditions and the rate of health declines when estimating the effects of SES and mobility on subsequent physical and mental outcomes.

**This Study**

*Theoretical framework*

The theoretical framework of this study is shown in Figure 1. Specifically, we will test four potential pathways related to the reciprocity between SES and health. The first two paths (a and b) link SES and changes in SES (mobility) to changes in health between two adjacent time points. The latter two paths (c and d) show the opposite processes, allowing health and changes in health (presumably health decline) to affect SES changes. Additionally, as summarized by the dashed lines in the figure, there is autocorrelation within income and health over time, both directly and indirectly through their respective rate of change over time.

*Analytic Plan*

We will test the four pathways in Figure 1 with data from the ACL. As a nationally representative longitudinal study, the ACL draws respondents using a multistage stratified area probability framework and the population is adults aged 25 and older in the US in 1986. It provides sampling weights that adjust for nonresponse and sampling design. Currently, data from five waves are available: 1986, 1989, 1994, 2001/2002, and 2011/2012. The original sample includes 3,617 respondents. However, because it requires four or more waves of data to simultaneously test the four pathways proposed in this study (Mund and Nestler 2019), we will restrict the analytic sample to 535 people who had been below 50 in the first four waves. Age 50 is chosen to avoid the issue of right censoring due to retirement as much as possible.

Following previous studies of intragenerational mobility (Cheng 2014; Frech and Damaske 2019), we use income as a measure of SES. As for health, the ACL has several measures that are consistent across waves, including self-rated health, depressive symptoms (measured with the CES-D), cognitive impairment index, the number of chronic conditions, and the number of debilitating chronic conditions. These measures allow us to capture a wide range of physical and mental conditions that can potentially have reciprocal relationships with income and income mobility.

The four paths in Figure 1 will be estimated simultaneously with an extended bivariate dual change score model. The dual change score model (DCSM) is part of the large family of latent difference score models. It estimates time-dependent effects by specifying a regression between scores at the prior time point (e.g., income at time 1) and the change scores in the same variable (e.g., income mobility from time 1 to time 2). The term “dual change” refers to two components of change that are represented in the model: a constant change component and a proportional change component (Newsom 2015). The constant change component is similar to the slope in growth curve models and captures the overall rate of change across all time points as well as between-individual differences in this change. The proportional change component, on the other hand, describes how the change in a variable between adjacent time points depends on this variable’s original level at the prior time point.

The basic DCSM can be extended to bivariate analysis on the associations between two processes across time. This bivariate DCSM has been recently further extended by Grimm and colleagues (2012) to allow adding time-dependent effects between the change scores of the two variables. One of the key features of the extended bivariate DCSM is that it allows us to investigate the effects of changes in one variable on the subsequent changes in the other variable (Mund and Nestler 2019). This unique feature of the method makes it possible to simultaneously estimate the four pathways depicted in Figure 1, which is a direct investigation on several key mechanisms of the SES-health association and the health selection process.

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**Figure**

Shape

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Figure 1: Theoretical Framework of the Reciprocity Between Income and Health