Conscientiousness and Mortality: An Exploration of Mechanisms Using the Panel Study of Income Dynamics

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Abstract
Growing evidence suggests connections between conscientiousness and health and mortality. Little work, however, has examined the impact of conscientiousness on health into older ages, though its health benefits may accrue over time, or the relative importance of the pathways through which conscientiousness shapes health. This is surprising given that conscientiousness is an important predictor of wages, employment, risky behaviors, and family formation, and these factors are also all strongly linked to health. Moreover, almost all of the existing evidence is based on highly select samples. We address these gaps by using almost 40 years of data from the Panel Study of Income Dynamics to examine the relationship between conscientiousness measured in 1972 and subsequent mortality through 2009. We also assess the role of socioeconomic status attainment, marital status, and health behaviors as mechanisms in this relationship. Preliminary results indicate that conscientiousness is associated with subsequent mortality independent of other factors.

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Background and Significance

A growing body of research suggests psychological human capital—skills such as conscientiousness and traits such as personal efficacy and hostility—is related to mortality and physical health (for a review, see Deary, Weiss, and Batty 2010). While prior work has established this association, little is known about how psychological human capital patterns health and mortality across the life course, even though psychological human capital is considered an important driver of cumulative advantage in stratification processes (Farkas 2003). Furthermore, the mechanisms that drive the psychological human capital-health relationship are not well-explicated. This is surprising given that psychological human capital is important for outcomes such as wages, risky behaviors, and family formation (Heckman, Stixrud, Urzua 2006), and these factors are also all strongly linked to health (Herd, Goesling, and House 2007; Lantz et al. 1998; Waite 1995). Moreover, the empirical evidence linking conscientiousness to mortality in the United States is based primarily on highly select samples such as public school students in Los Angeles and San Francisco in the 1920s with an IQ of greater than 135 (Friedman et al., 1993, 1995, 2000), Catholic clergy members (Wilson et al., 2004), patients with IDMM and end-stage renal disease (Brickman et al., 1996), patients with chronic renal insufficiency (Christiansen et al., 2002), and graduates from Wisconsin high schools in 1957 (Jokela et al., 2013). Exceptions include recent work by Hill et al. (2011) who examine 512 older adults drawn from a national study and Jokela et al. (2013) who examine a national sample of older adults between 2006 and 2010 and a sample of middle-aged Americans between 1995 and 2004.

Among measures of psychological human capital (also called "soft skills"), the most robust predictor of mortality is conscientiousness (Jokela et al. 2013). Conscientiousness reflects persistence, self-control, and planning for the future (Jokela et al. 2013). These facets of conscientiousness are thought to aid in health promotion directly by facilitating healthy behaviors (Bogg and Roberts, 2004), such as watching what one eats and refraining from (and quitting) smoking, which are important determinants of mortality (Lantz et al. 1998). Conscientiousness may also promote longevity through pathways not so directly linked to health but that predict mortality, such as occupational attainment (Marmot 2004). Studies find that conscientiousness is positively linked to occupational attainment, even after controlling for IQ (Roberts et al. 2007). In addition, conscientiousness is also negatively related to divorce (Roberts et al. 2007), which is also associated with elevated mortality risk (Waite 1995). Taken together, these studies suggest that conscientiousness may be linked to mortality via a variety of pathways. To our knowledge, however, no prior study has systematically examined the relationship between conscientiousness and mortality in longitudinal data as well as the role of socioeconomic status and marriage as potential mediators.

In the current project, we use nearly 40 years of data from the Panel Study of Income Dynamics (PSID) to examine the relationship between conscientiousness measured in 1972 and mortality through 2009. This research makes several significant contributions to work on human capital, health, and cumulative inequality. First, the only prior long-term study of the relationship between psychological human capital and mortality is based on a sample of gifted children (the Terman study) (see Friedman et al. 1993, 1995, 2000), and findings from this study may not be

representative of the general population. In addition, most prior work on psychological human capital (some of which uses nationally representative data) has tended to examine the impacts of psychological human capital in childhood on outcomes in young or early-middle adulthood (e.g. Perry Preschool Study, NLSY79, AddHealth), but if the benefits of psychological skills accumulate over the life course as cumulative advantage theory would suggest (Dannefer 2003), studies of disparities in psychological human capital based on young samples followed for relatively short periods of time may underestimate the full impacts of psychological human capital on health. This is particularly important for studying mortality as an outcome, which is relatively rare before middle age. Our use of nationally-representative data and a long observational window increases confidence in the generalizability of our findings regarding the relationship between psychological human capital and health and mortality. In addition, we will assess the roles of socioeconomic status, marital status, and health behaviors as mechanisms driving the psychological human capital-health relationship. By using repeated measures of socioeconomic factors, marital status, and health behaviors, from young-to-middle adulthood through older ages, we are able to assess how psychological human capital shapes life course processes related to socioeconomic attainment, family formation and marital dissolution, and health behaviors, as well as their subsequent impacts on health and survival.

Research Questions

This project addresses two primary questions. First, how is conscientiousness relatively early in life (age 20-40) related to mortality across the life course? Second, to what extent do health behaviors, socioeconomic status attainment, and marital status work as mediators of the relationship between conscientiousness and mortality?

Methods

Data

To answer these questions we will use almost 40 years of data from the public-use Panel Study of Income Dynamics (PSID), a nationally-representative sample of Americans begun in 1968.

Key Measures

Dependent Variable: *Mortality:* Our key outcome of interest is mortality (both status and timing).

Independent Variables: Conscientiousness: The 1972 PSID questionnaire contains five items that tap into dimensions of conscientiousness. Each item is answered on a five-point scale, with higher values indicating greater conscientiousness. As exploratory factor analysis reveals that these measures do not satisfy conditions for a conscientiousness scale, at this time we examine them separately.

1). “Are you the kind of person that plans his life ahead all the time, or do you live more from day to day?”

2). “When you make plans ahead, do you usually get to carry out things the way you expected, or do things usually come up to make you change your plans?”

3). “Would you say you nearly always finish things once you start them, or do you sometimes have to give up before they are finished?”

4). “Would you rather spend your money and enjoy life today, or save more for the future?”

5). "Do you think a lot about things that might happen in the future, or do you usually just take things as they come?"

Independent Variables: Mechanisms: We are primarily interested in mediators that fall into three large categories: socioeconomic status (e.g. household income and poverty status, unemployment), marital status (marital formation and marital dissolution, particularly divorce), and health behaviors (smoking, alcohol use, exercise, and body mass index). A key strength of the PSID data is that many measures of these mediators are collected repeatedly over time, which facilitates an examination of these factors across the life course.

Controls: We also include several control variables which may have important independent associations with mortality, and/or may be correlated with conscientiousness. This allows us both to contextualize the relative importance of conscientiousness vis-à-vis other predictors of mortality, as well as to help ensure minimal bias in our estimates of the relationship between conscientiousness and mortality. These controls include, among others: age, race/ethnicity, education, other dimensions of personality, and cognition, which is derived from a 12-item sentence completion test.

Analytic Sample

Our analytic sample is based on male household heads in 1972. The information on personality, including conscientiousness, was not collected for a representative sample of women. Because we are interested in the relationship between conscientiousness relatively early in life and subsequent measures of economic status, health behaviors, and marital status, we restrict our sample to male household heads aged 20 to 40 in 1972. This strategy helps ensure that conscientiousness largely precedes subsequent hypothesized mechanisms linking conscientiousness and mortality, such as socioeconomic status attainment, which might themselves beget higher levels of conscientiousness. Our analysis is based on approximately 1,500 male household heads (out of approximately 5,000 household heads) who satisfied our age criteria.

Statistical Analysis

We will employ Cox proportional hazard models to assess the relationship between conscientiousness and subsequent mortality, explicitly accounting for attrition. In subsequent analysis, we will enter time-varying measures of key mediators (soecioeconomic status, health behaviors, and marital status) to our models.

Preliminary Results

Table 1 presents summary descriptive measures of key covariates of interest. While wave-to-wave attrition is very modest, the cumulative impact of a loss of a small number of cases per wave over nearly 40 years is relatively large. As such, we examine the distribution of key covariates by three interview status measures: alive throughout survey period, attrition during survey period, and mortality during survey period. By examining the distribution of baseline covariates by subsequent survival, attrition, or mortality, we are able to gain a preliminary understanding of how attrition affects our results. A comparison of the three interview statuses indicate that those who survive and are present throughout the survey have the higher conscientiousness, generally followed by attritors and those who died over the observational

window. For many other characteristics, attritors tend to resemble those who died. Table 2 shows preliminary results from a logistic hazard model that excludes sample members who have attrited. Results indicate that, controlling for age, education, race, and cognitive test score, conscientiousness as measured by the "carry things out" item is negatively and statistically significantly associated with mortality. Results are similarly robust for the "plans life ahead" conscientiousness measure.

Discussion and Future Directions

Our preliminary findings demonstrate that conscientiousness effects mortality over the life course with a national sample. This finding lays the foundation for several analyses to be presented at the Population Association of America Annual Meetings. First are foremost, we will estimate Cox proportionate hazard models that account for attrition and incorporate time-varying measures of socioeconomic status, health behaviors, and marital status. We will also assess examine variation in the relationship between conscientiousness and mortality by sociodemographic characteristics (race, education, family background).

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Table 1. Baseline (1972) Descriptive Statistics by Interview Status, Male Household Heads Aged 20-40, PSID

	Always Surviving in Sample (n approx. 478)		Died (n approx. 402)		Attritted (n approx. 673)		Range
	Mean	SD	Mean	SD	Mean	SD	
Conscientiousness (mean)							
Plans life ahead	2.51	1.89	1.88	1.98	2.00	1.96	0-4
Carry things out	3.00	1.68	2.23	1.94	2.21	1.95	0-4
Finish things once started	3.33	1.48	2.89	1.78	3.01	1.70	0-4
Save for the future	2.05	1.83	1.91	1.88	1.96	1.88	0-4
Think about future	2.08	1.94	1.75	1.96	1.90	1.97	0-4
Any household spending on tobacco (proportion)	0.52		0.73		0.63		0-1
Married (proportion)	0.92		0.85		0.86		0-1
Cognitive test score (mean)	9.23	1.64	8.41	2.08	8.71	1.93	0-12
Grew up poor-subjective report (proportion)	0.38	0.49	0.57	0.50	0.45	0.50	0-1

Table 2. Logistic Hazard Model Predicting Mortality as a Function of Conscientiousness and Sociodemographic Controls, Attritors Omitted, Panel Study of Income Dynamics (n=860)

	Coeff.	SE	
Carry things out	-0.15	0.04	**
Education 1972	-0.24	0.05	***
Age 1972	0.07	0.01	***
White, non-Hispanic	-0.82	0.19	***
Cognitive test score 1972	-0.02	0.05	
Constant	-0.27	0.53	
χ^2	163.21		***
Pseudo-R^2	0.14		