The Shifting Importance of Physical and Mental Health on Self Evaluations of Health across the Life Course

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Abstract

Self-rated health (SRH) is one of the most widely used and validated measures of health in the social and population health sciences. The relationship between SRH and other indicators of health such as chronic diseases and mortality has been well documented. Yet, the underlying meaning of SRH remains ambiguous. Specifically, the relative impact of physical and mental health on global ratings of SRH is not well understood. While most studies of SRH have focused on the relationship between SRH and objective measures of health (e.g., biomarkers, chronic disease, mortality risk, disability), this study uses domain-specific measures, self-rated physical and mental health, to better understand the meaning of general SRH. My analysis uses data from the 2010 Cancer Control Supplement of the National Health Interview Survey which included measures of self-rated physical and mental health. I capitalize on these novel data to provide a more parsimonious decomposition of SRH. Results from age stratified OLS regression models predicting SRH using self-rated physical and mental health support that SRH is largely a function of self-rated physical and mental health and relevant sociodemographics. Overall, self-rated physical health was a stronger predictor of overall self-rated health than self-rated mental health. The association between physical health and self-rated health increased with age. However, results also suggest that while physical health is a stronger predictor of SRH across age, the relative importance of mental health is greatest at younger ages.

Introduction

Self-rated health is one of the most widely used and validated measures of health. It is a global self-assessed measure of health that is based on asking respondents to rate their health on a four or five-point scale. Self-rated health is an attractive measure due to its simplicity; it provides an assessment of health using a single ordinal variable and can be easily included in surveys of population health. Self-rated health has also been subject to extensive validation efforts. In particular, self-rated health has been consistently shown to be an independent predictor of morbidity and mortality (Ferraro and Farmer 1999; Idler and Benyamini 1997).

Despite its widespread use and numerous attempts to validate the measure, relatively little is known about the determinants of self-rated health and the psychological processes underlying people's assessments of their health. Researchers have approached this issue in two ways. The first involves studies which seek to understand the psychological underpinnings and cognitive processes underlying individuals' assessments of their health. These studies tend to show that self-ratings of health are produced as part of a cognitive process that is inherently subjective and contextualized in the social and cultural environment rather than being driven by formalized rules (Jylhä 2009). Other studies tend to focus on identifying various objective determinants of self-rated health (Singh-Manoux 2006). The idea behind this line of research is that understanding which health conditions (e.g., chronic conditions, functional limitations) most strongly correlate with self-rated health will yield a clarified understanding of what health factors are salient to people when they rate their health. However, such an approach is not subjective nor evaluative. The current study attempts to bridge this gap by identifying the subjective health determinants of self-rated health.

Research has demonstrated that the way in which individuals evaluate their health differs based on a number of demographic and sociodemographic characteristics including birth cohort, ethnicity, sex, and age (Altman, Van Hook, and Hillemeier 2016; Case and Paxson 2005; Finch et al. 2002; Krause and Jay 1994). Age has been shown to be a particularly important demographic characteristic in terms of its relevance to self-evaluations of health (Krause and Jay 1994; Schnittker 2005). Age holds particular relevance in understanding the relative of importance of physical and mental health to self-rated health across the life course. For instance, based on social comparison theory, physical health may take on less importance as the physical health of their similarly aged peers declined. In support social comparison theory, Schnittker (2005) found that the association between mental health and self-rated health got stronger as individuals got older whereas the association between physical health (e.g., chronic conditions and functional limitations) and self-rated health declined. However, a limitation of this study is that—as with much of the literature on the meaning of self-rated health—is methodologically focused on the correspondence of objective measures of health to self-rated health.

Using subjective measures of mental and physical health may provide a more accurate picture of the importance of perceived physical versus mental health statuses across the life course. That is an important advantage of the methodological approach taken in the current paper is that the measures of physical and mental health are more methodologically and conceptually comparable than objective measures. The specific activity that the respondent undergoes when assessing their mental and physical health is the identical to their assessment of their overall health. I argue that this provides a more reasonable foundation for understanding the importance of mental and physical health to individuals' ratings of their own health. Such an approach better

aligns with the inherently subjective nature of self-rated health while still allowing for an analytical approach that is consistent with prior studies on this topic.

To date, most research examining the determinants of self-rated health focuses on the relationship between self-rated health and objective measures of physical health. Although such studies have contributed much in terms of establishing the criterion validity of self-rated health—whether the measure correctly predicts health outcomes—what people actually consider when they rate their health is poorly understood. Likewise, how the relative importance of physical and mental health to individuals' assessment of their health shifts across age is not well understood. As such, the goal of this study is to better understand the importance of physical and mental health to self-rated health across age using subjective measures of mental and physical health. The proposed research will investigate two primary research questions:

1. How do self-evaluations mental, physical, and overall self-rated health change across age?
2. How does the relationship between mental health and physical health and self-rated health change across age?

Method

Data

Data were obtained from the 2010 National Health Interview Study (NHIS). The NHIS is a nationally representative cross-sectional survey of the U. S. non-institutionalized civilian population ages 18 and older. The data used in the study included respondents from the sample adult file with linked responses to the Cancer Control Supplement (CCS; N = 17,284). The CCS has been fielded every 5 years since 2000 to monitor progress towards cancer-related goals in the Healthy People 2020 objectives. The CCS focuses on issues related to knowledge, attitudes, and

practices of cancer-related health behaviors, screening, and risk assessment. The 2010 CCS is unique in that, in addition to items related to cancer screening, it includes self-assessed measures of mental and physical health. This data allowed for an analysis of the association between mental, physical, and global self-rated health using measures that are comparable to the conventional self-rated health measure. Missing data were handled using listwise deletion. After listwise deletion, the final analytic sample included 16,510 observations.

Measures

Outcome variable. The dependent variable in this study was be self-rated health. Self-rated health was measured by asking participants, "Would you say your health in general is excellent (1), very good (2), good (3), fair (4), or poor (5)?" Although this variable is commonly dichotomized as fair/poor versus good/very good/excellent, this variable was treated continuously to maximize comparability with other studies examining the relationship between mental health and self-rated health (Schnittker 2005; Singh-Manoux 2006). The variable was coded such that higher responses indicate worse health as has been typically done in prior research using self-rated health.

Predictors. Overall physical health was assessed using self-rated measures of physical and mental health. Self-rated physical health was measured by asking participants, "In general, how would you rate your physical health?" whereas self-rated mental health was measured by asking participants, "In general, how would you rate your mental health, including your mood and your ability to think?" For each of these items, participants are asked to respond using a 5-point scale: excellent (1), very good (2), good (3), fair (4), poor (5). These items were be treated as continuous variables with higher scores indicating worse health.

Moderator. Age was included as a moderator to determine the extent to which the associations between physical and mental health and self-rated health change across age. Consistent with Schnittker (2005), age-groups were divided into categories in order to run age stratified regression models. These included: 18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, and 75 years and older. Age was also treated continuously in ancillary analyses to generate predicted means across individual years of age.

Covariates. Covariates included sex (female = 1), race, income, education, employment status, and martial status. Race and ethnicity were categories using a series of dummies contrasting White Hispanic, Black non-Hispanic, Black Hispanic, Asian non-Hispanic, and Asian-Hispanic to White non-Hispanic (reference category). Income (in dollars) and education (in years) were treated as continuous variables. Respondents were classified as employed versus unemployed (reference). Marital status was assessed by classifying respondents as married versus non-married (reference).

Analytic approach

Descriptive statistics with means and standard deviations for variables included in the regression model are shown in Table 1. Descriptive analyses were used to provide an account of how self-rated physical, mental, and overall health change across age. Three OLS regression models were estimated with age as a continuous variable to produce adjusted means of self-rated physical, mental, and overall self-rated health across age. In addition to demographic controls, each of these models were adjusted for the self-rated health measures not included as dependent variables. For example, models predicting self-rated physical health controlled for self-rated mental and overall health and vise versa. Doing so allowed me to adjust for any potential indirect effects that the self-rated health variables might have imparted on each other. Next, to determine

the how the effects of self-rated mental and physical health on overall self-rated health changes across age, I estimated a series of age-stratified models (18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74) regressing self-rated health on self-rated physical and mental health with covariates. These age breakdowns were chosen consistent with those used by Schnittker (2005) with the addition of a base age category of ages 18 to 24. In essence, doing so produced models that are fully interactive (i.e., all predictors are interacting with age). This allowed me to test my second research question by testing how the association between self-rated physical health and self-rated health as well as the association between self-rated mental health and self-rated health change across age. Auxiliary analyses were then run estimating an OLS regression model regression self-rated health on self-rated physical and mental health with interaction terms of age (continuous) by self-rated physical and mental health. These models were used to generate predicted means of self-rated health for individuals with fair/poor physical and mental health across single years of age. Finally, simple slopes analysis were conduced to further probe these interactions by pointing the slopes for self-rated mental and physical health at +1/-1 SD of the mean age in the analytic sample.

Table 1. Descriptive Statistics of Variables Included in Analysis (*N* = 16,510).

Variable	*M*	*SD*	Min	Max
Self-rated health[a]	2.40	1.10	1	5
Self-rated physical health[a]	2.47	1.05	1	5
Self-rated mental health[a]	2.15	0.98	1	5
Age	52.16	16.23	18	85
Female	0.57	0.50	0	1
Employed	0.56	0.50	0	1
Married	0.63	0.48	0	1
Poverty (1 = not in poverty)	0.86	0.35	0	1
Non-Hispanic White (%)	62.69			
Hispanic White (%)	16.98			
Non-Hispanic Black (%)	13.11			
Hispanic Black (%)	0.58			
Non-Hispanic Asian (%)	6.89			
Hispanic Asian (%)	0.75			

Note. *N* = 16,510, based on analytic sample for regression models.
[a]1 = excellent, 5 = poor

Results

Table 1 provides summary statistics for respondents included analytic sample. The average age of respondents in the analytic sample was 52 years and 57% are women. The majority of respondents were non-Hispanic White (63%). For all measures of self-rated health, the mean was less than 2.5, indicating the average respondent was in good or very good mental, physical, and overall health.

Figure 1 shows respondents' mean overall, physical, and mental self-rated health across age. As expected, all three measures of health were worse with increasing age. However, mental health tends to be better overall across age and worsens more slowly than overall and physical health. The pattern of predicted means also suggests that ratings of one's physical health more closely track their ratings of overall health than mental health, especially at older ages.

Table 2 presents unstandardized coefficients from six age-stratified OLS regression models of self-rated health on mental and physical health, controlling for sex, poverty status,

employment status, and martial status. The table shows that the association between self-rated mental health and overall self-rated health decreased with age. The association between self-rated mental health and overall self-rated health is approximately 7.5 times greater for respondents ages 18-24 years ($B = 0.259$) compared to those 75 years and older ($B = 0.033$). In contrast, the association between self-rated physical health and overall self-rated health increased with age. The association between self-rated physical health and overall self-rated health is approximately 2 times greater in respondents in age group 45 or greater. It is also important to note that the model R^2 is generally higher in models for older respondents than younger respondents, suggesting that the factors of mental and physical health better explain older respondents' self-assessments of their health than younger respondents. In other words, there was a greater degree of residual variation in self-rated for younger respondents. The table also shows the mean level of self-rated mental and physical health for each age group. In contrast to the pattern observed for the coefficients, the means for mental and physical health show a linear increase across age groups. Thus, differences in the population level mean of self-rated mental health across age do not necessarily correspond to differences in the association between self-rated mental health and overall self-rated health across age.

As an ancillary analysis to the age-stratified models, a separate regression model was run to test for continuous interactions of self-rated mental health by age and self-rated physical health by age. The omnibus test for the regression equation in the was statistically significant, $F(13, 16{,}496) = 791.17$, $p < .001$. Consistent with the results of the stratified models, there was a significant interaction of self-rated mental health by age on overall self-rated health ($B = -0.005$, $p < .01$) and self-rated physical health by age on overall self-rated health ($B = 1.03$, $p < .001$). For interpretation, predicted means were generated for overall self-rated health across single years of

age for respondents in fair/poor self-rated mental and physical health (Figure 2). This figure shows that at younger ages, fair/poor self-rated mental and physical health is associated with a similar means for self-rated health. At older ages, there is a much larger gap in mean self-rated health between fair/poor mental and physical health. This indicates that at younger ages, physical and mental health have similar importance to respondents' overall ratings of their health. However, at older ages, physical health appears to have greater importance to respondents overall ratings than mental health.

Finally, in order to better understand how the effects of self-rated mental and physical health on overall self-rated health changes across age, I decomposed each of the interactions into simple slopes. Slopes were plotted at +1/-1 SD of the mean age for respondents in the analytic sample (52 years). As shown in Figure 3, the simple slopes demonstrate that the effect of fair/poor mental health on overall health is larger for respondents who are 36 years old (B = 0.138) compared to those who are 68 years old (B = 0.066). As shown in Figure 4, the simple slopes also demonstrate that the effect of physical health was smaller for respondents who are 36 years old (B = 0.515) compared to those are 68 years old (B = 0.667). Overall, the effects of physical health are stronger than mental health, regardless of age. However, the magnitude of the effects of both mental and physical health depends on age. The results of the simple slopes analysis corroborate the pattern of results from the age-stratified models by demonstrating that the effects of self-rated mental health on overall self-rated health decrease with age whereas the effects of self-rated physical health on overall self-rated health increase with age. Finally, these results suggest that the relative importance of mental health for assessments of overall health is greatest at younger ages whereas the relative importance for physical health is at older ages.

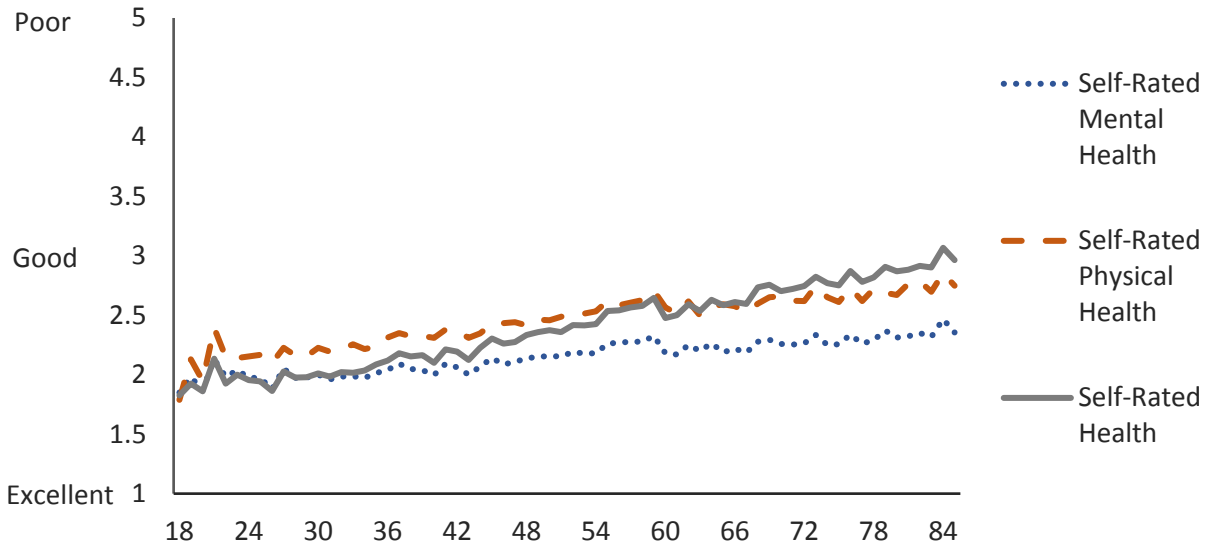

Figure 1. Mean Self-Rated Health by Age

Table 2. Unstandardized Coefficients from Age-Stratified Regressions on Self-Rated Health (N = 16,510)

	Age Group						
	18-24	25-34	35-44	45-54	55-64	65-74	75+
Self-Rated Mental Health	0.259 (0.049)	0.122 (0.021)	0.131 (0.018)	0.096 (0.018)	0.069 (0.017)	0.095 (0.021)	0.033 (0.023)
Self-Rated Physical Health	0.325 (0.052)	0.450 (0.020)	0.523 (0.018)	0.572 (0.017)	0.696 (0.016)	0.654 (0.020)	0.666 (0.021)
R^2	0.351	0.360	0.419	0.495	0.604	0.534	0.502
N	353	2,295	3,628	3,414	3,217	2,159	1,804
Self-Rated Mental Health Mean	1.86	1.93	2.08	2.19	2.25	2.20	2.32
Self-Rated Physical Health Mean	2.20	2.19	2.31	2.47	2.63	2.60	2.71

Note. Models controlling for sex, poverty status, employment status, and marital status
All coefficients statistically significant, $p<.001$

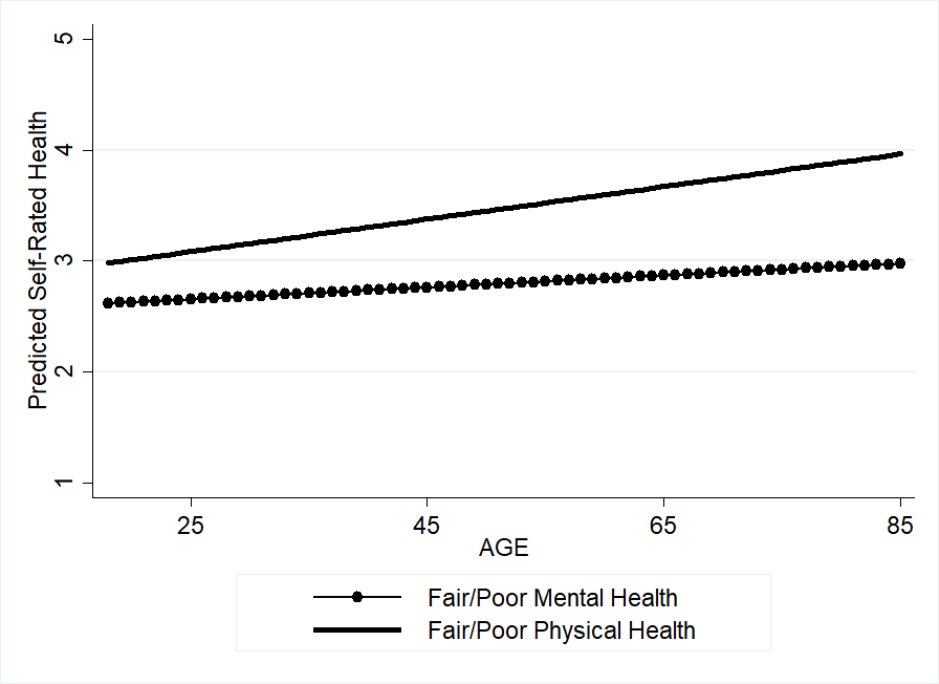

Figure 2. Predicted Self-Rated Health by Mental and Physical Health Across Age

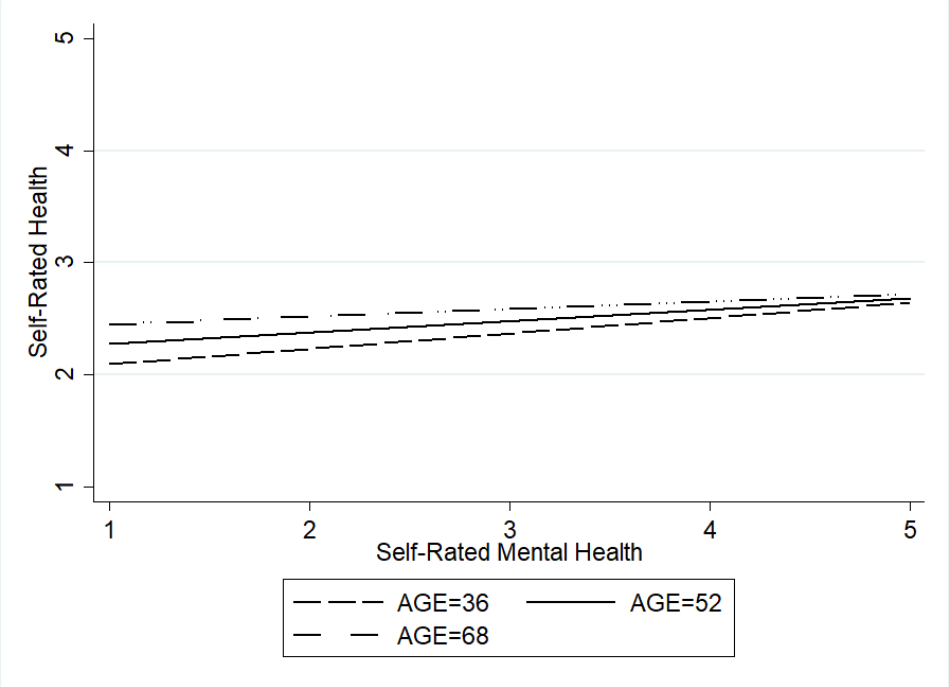

Figure 3. Interaction of Self-Rated MentalHealth by Age on Self-Rated Health

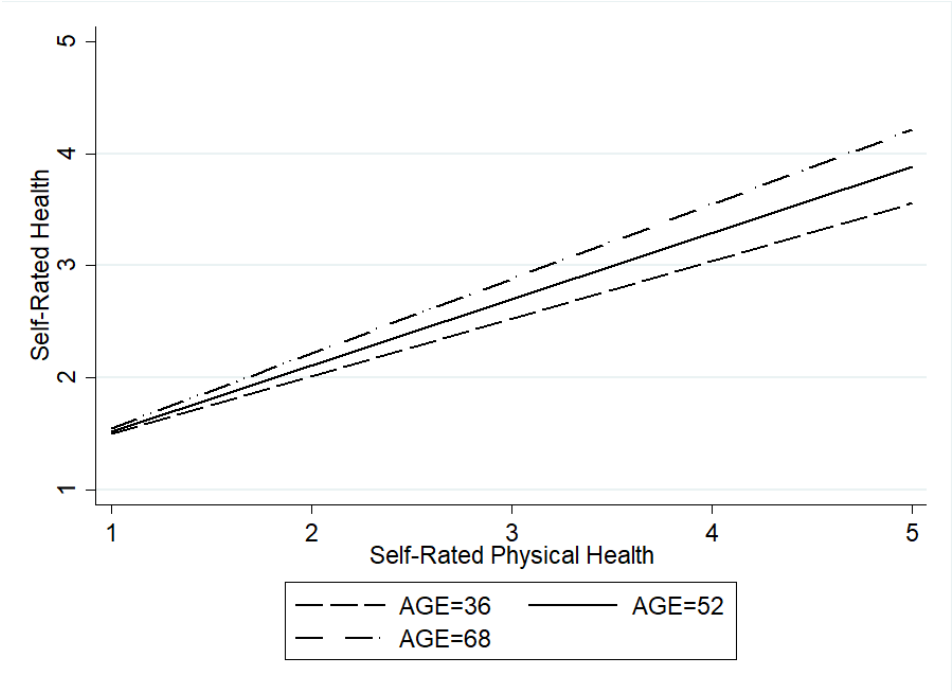

Figure 4. Interaction of Self-Rated Physical Health by Age on Self-Rated Health

Discussion

The goal of the current study was to provide a better understanding of the meaning of self-rated health and how it changes with age. In particular, we sought to examine the extent to which two primary health domains, mental and physical health, determine self-rated health and how the importance of these domains changes across age. Studies addressing similar questions typically seek to identify various objective physical and mental health determinants of self-rated health (Jylha et al. 1998; Singh-Manoux 2006). However, given that research has clearly shown that self-rated health is subjective and evaluative, such emphasis on objective health measures may provide a limited understanding of the meaning of self-rated health. Thus, we argue that existing approaches have left a methodological gap. A strength of the approach used in this study

is that physical and mental health are measured using the same question format that is used in assessing overall self-rated health.

Results from this study support that self-rated health is largely a function of self-rated physical and mental health, net of health-related sociodemographics. Overall, my results suggest that physical health has a larger impact on people's self-assessments of their health. The impact of physical health on self-rated health increased with age whereas the impact of mental health on self-rated health decreased with age. The results of this study can also be interpreted in terms of the relative importance of mental and physical health. While physical health is a stronger predictor of SRH across age, the relative impact of mental health is greatest at younger ages. Substantively, these results confirm that age is an important source of reporting heterogeneity in self-rated health. However, the results expand upon previous research by demonstrating that the age heterogeneity of self-rated health extends to the specific domains of self-rated health. The meaning of self-rated health differs depending on one's age.

Previous research has suggested that mental and physical health are key dimensions underlying the meaning of self-rated health (Singh-Manoux 2006). This was consistent with the results of my study as these two factors alone explained up to 60% of the variation in self-rated health, depending on age. Similarly, Schnittker (2005) found that mental and physical health factors explained most of the variation in self-rated health, net of controls. However, Schnittker found that effects of mental and physical health changed across age; the association between mental health and self-rated health got stronger as individuals got older whereas the association between physical health (e.g., chronic conditions and functional limitations) and self-rated health declined. In contrast, the current study found the opposite pattern; the effects of physical health increased with age while the effects of mental health decreased. One possibility for this

difference may be due to the fact that my study used subjective as opposed to objective measures of health. For instance, Schnittker used functional limitations, chronic conditions, and CES-D scores. Although the CES-D was highly correlated with self-rated at older ages, much of this effect could have been mediated through the effects of physical health. That is, the presence of depressive symptoms may rise in older individuals due to physical health declines. This is pattern is consistent with previous research showing that depressive symptoms increase in older adults in part due to declines in physical health. (Clarke et al. 2011).

I acknowledge several limitations to this study. First, any age differences observed in the study could potentially reflect underlying cohort differences. Cohorts have been found to be a potential source of reporting heterogeneity in the measurement of self-rated health (Altman et al. 2016). Second, the self-reported mental health measure used in the study is phrased such that it asks respondents to rate their mental health, including their mood and ability to think. Unfortunately, this question is doubled barreled in that it includes two separate mental health factors, mood and cognition. Although these two concepts may be closely related and comorbid in the context of mental health, it is impossible to know which aspect is more salient. There are also plausible reasons to think that the salience and interpretation of either of the factors within this question could change depending on age. Some of the difference in the findings between the results shown here and previous research could be accounted for by the wording of this question. A variance decomposition of this item across age would be needed to provide a better account of the extent to which this impact my results.

Despite the limitations of this study, it makes a number of contributions to our understanding of self-rated health. Self-rated health can be accounted for in large part by individuals' perceptions of their physical and mental health. The importance of these domains,

however, shifts with age; self-rated health is most strongly associated with physical health, especially in older individuals. The meaning of self-rated health is multidimensional and changes across the life course.

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