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Personality change at mid-life is associated with changes in self-rated health: Evidence from the Hawaii Personality and Health Cohort

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ABSTRACT

Personality traits change across the lifespan, and trait change, in addition to trait level, may be related to health. Longitudinal data from the Hawaii Personality and Health Cohort were used to investigate associations between changes in traits and self-rated health (SRH). Participants ($N = 733$, $M_{age} = 44.4$) completed measures of the Big Five personality traits and SRH twice approximately 3 years apart. Personality trait changes were associated with SRH change. Additionally, increases on Agreeableness, Conscientiousness, and Openness, and decreases on Neuroticism, predicted increases in SRH, even when controlling for gender and education. Relating correlated trait change at mid-life, when traits reach peak stability, to a consequential health outcome such as SRH change, demonstrates the value of treating both traits and health indicators as dynamic variables.

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1. Introduction

The relation between personality trait change and change in self-rated health (SRH) at mid-life was investigated in the Hawaii Personality and Health Cohort. Ratings of SRH are powerful predictors of health outcomes, even after accounting for objective health status, health behaviors, and sociodemographic factors. SRH, typically assessed by a single item, has been repeatedly found to predict mortality above and beyond objective health status in both community and patient samples (Benyamini, 2011; Benyamini & Idler, 1999; Heidrich, Liese, Lowel, & Keil, 2002; Idler & Benyamini, 1997; Khang & Kim, 2010; Lee, 2000). Single-item SRH was associated with the inflammatory markers interleukin-6 and C-reactive protein in a healthy community sample (Christian et al., 2011), and with modifiable health behaviors that are strongly associated with preventable causes of death (Mokdad, Marks, & Stroup, 2004).

Personality traits are established predictors of health and longevity that are at least as strong as socioeconomic status and intelligence (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Although all the Big Five traits have been related to health, the two most consistent predictors of positive health outcomes including SRH, clinically assessed biomarkers, and longevity are high Conscientiousness and low Neuroticism (Chapman, Duberstein, & Lyness, 2007; Chapman, Duberstein, Sorensen, & Lyness, 2006; Goodwin & Friedman, 2006; Hampson, Edmonds, Goldberg, Dubanoski, & Hillier, in press; Kern & Friedman, 2008; Lockenhoff, Sutin, Ferrucci, & Costa, 2008; Martin, Friedman, & Schwartz, 2007; Mroczek, Spiro, & Turiano, 2009; Sutin et al., 2010; Wasylkiw & Fekken, 2002; Williams, O'Brien, & Colder, 2004). Openness to Experience also predicts adult health outcomes (Chapman et al., 2007; Richman et al., 2005) including mortality (Iwasa et al., 2008; Jonassaint et al., 2007; Swan & Carmelli, 1996; Turiano, Spiro, & Mroczek, 2012).

Although personality tends to increase in stability across the life course (Roberts & DelVecchio, 2000), there is non-trivial individual-level personality change into adulthood (Allemand, Zimprich, & Martin, 2008; Donnellan, Conger, & Burzette, 2007; Roberts & Mroczek, 2008; Roberts, Walton, & Viechtbauer, 2006; Srivastava, John, Gosling, & Potter, 2003). Trait change as well as overall trait level may be relevant to health. Changes in Neuroticism predicted mortality in the very old (Mroczek & Spiro, 2003), and changes in Conscientiousness were correlated with changes in self-reported physical health over 3 years in a community sample (Takahashi, Edmonds, Jackson, & Roberts, 2013). Decreases in Conscientiousness and increases in Neuroticism predicted poorer SRH (measured by a single item) across two assessments 10 years apart in the Midlife in the United States study (age range 20–75; Human et al., 2012). Decreases in Conscientiousness and

Abbreviations: SRH, self-rated health.

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Extraversion and increases in Neuroticism predicted poorer self-reported physical health in a large-scale Australian study with assessments 4 years apart (age range 20–79; Magee, Heaven, & Miller, 2012). Magee et al. (2012) also found cohort differences in associations between trait change and health, with stronger associations for Neuroticism in younger and older cohorts, and for Conscientiousness in younger and middle-aged cohorts. One study found no associations between trait change among older adults (55–85 years) and changes in self-reported disease, disability and overall health over a 6-year period (Small, Hertzog, Hultsch, & Dixon, 2003).

The previous studies suggest that the association between trait change and health change may be dependent on life stage. The present investigation examined these associations within a more age homogenous sample than studied hitherto. We examined change over a relatively short period (3 years) from the mid to late 40's, a period when both personality and health are relatively stable. Thus this study provides a rigorous test of the hypothesis that trait change is associated with self-reported health change.

2. Method

2.1. Participants

Participants were members of the Hawaii Personality and Health Cohort ($N = 2418$; Hampson et al., 2001). Teachers assessed the personalities of members of this cohort when they were elementary school children in Hawaii between 1959 and 1967. Beginning in 1998, the child participants, by then middle-aged adults, were located for an ongoing follow-up study of personality and health, which includes completing several self-report questionnaires. To date, 73% of the original childhood sample that could be located has been recruited for follow-up studies. The adult sample was representative of the child sample in terms of gender (50% female). Adult participants were about one tenth of a SD higher on childhood Conscientiousness (Cohen's $d = -.09$) and Openness (Cohen's $d = -.08$) than the full child sample.

The current article presents data from members of the adult sample who completed at least the first two assessments and the questions related to personality and self-rated health ($N = 733$). These were the only two assessments that measured personality using the same instrument, and also measured SRH.

These participants (357 men, 376 women) are from diverse ethnic backgrounds (19% Caucasian, 48% Asian–American, 18% Hawaiian/Pacific Islander, 8% Filipino) and levels of education (2.3% some high school or less, 17.1% high school graduates/GED, 3.1% some technical school, 3.5% technical or nursing school graduates, 26.3% some college/community college, 27.4% college graduates, 19.9% postgraduate or professional degree, 0.3% unknown). The average age of participants was 44.14 years ($SD = 1.96$) at Time 1, and 46.85 years ($SD = 1.98$) at Time 2. Sample size at Time 1 was 1056 and at Time 2 was 934. Those who did vs. did not complete the Time 2 assessment only differed on one of the Big Five traits. Those who completed the Time 2 assessment ($M = 3.50$, $SD = .63$) were lower on Openness than those who did not ($M = 3.58$, $SD = .61$), $t\ (1258) = 2.37$, $p = .02$, $d = .13$; and also reported somewhat better health at Time 1($M = 2.57$, $SD = .95$) compared to those who did not complete the Time 2 assessment ($M = 2.71$, $SD = .98$)[1], $t\ (1049) = 2.24$, $p = .02$, $d = .14$). However, both of the effect sizes are small, indicating that the differences between the groups are unlikely to bias the results.

2.2. Measures

2.2.1. Personality

The Big Five Inventory (BFI; John, Naumann, & Soto, 2008) consists of 44 short descriptive items (e.g., "Is talkative") that assess the five broad personality traits of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. Participants indicated how accurately each statement described themselves (1 = *Very inaccurate*, 5 = *Very accurate*). In the current sample, the alpha reliabilities ranged from .79 for Openness at Time 1 to .85 for Neuroticism at Time 2.

2.2.2. Self-rated health

SRH was assessed with the widely used single-item measure "Compared to others of your same age and sex, would you say that in general your health is…." Response options were: Excellent, Very good, Good, Fair, and Poor. The test–retest correlation for SRH was .67 (see Table 1), which is evidence that the measure is fairly reliable but still includes some change over this time interval.

2.3. Procedures

Time 1 (1999–2004; age range 40–50) measures included the BFI, educational attainment, SRH, gender, and ethnicity. Time 2 (2002–2008; age range 43–53) measures were mostly collected during 2002 and included the BFI and SRH. The range in time between Time 1 and Time 2 was 619–1281 days ($M = 1001.77$, $SD = 73.54$).

Of the 731 participants who reported SRH at Time 1, 172 did not report SRH at Time 2. There were no differences on Time 1 SRH between those who did ($M = 2.59$, $SD = .95$) and did not ($M = 2.47$, $SD = .94$) provide Time 2 SRH, $t\ (729) = 1.56$, $p = .12$, $d = .12$, or on any of the five personality change scores, t's < 1.43, p's > 15. However, those with Time 2 SRH were more neurotic at both time points (Time 1: $t\ (729) = 1.09$, $p = .04$, $d = .08$; Time 2: $t\ (729) = 2.17$, $p = .03$, $d = .16$), less conscientious at Time 2 ($t\ (729) = 2.12$, $p = .03$, $d = .16$), and marginally less conscientious at Time 1 ($t\ (729) = 1.43$, $p = .054$, $d = .11$). However, note that the effect sizes of the differences are quite small, which suggests that the differences would not bias the results. Additionally, the interval between the Time1 and Time 2 assessments was not related to personality change or SRH (r's = −.02 to .03, p's > .42).

3. Results

Table 1 shows the descriptive statistics for personality traits and SRH at Times 1 and 2. The only significant difference in mean level was for Neuroticism, which was slightly higher at Time 1, $t\ (732) = 2.53$, $p = .01$, $d = .08$.

3.1. Rates of reliable personality change

Absence of mean level change can obscure change at the individual level, for example when equal numbers of individuals increase and decrease on a trait across the same period. To evaluate individual-level change across the two time points the reliable change index (RCI; Christensen & Mendoza, 1986; Jacobson & Truax, 1991; Roberts & Mroczek, 2008) was calculated for each individual on each trait by dividing the difference between the individual's scores by the standard error of the difference between the scores for the sample.[2] This represents a standardized metric for individual-level change where a value greater than 1.96 is considered to be statistically unlikely and therefore represents

[1] Lower scores indicate better SRH.

[2] Using the standard deviation of the trait scores at Time 1.

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