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Does Personality Confound the Relationship Between Health and Relative Deprivation? Evidence from Costa Rica

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Abstract

Income inequality and measures of relative deprivation have been found to be associated with self-reported health, mortality and morbidity. Yet, there remains much skepticism about the validity of these relationships as causal. It has been hypothesized that social circumstance "gets under one's skin" through a stress response, which may be highly related to one's personality or disposition. We evaluate whether a well-studied and stable personality trait, locus of control and its dimensions, confounds the relationship between relative deprivation and health outcomes and health behaviors in the context of an elderly population in Costa Rica. We use the Costa Rican Study on Longevity and Healthy Aging, an on-going longitudinal study of a nationally representative sample of adults aged 60 and older to test these relations. We find evidence that relative deprivation is related to locus of control, particularly reports of external locus of control or fatalism. We further find that both locus of control and fatalistic beliefs are important predictors of poor mental health and poor self-reported health, but relative deprivation is not related to these outcomes. In contrast, relative deprivation was found to be a predictor of smoking and drinking health behaviors, but these relations do not appear to be confounded by locus of control or sense of fatalism. Thus at least in this Costa Rican context, we are able to rule out this hypothesized threat to causally interpreting health associations with relative deprivation.

Background

The hypothesis that economic inequality adversely affects health outcomes has been extensively debated in recent decades. Despite the large number of studies, there is limited consensus on the health effects of inequality (A. Deaton, 2003; Kondo et al., 2009; Lynch et al., 2004; Wilkinson & Pickett, 2006). Recently a related literature has examined the relationship between relative deprivation and health as a mechanism to explain the economic inequality and health relation. Income inequality and measures of relative deprivation have been found to be associated with self-reported health and mortality (Subramanyam et al., 2009, Salti, 2010). Yet, there remains much skepticism about the validity of these relationships as causal. The ability to make strong causal statements has been further limited by the fact that little work has been done to analyze "third factor" arguments, such as how personality traits could affect both one's relative SES status and health outcomes. For example, it could be that personality traits that influence one's tolerance to stress could potentially induce selection into different occupations or locations and hence SES trajectories. This study explores whether personality might confound health-inequality relationships.

Previous research has found that increases in income inequality were associated with increases in age and sex specific mortality related to suicide and cirrhosis in Costa Rica (Modrek, Ahern, 2011). In addition, higher relative deprivation has been found to be associated with higher mortality in Costa Rica (Modrek, Dow, Rosero-Bixby, 2012). However, it is unclear to what extent other "third factor variables" confound this relationship. Indeed it had been hypothesized that SES must "get under one's skin" through a stress response which may be highly related to one's personality or disposition. Therefore, it may be that personality traits relate independently to both one's relative SES deprivation (through many channels, but particularly labor force ones) and health outcomes.

Economists have been particularly interested in personality traits as "third factor variables" and have conceptualized certain personality traits as inherent non-cognitive skills that are central to one's human capital. These traits are thought to be an important factor, which may confound many observed relationships. Figure 1 panel A outlines this theoretical model where personality traits determine both subsequent health and level of relative SES, through a variety of education and labor market forces. This model suggests that any observed relation between health and relative SES is spurious. An alternative model suggests that relative SES and personality risk for negative health outcomes cluster together and are correlated risks. The direction of the relations between personality and relative SES may be ambiguous, and each *may be* independently related to health outcomes. Figure 1 panel B outlines this alternative theoretical model. Note that depending on the directionality of the relation between relative SES and personality traits, one or the other may mediate the relation with health outcomes.

To elucidate which of the above models may be at work, the measurement of personality traits has recently been included in large-scale surveys that collect both health and SES

measures. Along with the Big Five (openness, conscientiousness, extraversion, agreeableness, and neuroticism), locus of control has been of interest. Locus of control is meant to capture "a generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences" (Rotter, 1966). Those believing that life's outcomes are due to their own efforts have an internal locus (sense) of control, while those believing that outcomes are largely due to luck or other uncontrollable factors have an external locus of control—a sense of fatalism. Moreover, locus of control has been found to be related to several economic outcomes such as earnings (Heineck, Anger, 2010; Semykina, Linz, 2007; Osborne, Groves, 2005), and educational attainment (Baron, Cobb-Clark, 2010; Coleman, Deleire, 2003). In addition, locus of control has been found to be related health behaviors (Chiteji, 2010). Moreover, locus of controls is thought to be relatively stable personality trait over the life course and does not appear to be related to the demographic, labor market, and health events (Cobb-Clark, Schurer, 2011).

Data

Data for this analysis come from two sources. The majority of data comes from the Costa Rican Study on Longevity and Healthy Aging (CRELES), an on-going longitudinal study of a nationally representative sample of about 9,000 adults aged 60 and over and residing in Costa Rica in the year 2000. This survey over-sampled of the oldest old and included an in-depth, longitudinal survey for a subsample of about 2,800 of the initial participants. All health variables and most SES and demographic controls come from the subsample of this survey. The relative deprivation measures, detailed below, are based on the comparison of the wealth data collected in CRELES relative to the wealth distribution in one's canton of residence based on the complete 2000 census microdata.

Measures

Health Outcomes

We consider several health indicators to reflect the multidimensional character of the concept of health including self-reported subjective health, mental health, and health behaviors. For self-reported health (SRH), we designate a respondent as having poor-SRH if they respond that their health is fair or poor. For mental health, we designate a respondent as mildly depressed if they respond negatively to 6 of the 15 questions on the Yesavage's geriatric depression scale (Sheikh, Yesavage, 1986). For health behaviors, we designate a respondent as a smoker if he/she ever smoked, and we designate an individual as a consumer of alcohol if they respond that they drink daily or occasionally. While the final alcohol measure is not necessarily bad for one's health, it is a measure of health related behavior.

Controls

We include standard demographic and socio-economic controls. Demographic controls included age, age squared, sex, age interacted with sex, marital status (whether or not currently married and including those in consensual unions). Socio-economic controls include educational attainment and wealth measured by assets. Educational attainment is

measured in three naturally defined groups: (1) no formal education, (2) primary education (1 to six grades), and (3) some secondary school or higher. The wealth measure is a count of the number of assets (telephone, hot-water heater, refrigerator, television, washer, stove, computer and car) and amenities in the household (access to electricity, piped-in water, sewage, room, and non-dirt floors) in 2000. For each category, ownership increases the wealth measure by 1 and all categories are given equal weight; thus the wealth measure ranges from 0 to 13.

We used these asset and wealth measures in several additional ways. First, we use the specific assets to designate an individual as having an unmet basic need if the respondent lacks basic amenities, such as non-dirt floors or access to sewage. Second, we categorize an individual as having high wealth if the respondent has greater than 11 of the 13 assets and no unmet basic needs. Finally, we use the wealth scale as the basis of the relative deprivation score.

Relative Deprivation Score

Household relative deprivation was estimated for each individual in our sample using the wealth information from the CRELES and mapped to the 2000 census microdata, which includes all households within a canton. Following Eibner and Evans (2005) and originally defined by Yitzhaki (Yitzhaki, 1979), relative deprivation was defined as the sum of the differences in the wealth index between person i and all others j who have more wealth than person i in their canton. This is calculated as:

$RD_i = (1 / N)* \sum (y_j - y_i) \; \forall \; y_j > y_i$ OR equivalently $RD_i = Pr(y > y_i)*[E(y|y > y_i) - y_i]$

This measure captures the expected difference in household wealth between person i and all other individuals j with greater wealth in his or her canton. Since CRELES only sampled older households, we wanted to ensure that the distribution of wealth used in the census was similar to those in CRELES because we were aware that older people tend to be wealthier. In Figure 2, we show that the wealth distribution in CRELES matched the one from the census using households with a head > 19 years of age and having at least one resident older than 55. We use this distribution to calculate the relative deprivation score.

Personality

The CRELES survey included eight "personality" questions (see table 1) that collectively measure the locus of control construct. We generate an overall internal locus of control measure by adding up the responses to the eight questions (and reversing the scale when necessary for questions where a lower value suggests higher internal locus of control). We then standardize the measure so that it has mean zero and standardization of 1.

We also conduct factor analysis on these eight questions. The factor analysis results suggest that there are 3 distinct constructs included in the eight-question locus of control module. The first component explains most of the variation in two questions, "The very

good things that happen to us are because of good luck" and "The majority of problems are due to bad luck". These questions together measure one's external locus of control, therefore we construct an indicator of fatalism measured as whether respondents agree or slightly agree with both questions. The second loads onto questions "One is responsible for one's own successes" and "One is responsible for one's own shortcomings". These questions essentially measure personal responsibility and a sense of internal locus of control, therefore we construct an indicator measure of whether respondents agree or slightly agree with both questions. The final factor loads most strongly on the question, "One can do nearly anything one sets one's mind to", which we interpret as capturing a sense of optimism, so we construct an indicator measure of whether respondents agree or slightly agree with the statement. Our measure of standardized locus of control increases as individuals agree more with statements that reflect a higher sense of internal control. Accordingly, the standardized locus of control is negatively correlated with the fatalism measure (corr= -0.539, p-value=0.000), and positively correlated with the measure of internal control (corr= 0.272, p-value=0.000) and optimism (corr= 0.237, p-value=0.000).

Statistical Analyses

In order for an unobserved variable to be a potential confounder, it must be related to the explanatory variable of interest. Accordingly, we first explore whether our personality measures are related to the relative deprivation measure. We first use OLS regression models to explore whether the four constructed personality measures, standardized locus of control, external locus of control, internal locus of control, and optimism, relate to the relative deprivation measure after controlling for basic demographic and SES variables. Demographics characteristics include age and sex; to account for non-linear age effects and differential age effects by sex, we also included in the models a quadratic term for age and an interaction term for age and sex. We further include controls for marital status, education level, having basic unmet needs, and having high wealth as defined above. Since relative deprivation varies at the individual level, we can also include canton-level fixed-effects to account for all other time-invariant canton characteristics that are correlated with relative deprivation and the health outcomes. The stylized models that we estimate are:

$$F(RD_{ic}) = \beta_0(\textbf{Canton FE}_{\textbf{c}}) + \beta_1 (\textbf{Demographic Controls}_{\textbf{i}}) + \beta_2 (\textbf{SES Controls}_{\textbf{i}}) + \beta_3 (\text{Personality}_i) + \varepsilon_i$$

The personality measures that were related to relative deprivation, RD, were then used in the subsequent analyses.

Using the same sets of covariates as above, we next estimate the relationship between relative deprivation and health outcomes with and without controlling for the personality constructs. All four health outcomes are dichotomous so we use fixed effects logistic regression. The stylized models that we estimate are:

$$F(\text{Health Outcome}_i) = \beta_0(\textbf{Canton FE}_c) + \beta_1(\textbf{Demographic Controls}_i) + \beta_2(\textbf{SES Controls}_i) + \beta_3(RD_{i,c}) + \varepsilon_i$$

$$F(\text{Health Outcome}_i) = \beta_0(\textbf{Canton FE}_c) + \beta_1(\textbf{Demographic Controls}_i) + \beta_2(\textbf{SES Controls}_i) + \beta_3(RD_{i,c}) + \beta_4(\text{Personality}_i) + \varepsilon_i$$

As appropriate, we estimated robust standard errors to account for heteroskedasticity by using the "robust" option in the Stata 11 software package.

Results

In Figure 3 we show the age distribution of the entire CRELES and the sample with the measure of locus of control. The sample with the locus of control measure is skewed to the left and doesn't include the oldest-old because CRELES excluded these questions when proxies were used in answering other parts of the survey. We know from Figure 3, that the use of proxies caused systematic missingness, particularly by age. In Table 2 we present the summary statistic for the CRELES sample that did not need a proxy (truncated full sample) and the analytical sample used in the study. Table 2 shows that there were approximately 300 participants that did not use proxies but still had missing values for the personality variables. The analytical sample size is slightly smaller than the truncated full sample, but there were no statistically significant difference in any of the observed variables between the truncated full sample (no proxies) and the analytical sample (no proxies and no personality variables).

Table 3 presents the results of the relationship between the personality measures and the relative deprivation measure. The standardized summary locus of control measure is correlated with relative deprivation; an increase in locus of control (more internal control) is related to a decrease in relative deprivation. Likewise, the fatalism/external locus of control indicator is also correlated to relative deprivation in the opposite direction; agreeing to the fatalism/external locus of control questions increases relative deprivation by about 0.2 units. Neither of the other two personality constructs is significantly related to the relative deprivation measure. Since the internal locus of control and the optimist measures are unrelated to relative deprivation, we do not further pursue their confounding role; thus in the following tables we investigate only the potential confounding role of the standardized internal locus of control measure and the external locus of control (fatalist) measure.

Table 4 presents the results for the relationship between relative deprivation and our four health outcomes, accounting for locus of control. The locus of control measure is independently related to a decrease in poor self-reported health (OR=0.757; 95% CI=0.682-0.841) and mild depression (OR=0.613; 95% CI=0.532-0.707). Relative deprivation is not related to these outcomes. In contrast, relative deprivation is marginally related to smoking behavior (OR=1.1; 95% CI=0.99-1.2), but not locus of control. In addition the estimated coefficient on relative deprivation does not change with the inclusion of the locus of control measure. Finally, both locus of control and relative deprivation are related to drinking behavior. Respondents having a higher measure of

control are likely to consume alcohol less (OR=0.87; 95% CI=0.781-0.978). Those who are more relatively deprived are also less likely to consume alcohol; although it is not entirely clear whether this lower alcohol consumption is good or bad, it is still informative to test whether the relationship is confounded by personality measures. Again for alcohol, however, the estimated coefficient on relative deprivation does not change with the inclusion of the locus of control measure.

Table 5 presents the results for the relationship between relative deprivation and our four health outcomes accounting for the fatalism personality construct. Overall the results echo those found in Table 4. Agreeing to the fatalism/external locus of control questions increases poor self-reported health (OR=1.26; 95% CI=1.02-1.55) and mild depression (OR=1.78; 95% CI=1.35-2.30), but these outcomes were not related to relative deprivation. Respondents' relative deprivation is related to smoking behavior (OR=1.1; 95% CI=0.99-1.2), but not fatalism. Fatalism is marginally related to alcohol consumption, but its inclusion in the regressions does not alter the magnitude of the relation between relative deprivation and the alcohol consumption. In a final specification, we include measures of standardized locus of control and fatalism in the same model simultaneously; the results are largely unchanged with regard to relative deprivation (not shown).

Discussion

Locus of control is an important predictor of mental health and self-reported health, but relative deprivation is not. In contrast, relative deprivation is a predictor of health behaviors (smoking and drinking), but these relations do not appear to be confounded by locus of control or fatalism. Rather locus of control and relative deprivation appear to cluster within a population but each is related to different dimensions of health independently. Thus at least in this Costa Rican context, we are able to rule out this hypothesized threat to causally of interpreting health associations with relative deprivation as outlined in Figure 1 panel A, in favor of a correlated risks interpretation as outlined in Figure 1 panel B.

There are very few studies that examine the role of personality in the relative SES and health relation to compare our findings to. However, a recent study examined whether personality confounded the education and smoking behavior relation in the context of the US. The authors found no evidence of confounding in the education and smoking behavior relation by several personality traits (Chapman et al., 2009). More studies of this nature are needed before we can make overarching conclusions, but our results are very much in line with the ones reported by these authors.

The interpretation of the findings presented here must take account of both the strengths and weaknesses of the study design. Given that health is a multidimensional construct and that well being in one dimension of health does not necessarily translate to well being in another, a notable strength of this study is that we examined different dimensions of health on a single population. In doing so, we found different relations of locus of internal control and relative SES on mental health and health related behaviors. For all

four outcomes, we did not find evidence of confounding by personality traits, which bolsters the claims that previously found health associations with relative SES are not confounded in the Costa Rican context (Modrek, Ahern, 2011; Modrek, Rosero-Bixby, Dow, 2012). Nonetheless, the cross-sectional nature of this analysis limits our ability to assess the temporal relations between our three variables of interest. Ideally, we would have measured personality traits or locus of control in early adult life and then subsequent relative SES and health outcomes. Since that was not possible, in our analysis we assumed the stability of the locus of control construct as previously documented in other studies (Cobb-Clark, Schurer, 2011). In addition, the CRELES study only included a limited number of personality questions and did not have measures of other relevant personality traits such as the Big Five (openness, conscientiousness, extraversion, agreeableness, and neuroticism). Had we had those measures and found no evidence of confounding, our results would be more persuasive.

Based on the present analysis, we find that personality traits, particularly internal locus of control, predicts some dimensions of health, such as self-reported health and depression, but it does not confound the relation between health behaviors and relative deprivation**.** Since there are very few studies that account for personality traits, relative SES, and health simultaneously, this is an area that deserves further attention.

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Figure 1: Stylized relations between personality, relative deprivation and health

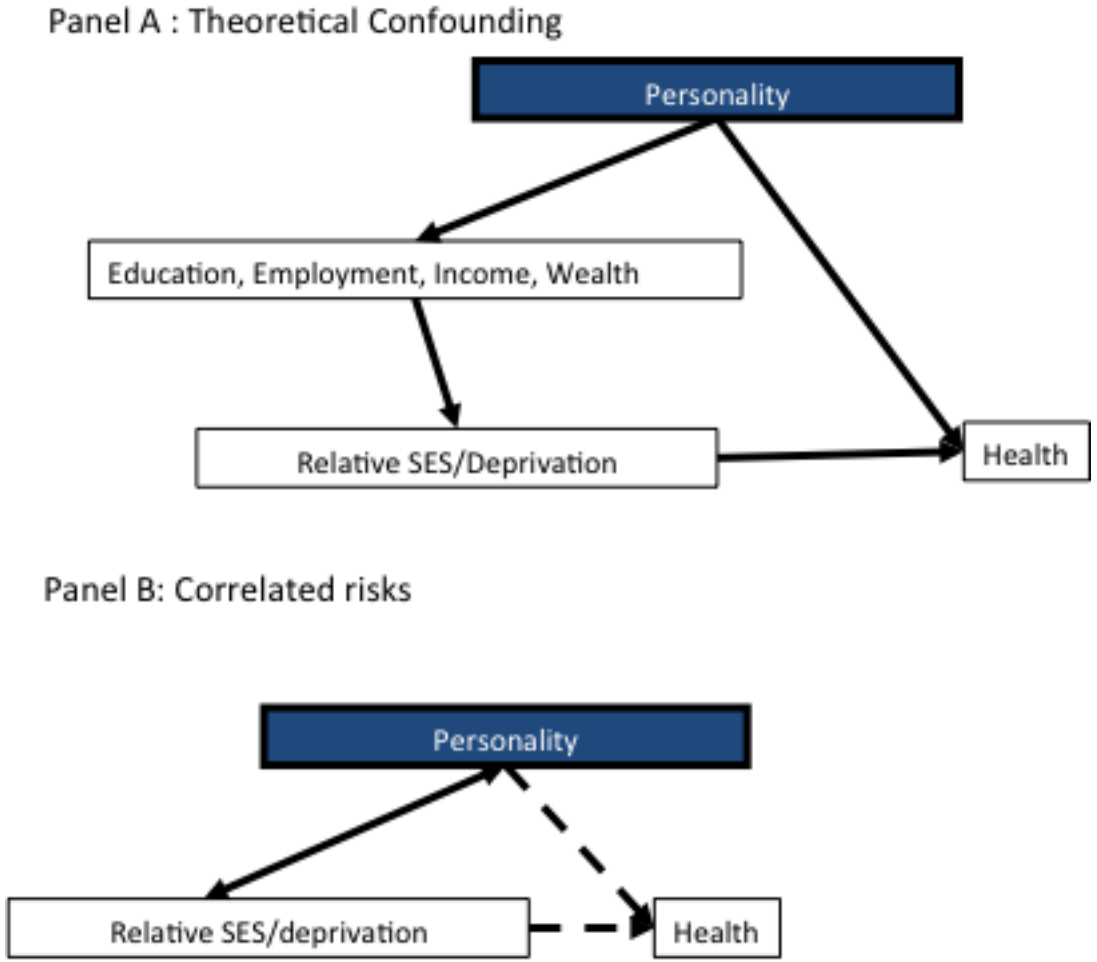
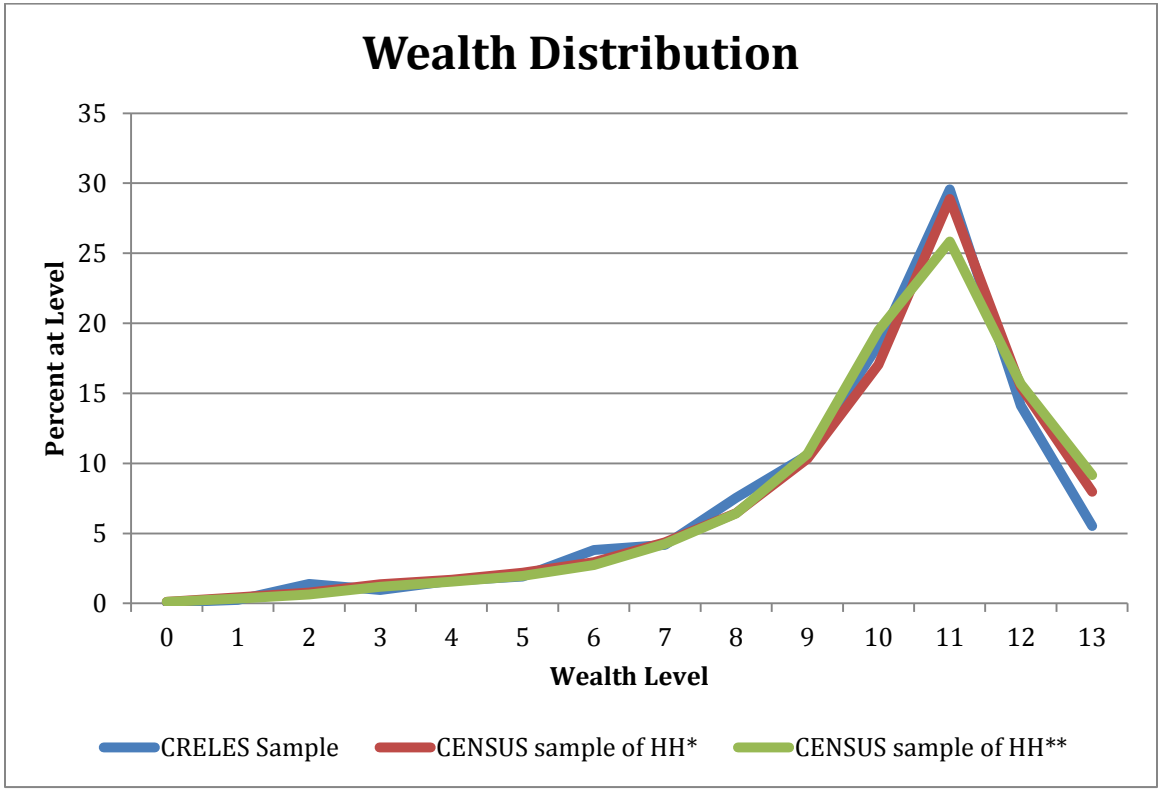


Figure 2: Wealth Distribution



** Household with head older than 19 years old
* Household with head older than 19 years old and had a person 55+ living in the household

Figure 3: Comparison of full CRELES to Analytical sample

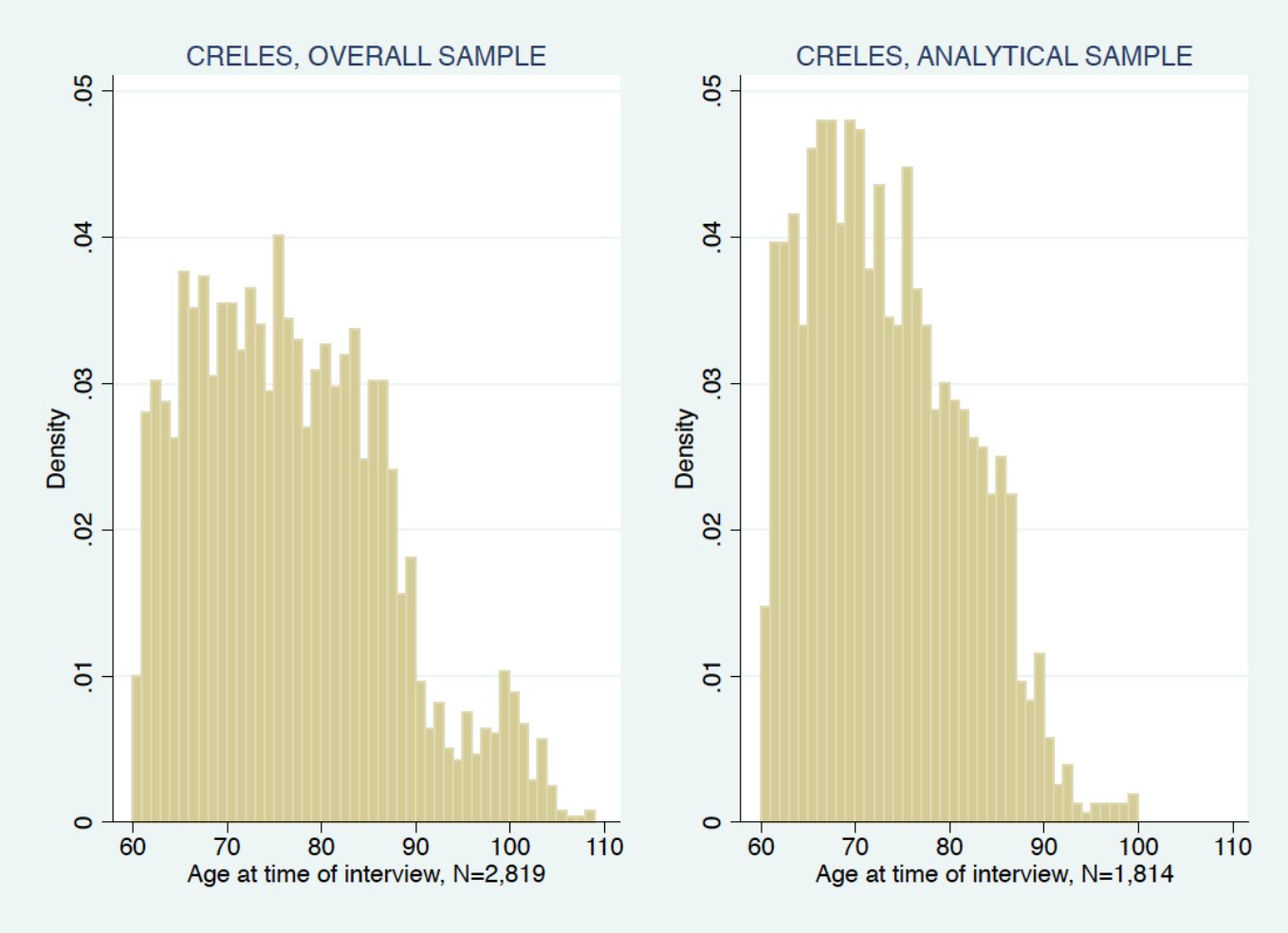


Table 1: Personality/Disposition Module in CRELES with 4 point Likert Scale

	Agree==1; Agree a little=2; Disagree a little=3; Disagree=4
C119	There is not much sense in planning for the future (higher value suggests higher internal locus of control)
C120	The very good things that happen to us are because of good luck (higher value suggests higher internal locus of control)
C121	One is responsible for one's own successes (lower value suggests higher internal locus of control)
C122	One can do nearly anything one sets one's mind to (lower value suggests higher internal locus of control)
C123	The majority of problems are due to bad luck (higher value suggests higher internal locus of control)
C124	One has little control over the bad things that happen (higher value suggests higher internal locus of control)
C125	The tragedies that happen to us are a result of one's own mistakes (lower value suggests higher internal locus of control)
C126	One is responsible for one's own shortcomings (lower value suggests higher internal locus of control)

Loads on fatalism construct
Loads on personal responsibility construct
Loads on optimism construct

Table 2: Summary Statistics for Full and Analytical Samples

	Truncated Full Sample with no proxy, N=2,123		Analytical Sample with no pr and no missing personality variables, N=1,814	
	Mean	Std. Dev.	Mean	Std. Dev.
Demographics				
Age	73.33	8.34	73.01	8.25
Male	0.53	0.53	0.50	0.50
Consensual Union	0.50	0.56	0.50	0.49
Education				
No formal	0.15	0.35	0.15	0.35
Elementary	0.69	0.46	0.68	0.47
Secondary +	0.16	0.37	0.17	0.38
Wealth Metric				
Unmet Basic Need	0.24	0.43	0.24	0.42
Highest Wealth	0.11	0.31	0.11	0.32
Relative Deprivation				
Relative Deprivation [Range 0-10.2]	0.95	1.33	0.94	1.34
Outcomes				
Self-reported poor health (N=2114, 1811)	0.48	0.50	0.48	0.50
Depression (6+ out of 15 Yesavage) (N=1763, 1563)	0.18	0.39	0.18	0.39
Ever smoked	0.43	0.50	0.44	0.50
Drinks Daily or Occasionally	0.31	0.46	0.32	0.47
Personality				
Std Locus of control (Higher values; Range -3.66-2.01)			0.00	1.00
Fatalistic Indicator			0.306	0.461
Internal control indicator			0.959	0.198
Optimistic indicator			0.943	0.231

Table 3: Association between relative deprivation and personality constructs

	Relative Deprivation			
Age	0.003	0.002	0.004	0.004
	(-0.010 - 0.015)	(-0.009 - 0.013)	(-0.007 - 0.015)	(-0.007 - 0.015)
Age squared	0	0	0	0
	(-0.001 - 0.001)	(-0.001 - 0.001)	(-0.001 - 0.001)	(-0.001 - 0.001)
Male	-0.139***	-0.112**	-0.128***	-0.130***
	(-0.242 - -0.037)	(-0.207 - -0.016)	(-0.219 - -0.038)	(-0.223 - -0.037)
Age x Male	-0.006	-0.007	-0.007	-0.006
	(-0.017 - 0.005)	(-0.017 - 0.004)	(-0.017 - 0.003)	(-0.016 - 0.004)
Consensual Union	-0.251***	-0.234***	-0.236***	-0.241***
	(-0.345 - -0.157)	(-0.319 - -0.148)	(-0.322 - -0.151)	(-0.327 - -0.155)
Education (omitted= Primary)				
No formal	0.384***	0.338***	0.391***	0.397***
	(0.232 - 0.536)	(0.189 - 0.488)	(0.233 - 0.549)	(0.240 - 0.554)
Secondary +	-0.130*	-0.119*	-0.161**	-0.147**
	(-0.265 - 0.005)	(-0.243 - 0.005)	(-0.283 - -0.039)	(-0.263 - -0.030)
Wealth Metric				
Highest Wealth	-0.515***	-0.525***	-0.524***	-0.524***
	(-0.610 - -0.421)	(-0.610 - -0.440)	(-0.606 - -0.442)	(-0.602 - -0.446)
Unmet Basic Need	1.738***	1.773***	1.737***	1.760***
	(1.533 - 1.942)	(1.583 - 1.963)	(1.551 - 1.923)	(1.579 - 1.941)
Personality Constructs				
Standardized Locus of Control	-0.062**			
	(-0.124 - -0.001)			
External Locus of Control/Fatalist		0.193***		
		(0.103 - 0.283)		
Internal Locus of Control			-0.15	
			(-0.546 - 0.246)	
Optimist				-0.06
				(-0.286 - 0.166)
Constant	0.768***	0.682***	0.891***	0.801***
	(0.648 - 0.888)	(0.565 - 0.800)	(0.463 - 1.319)	(0.610 - 0.992)
Canton FE	YES	YES	YES	YES
Number of canton	56	56	56	56
Model	XT REG	XT REG	XT REG	XT REG
Observations	1813	1974	2064	2101

*** significant at 1%, **significant at 5%; * significant at 1%

Table 4: Association between health outcomes and relative deprivation, with and without standardized locus of control construct

	Self-Reported Poor Health		Mild Depression		Smoking		Alcohol Consumption	
Age	1.002	1.008	0.993	1.004	0.997	0.999	0.970**	0.973**
	(0.979 - 1.025)	(0.986 - 1.031)	(0.961 - 1.026)	(0.972 - 1.036)	(0.974 - 1.022)	(0.976 - 1.023)	(0.948 - 0.993)	(0.951 - 0.996)
Age squared	1	1	1.001	1.001	1	1	1	1
	(0.999 - 1.001)	(0.998 - 1.001)	(0.999 - 1.003)	(0.999 - 1.003)	(0.999 - 1.001)	(0.999 - 1.001)	(0.998 - 1.001)	(0.998 - 1.001)
Male	1.233*	1.265**	1.879***	1.911***	0.097***	0.099***	0.338***	0.345***
	(0.986 - 1.542)	(1.013 - 1.579)	(1.376 - 2.566)	(1.407 - 2.595)	(0.075 - 0.126)	(0.076 - 0.128)	(0.266 - 0.431)	(0.271 - 0.438)
Age x Male	0.997	0.997	0.976	0.975	1.008	1.007	1.011	1.011
	(0.973 - 1.022)	(0.973 - 1.021)	(0.944 - 1.009)	(0.944 - 1.007)	(0.981 - 1.035)	(0.980 - 1.034)	(0.984 - 1.039)	(0.984 - 1.038)
Consensual Union	1.240*	1.203*	1.041	0.967	0.789*	0.784*	0.942	0.93
	(0.994 - 1.548)	(0.966 - 1.499)	(0.775 - 1.398)	(0.724 - 1.292)	(0.612 - 1.018)	(0.608 - 1.011)	(0.739 - 1.201)	(0.730 - 1.185)
Education (omitted= Primary)								
No formal	1.015	1.032	1.304	1.323	1.699***	1.702***	0.680**	0.688**
	(0.753 - 1.368)	(0.767 - 1.388)	(0.891 - 1.909)	(0.910 - 1.923)	(1.210 - 2.387)	(1.213 - 2.390)	(0.477 - 0.970)	(0.483 - 0.979)
Secondary +	0.446***	0.410***	0.825	0.705	1.023	0.992	1.783***	1.687***
	(0.329 - 0.605)	(0.303 - 0.553)	(0.532 - 1.280)	(0.459 - 1.080)	(0.746 - 1.403)	(0.725 - 1.356)	(1.331 - 2.389)	(1.265 - 2.251)
Wealth Metric								
Highest Wealth	0.652**	0.641**	0.844	0.811	0.821	0.813	1.426**	1.405*
	(0.457 - 0.930)	(0.451 - 0.912)	(0.499 - 1.427)	(0.485 - 1.356)	(0.565 - 1.194)	(0.559 - 1.182)	(1.014 - 2.006)	(0.999 - 1.975)
Unmet Basic Need	1.112	1.128	1.009	1.041	0.916	0.923	1.425**	1.435**
	(0.823 - 1.502)	(0.837 - 1.521)	(0.677 - 1.503)	(0.703 - 1.542)	(0.652 - 1.287)	(0.658 - 1.296)	(1.024 - 1.983)	(1.032 - 1.996)
Relative Deprivation								
Relative deprivation Score	1.041	1.054	1.074	1.096	1.100*	1.103*	0.872**	0.877**
	(0.948 - 1.143)	(0.960 - 1.157)	(0.957 - 1.204)	(0.979 - 1.228)	(0.990 - 1.222)	(0.993 - 1.226)	(0.783 - 0.971)	(0.788 - 0.976)
Personality Constructs								
Standardized Locus of Control	0.757***		0.613***		0.922		0.874**	
	(0.682 - 0.841)		(0.532 - 0.707)		(0.822 - 1.035)		(0.781 - 0.978)	
Canton FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of canton	53	53	51	51	54	54	53	53
Model	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit
Observations	1801	1801	1533	1533	1808	1808	1805	1805

*** significant at 1%, **significant at 5%; * significant at 1%

Table 5: Association between health outcomes and relative deprivation, with and without fatalist/external locus of control construct

	Self-Reported Poor Health		Mild Depression		Smoking		Alcohol Consumption	
Age	1.005	1.006	1.004	1.007	0.998	0.998	0.968***	0.969***
	(0.983 - 1.027)	(0.985 - 1.028)	(0.973 - 1.036)	(0.977 - 1.039)	(0.975 - 1.021)	(0.976 - 1.022)	(0.947 - 0.990)	(0.948 - 0.991)
Age squared	1	1	1.001	1.001	1	1	1	1
	(0.999 - 1.001)	(0.999 - 1.001)	(0.999 - 1.002)	(0.999 - 1.002)	(0.999 - 1.001)	(0.999 - 1.001)	(0.999 - 1.001)	(0.999 - 1.001)
Male	1.277**	1.275**	1.948***	1.927***	0.102***	0.103***	0.341***	0.341***
	(1.031 - 1.582)	(1.030 - 1.579)	(1.446 - 2.624)	(1.433 - 2.592)	(0.080 - 0.131)	(0.080 - 0.131)	(0.270 - 0.430)	(0.270 - 0.429)
Age x Male	0.995	0.995	0.973*	0.971*	1.003	1.003	1.017	1.016
	(0.973 - 1.018)	(0.972 - 1.018)	(0.943 - 1.004)	(0.941 - 1.002)	(0.978 - 1.029)	(0.977 - 1.029)	(0.991 - 1.043)	(0.991 - 1.043)
Consensual Union	1.219*	1.214*	0.922	0.917	0.822	0.82	0.931	0.927
	(0.987 - 1.505)	(0.984 - 1.499)	(0.697 - 1.220)	(0.695 - 1.211)	(0.645 - 1.048)	(0.644 - 1.046)	(0.737 - 1.176)	(0.734 - 1.170)
Education (omitted= Primary)								
No formal	1.011	1.035	1.358*	1.421*	1.612***	1.628***	0.664**	0.679**
	(0.761 - 1.344)	(0.779 - 1.373)	(0.950 - 1.942)	(0.996 - 2.027)	(1.166 - 2.227)	(1.178 - 2.248)	(0.472 - 0.935)	(0.483 - 0.954)
Secondary +	0.408***	0.396***	0.803	0.741	1.054	1.036	1.647***	1.602***
	(0.305 - 0.546)	(0.296 - 0.529)	(0.532 - 1.212)	(0.493 - 1.114)	(0.779 - 1.427)	(0.767 - 1.399)	(1.246 - 2.177)	(1.214 - 2.112)
Wealth Metric								
Highest Wealth	0.640***	0.638***	0.803	0.778	0.783	0.782	1.494**	1.485**
	(0.456 - 0.899)	(0.454 - 0.895)	(0.487 - 1.326)	(0.472 - 1.281)	(0.545 - 1.124)	(0.545 - 1.121)	(1.077 - 2.073)	(1.070 - 2.060)
Unmet Basic Need	1.151	1.144	1.107	1.09	0.978	0.978	1.373*	1.366*
	(0.862 - 1.535)	(0.858 - 1.526)	(0.758 - 1.618)	(0.747 - 1.589)	(0.706 - 1.354)	(0.706 - 1.354)	(0.997 - 1.891)	(0.992 - 1.881)
Relative Deprivation								
Relative deprivation Score	1.05	1.058	1.082	1.100*	1.103*	1.107**	0.865***	0.871***
	(0.960 - 1.149)	(0.968 - 1.157)	(0.970 - 1.206)	(0.988 - 1.225)	(0.997 - 1.220)	(1.001 - 1.224)	(0.779 - 0.961)	(0.785 - 0.967)
Personality Constructs								
Fatalist	1.261**		1.778***		1.137		1.227*	
	(1.022 - 1.556)		(1.350 - 2.342)		(0.895 - 1.444)		(0.971 - 1.550)	
Canton FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of canton	53	53	51	51	55	55	54	54
Model	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit	XT Logit
Observations	1960	1960	1650	1650	1972	1972	1969	1969