

**Reconceptualizing health as wellness among older adults: Conditions,
constellations, and social risk factors from a nationally representative probability
sample of men and women 57 to 85 years of age**

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INTRODUCTION

Extant biomedical perspectives on sickness in late life focus either on individual health conditions, or in the clustering of such conditions into isolated syndromes. None have examined the concatenation of a full spectrum of health conditions into syndromal clusterings within individuals, or the social organization of these broad health statuses. Similarly, while references to “wellness” have become common in both the scientific and popular health literature, the question of what wellness in late-life consists of—in terms of a multi-condition health profile—has yet to be rigorously investigated, with existing studies using the term as an antonym for disease rather than a state of positive health. In part, this is due to a lack of suitable data. Clinical or convenience samples, from which biomeasures of health are generally drawn, typically lack statistical power and adequate social measures. Moreover, due to an unknown probability of selection bias, inferences drawn from such samples are not generalizable to larger or national populations. Large epidemiological studies, in contrast, have large sample sizes and therefore power, but lack biomeasures and a full range of social measures. To characterize disease and wellness adequately, a representative probability sample is needed.

We begin this effort here, using data from the 2005-2006 National Social Life, Health, and Aging Project (NSHAP), a nationally representative probability sample of elderly U.S.

women and men, to explore the social distribution and etiology of health constellations in the general population, with each constellation characterized by a profile of conditions from multiple domains of health. The data include self reports on a range of diagnosed health conditions as well as dimensions of mental health, as well as self-ratings of both physical and mental health. Unique to NSHAP is a wide range of biomeasures—including assessments of physical and sensory function, height and weight, systolic and diastolic blood pressure, salivary, vaginal mucosal, and blood samples (yielding C-reactive protein and hemoglobin a1c). The representativeness and multiple types of measures in NSHAP enable us to characterize wellness as well as disease in U.S. subpopulations not yet diagnosed with any health condition, as also sections possibly lacking access to healthcare—both of which are usually missed by disease registries. The combination of mental and physical status measures allows us to rigorously investigate mind-body junctures in the formation of health states.

Finally, in contrast with epidemiological studies containing only basic demographic data and isolated social measures, NSHAP was designed from the start as a sociologically-informed data collection effort. As such, it contains a uniquely wide range of measures, on an individual's broad social location (in demographic terms), social embeddedness (based on a rigorous network-roster method used in previous surveys, as well as ties to friends and family), and sociality (in terms of frequency of social interactions of various types). This richness of social data allows us to link health or illness configurations to a person's social profile.

METHODS

Survey

The National Social Life, Health, and Aging Project (NSHAP) is a population-based study of the health, social life, and well-being of older adults, ages 57-85, from across the United

States. The study conducted in-home interviews with 3,005 community-dwelling adults between July 2005 and March 2006. Blacks and Hispanics were oversampled, as were the oldest old, providing adequate cases for analyses by age, gender, and race/ethnicity. Through an in-person interview and a leave-behind questionnaire, NSHAP obtained information on demographic characteristics; social networks; social and cultural activity; physical and mental health, including cognition; well-being; illness; medications and alternative therapies; history of sexual and intimate partnerships; and patient-physician communication. NSHAP represents a unique, interdisciplinary effort to collect social data alongside biological indicators in a population-based sample of older adults. The NSHAP study collected 13 biomeasures, including the assessment of respondents' weight, waist circumference, height, blood pressure, distance vision, smell, touch, and mobility. NSHAP also collected blood spots, saliva, oral fluid for HIV testing, and, from female respondents, a self-administered vaginal swab. The survey had an unweighted response rate of 74.8% and a weighted response rate of 75.5%.^{1,2} Institutional review boards at the University of Chicago and the National Opinion Research Center (NORC) approved the data collection procedures.

For our analyses, we chose 40 health indicators (listed in the first column of Table 1), from 10 broad “domains” representing the full spectrum of late-life health, both physical and mental. Our specific health domains included: (1) body composition; (2) energy metabolism; (3) cardiovascular function; (4) inflammation/infection; (5) health behaviors; (6) cancer; (7) mental health and cognition; (8) functional health; (9) incontinence; and (10) sensory function.

Our analytic strategy begins with finite mixture modeling. Specifically, we use Latent Class Analysis (LCA) to extract possible syndromes characterized by the clustering of multiple health states, and the distribution of these syndromes among U.S. elderly. LCA is a statistical

method for the examination of possible unobserved “latent” categorical variables—with the categories indicating mutually exclusive latent classes—that might account for covariation among observed categorical indicators.^{3,4} Use of LCA to test the clustering of multiple symptoms into underlying syndromes—while never before done for such a wide variety of indicators, from a nationally representative survey—has become increasingly common in the epidemiology literature.⁵⁻¹⁰ Each of our class is thus a configuration consisting of particular values or probabilities of each of our 40 individual health conditions or measures. As such, this range of configurations portrays health in late life as a discrete rather than continuous distribution. All LCA analyses were conducted in Mplus Version 5.0¹¹

In our second step, we investigate the social organization of health among U.S. elderly, by using multinomial logit models to regress our latent classes, first on demographic variables denoting social location, and then on proximal social variables net of demographic factors. The latter group includes ties to and reliance on friends and family; other social activities, such as volunteering and church attendance; and a set of summary indicators for a person’s egocentric social network. A direct payoff from this strategy is that it allows for the creation of social profiles of health and illness states, that can be used to identify at-risk individuals in clinical settings. All multinomial logit models were run using the Stata 10.0 statistical package.¹²

Fourteen latent classes of health emerge from our results. Many of these are similar in content to syndromes in the clinical literature, an empirical indication of the validity of our method. Taken as a set, the classes represent not simply states but stages of health. The first stage consists of a single class we label *good enough health*—that, while not optimal in all aspects of health, represents a fairly robust and functional physical condition. This is the class that indicates “wellness” or healthy aging in our analyses. Surprisingly, a little over a quarter of elderly

individuals in the U.S. falls within this class. Another 52% fall into the second stage, comprised of 7 classes indicating *adequate health*. Stage 3 consists of 4 more classes representing a little over 19% of the U.S. elderly population, and indicates *poor health*. Finally, 2 *endstage* classes comprise stage 4, and represent just over 3% of the population of interest. We infer a pattern of disease-progression or “cascades” with these configurations, such that one class is a prior stage of another. A key contribution of this article is to investigate social attributes and behaviors—such as an individual’s social network patterns—that distinguish prior from later stages of a cascade, not simply as risk factors but as protective factors against the deterioration of health.

RESULTS

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Fig. 1: Syndromal Clusters: Mental Health Gradient

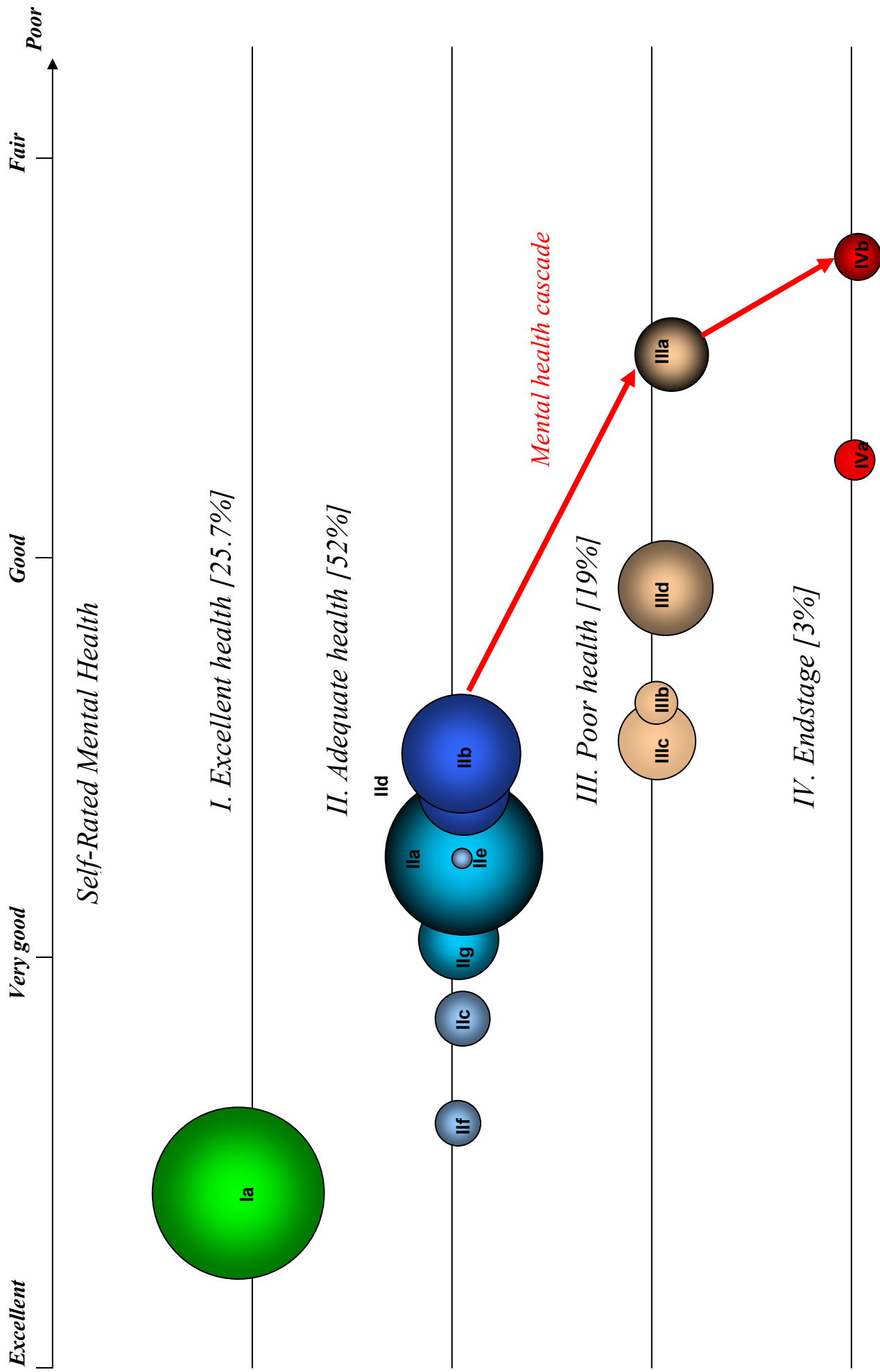


Fig. 2: Syndromal Clusters: Physical Health Gradient

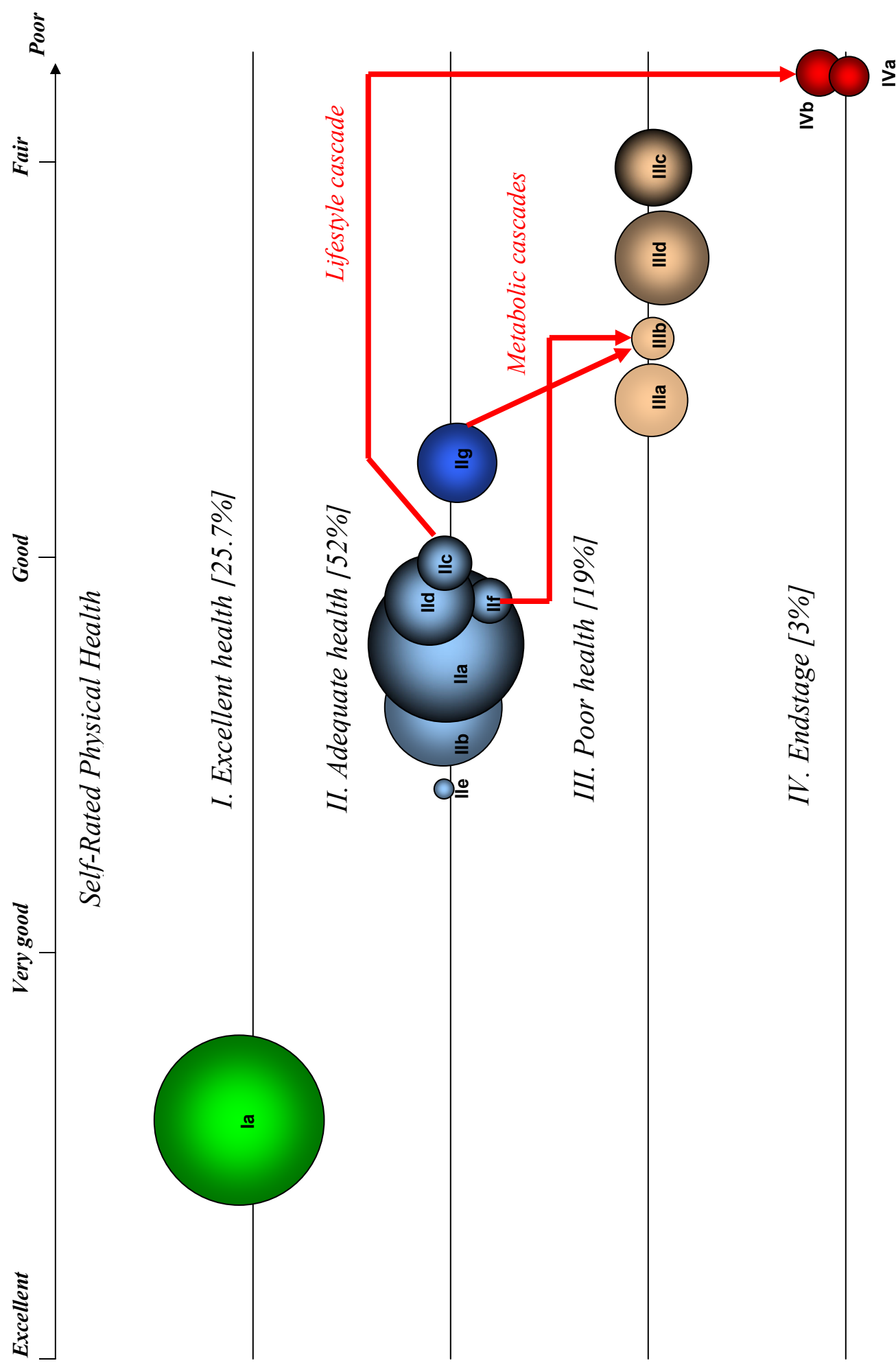


Table 1: Distribution of Indicators of Systems of Health by Syndromal Classes Among U.S. Women and Men Aged 57 to 85: Item means and Probabilities.

	I. Good Enough Health 25.7%	II. Adequate Health 52%										III. Poor health 19%				IV. Endstage 3%	
		Ila	Ilb	Ilc	Ild	Ile	Ilf	Ilg	Illa	Illb	Illc	Illd	IVa	IVb			
	Healthy	Conscientious	Pessimists 1.0	High Lifers 1.0	Deniers	High Lifers 2.0	Obese Smokers	Impaired Function	Pessimists 2.0	Obese Non-Risk Takers	Cardio-vascular Ill	Coping Ill	End-stage, Stable Mental health	End-stage, Bad Mental Health			
	27.50	28.09	27.47	28.75	31.22	31.82	36.58	32.64	26.61	35.29	31.88	30.63	27.71	33.41			
1. BODY COMPOSITION																	
	BMI ^a																
	0.06	0.11	0.06	0.14	0.25	0.00	0.32	0.86	0.17	0.63	0.29	0.36	0.26	0.44			
	5.71	5.79	5.79	6.08	5.95	5.54	6.00	7.78	5.76	11.59	5.95	6.09	6.08	6.64			
	0.13	0.20	0.14	0.03	0.07	0.12	0.16	0.11	0.15	0.15	0.18	0.28	0.20	0.16			
3. CARDIOVASCULAR FUNCTION																	
	Systolic bp ^a	129.50	134.02	134.80	160.37	141.52	139.10	138.20	131.53	124.18	135.22	143.07	127.55	137.02			
	Diastolic bp ^a	82.32	76.72	79.31	93.39	88.95	85.52	78.35	80.82	76.18	80.03	82.30	76.46	83.37			
	Hypertension ^b	0.34	0.54	0.41	0.45	0.79	0.53	0.80	0.40	0.60	0.65	0.85	0.57	0.84			
	Stroke ^b	0.01	0.07	0.04	0.01	0.08	0.11	0.12	0.14	0.05	0.23	0.21	0.30	0.19			
	Heart failure/attack ^c																
	Diagnosed or treated	0.03	0.11	0.04	0.00	0.18	0.07	0.17	0.13	0.22	0.23	0.13	0.15	0.18			
	Diagnosed and treated	0.01	0.04	0.01	0.08	0.09	0.06	0.09	0.06	0.16	0.16	0.10	0.10	0.12			
4. INFLAMMATION/INFECTION																	
	C-reactive protein ^a	1.68	2.15	2.00	4.38	3.37	30.88	3.31	2.93	5.34	3.47	3.29	6.50	8.92			
	Ever diagnosed w. STD ^b	0.09	0.07	0.08	0.02	0.07	0.00	0.11	0.13	0.10	0.07	0.12	0.00	0.16			
	EBV ^b	151.67	151.26	142.49	162.78	173.98	155.93	169.48	153.88	150.37	184.48	151.01	180.01	149.89			
	Ulcers ^b	0.06	0.19	0.12	0.08	0.12	0.07	0.09	0.16	0.08	0.17	0.26	0.12	0.31			
	Asthma ^b	0.04	0.11	0.11	0.10	0.07	0.06	0.08	0.11	0.21	0.21	0.14	0.19	0.32			
	Other urinary problems ^b	0.10	0.35	0.26	0.13	0.09	0.81	0.29	0.32	0.10	0.32	0.41	0.58	0.52			
	Poor kidney function ^b	0.01	0.03	0.00	0.00	0.00	0.04	0.06	0.09	0.06	0.11	0.13	0.05	0.14			
5. HEALTH BEHAVIORS																	
	Fewer hours of sleep [13 to 1] ^a	6.94	6.90	7.32	7.10	6.94	7.50	7.08	7.25	7.37	7.44	7.43	6.91	8.04			
	Cotinine ^a	1.68	2.15	2.00	4.38	3.37	100.00	3.31	2.93	5.34	3.47	3.29	6.50	8.92			
	Cirrhosis ^b	0.00	0.01	0.00	0.02	0.00	0.00	0.02	0.03	0.01	0.02	0.04	0.03	0.07			
	Emphysema/COPD ^b	0.02	0.17	0.08	0.20	0.03	0.24	0.10	0.13	0.00	0.22	0.20	0.24	0.41			

6. CANCER														
Cancer (common) ^b	0.20	0.28	0.16	0.18	0.12	0.00	0.15	0.23	0.18	0.06	0.18	0.37	0.33	0.16
Cancer (gender specific) ^b	0.05	0.06	0.07	0.05	0.04	0.04	0.03	0.03	0.09	0.03	0.03	0.07	0.03	0.01
7. MENTAL HEALTH AND COGNITION														
Depression ^{a,d}	-0.68	-0.48	0.47	-0.43	-0.44	0.45	-0.22	-0.33	1.75	0.66	0.36	0.60	1.43	3.00
Anxiety ^{a,d}	-0.50	-0.35	0.70	-0.44	-0.39	0.10	-0.14	-0.38	2.12	0.05	-0.02	0.36	0.60	2.60
Stress ^{a,d}	-0.52	-0.46	0.68	-0.32	-0.34	-0.23	-0.54	-0.36	1.73	0.38	0.23	0.40	1.39	1.79
Mental health (self-rating) ^c														
excellent	0.56	0.15	0.12	0.37	0.13	0.00	0.63	0.30	0.02	0.24	0.21	0.05	0.09	0.03
very good	0.41	0.52	0.42	0.31	0.43	0.87	0.12	0.33	0.09	0.24	0.28	0.32	0.16	0.05
good	0.02	0.32	0.38	0.32	0.40	0.00	0.25	0.29	0.41	0.16	0.27	0.39	0.25	0.26
fair	0.00	0.02	0.08	0.00	0.04	0.13	0.00	0.08	0.36	0.32	0.22	0.23	0.34	0.37
poor	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.12	0.05	0.03	0.01	0.15	0.29
Happiness ^c														
extremely happy	0.31	0.14	0.05	0.23	0.09	0.00	0.40	0.14	0.04	0.04	0.07	0.01	0.02	0.03
very happy	0.55	0.53	0.24	0.45	0.38	0.33	0.48	0.50	0.22	0.26	0.42	0.26	0.10	0.07
pretty happy	0.14	0.33	0.55	0.32	0.48	0.67	0.11	0.37	0.35	0.40	0.38	0.49	0.52	0.31
unhappy sometimes	0.00	0.00	0.16	0.00	0.05	0.00	0.00	0.00	0.31	0.29	0.12	0.23	0.27	0.36
unhappy usually	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.08	0.01	0.00	0.01	0.10	0.24
High self esteem ^c														
very true	0.62	0.44	0.21	0.45	0.47	0.07	0.76	0.58	0.24	0.40	0.49	0.27	0.19	0.17
somewhat true	0.29	0.34	0.38	0.34	0.38	0.93	0.21	0.26	0.34	0.33	0.32	0.40	0.30	0.28
neither true or untrue	0.05	0.09	0.18	0.10	0.06	0.00	0.00	0.09	0.10	0.10	0.07	0.16	0.15	0.26
somewhat untrue	0.03	0.09	0.18	0.05	0.08	0.00	0.00	0.06	0.16	0.18	0.08	0.07	0.21	0.18
not very true	0.01	0.04	0.05	0.07	0.02	0.00	0.03	0.01	0.16	0.00	0.04	0.10	0.16	0.12
Physical health (self-rating) ^c														
excellent	0.41	0.03	0.07	0.07	0.02	0.00	0.04	0.02	0.02	0.11	0.02	0.00	0.03	0.00
very good	0.51	0.38	0.44	0.26	0.22	0.53	0.38	0.21	0.18	0.05	0.06	0.07	0.05	0.02
good	0.06	0.45	0.31	0.47	0.64	0.47	0.34	0.41	0.32	0.20	0.16	0.30	0.00	0.08
fair	0.02	0.13	0.17	0.10	0.11	0.00	0.21	0.28	0.32	0.51	0.48	0.46	0.35	0.42
poor	0.00	0.02	0.00	0.11	0.01	0.00	0.04	0.07	0.16	0.14	0.29	0.17	0.57	0.49
Alzheimers ^b	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.03	0.01	0.01	0.07	0.04
Number of items														
Incorrectly remembered ^c														
0	0.76	0.72	0.66	0.60	0.58	0.66	0.77	0.61	0.50	0.51	0.39	0.49	0.18	0.33
1	0.20	0.21	0.23	0.25	0.30	0.34	0.19	0.31	0.26	0.36	0.41	0.33	0.28	0.42
2	0.03	0.06	0.08	0.13	0.10	0.00	0.04	0.06	0.10	0.10	0.09	0.13	0.17	0.13
3+	0.01	0.02	0.02	0.02	0.02	0.00	0.00	0.02	0.14	0.03	0.11	0.05	0.37	0.13
8. FUNCTIONAL HEALTH														
Pain walking ^b	0.17	0.34	0.38	0.25	0.25	0.00	0.71	0.63	0.62	0.30	0.62	0.78	0.68	0.84
Exercise forbidden ^b	0.01	0.06	0.07	0.00	0.00	0.00	0.02	0.00	0.07	0.15	0.13	0.11	0.19	0.16
Arthritis ^b	0.34	0.61	0.38	0.43	0.47	0.41	0.67	0.57	0.59	0.31	0.78	0.80	0.68	0.81

Poor functional health ^{a,d}	-0.50	-0.34	-0.40	-0.33	-0.32	-0.45	-0.18	-0.15	-0.12	-0.20	2.05	0.36	4.37	1.57
9. INCONTINENCE														
Fecal incontinence ^b	0.02	0.09	0.05	0.02	0.07	0.00	0.14	0.12	0.24	0.04	0.20	0.25	0.24	0.26
Urinary incontinence ^b	0.22	0.52	0.38	0.16	0.25	0.75	0.53	0.43	0.48	0.42	0.64	0.68	0.64	0.77
10. SENSORY FUNCTION														
Vision (objective) ^c														
Good	0.76	0.58	0.67	0.53	0.73	0.84	0.68	0.64	0.67	0.62	0.51	0.27	0.04	0.55
Moderately decreased	0.19	0.34	0.27	0.19	0.20	0.00	0.27	0.26	0.27	0.18	0.30	0.41	0.56	0.34
Poor	0.05	0.07	0.06	0.28	0.06	0.16	0.05	0.10	0.07	0.20	0.19	0.32	0.39	0.11
Poor hearing ^b	-0.34	0.18	-0.20	-0.10	-0.15	0.50	-0.19	0.05	0.21	0.01	0.16	0.30	0.04	0.29
Poor touch, smell, taste ^{a,c}	-0.64	0.15	-0.10	-0.14	0.37	-0.08	-0.86	0.03	0.13	0.19	0.18	0.39	0.84	0.83

Note: Green cells indicate robust health; yellow cells indicate compromised health; red cells indicate poor health.

^aContinuous indicator, cells denote item mean for each latent class.

^bDummy indicator, cells denote item probability for each latent class.

^cOrdinal scale, cells denote probability for each category for each latent class.

^dStandardized summary index.

Table 2: Demographic Correlates of Latent Classes of Health Conditions from Multivariate Multinomial Logit Models: Relative Risk Ratios (Standard Errors)

		LATENT CLASSES													
	N	I	IIa	IIb	IIc	IIId	IIe	IIIf	IIg	IIIa	IIIb	IIIc	IIId	IVa	IVb
N	2,977	699	638	348	72	235	9	39	194	145	48	179	263	46	62
%	100%	25.5	21.9	12.3	2.6	7.3	0.4	1.8	5.5	4.7	1.6	5.2	7.8	1.3	1.9
Age															
Age	2,977		1.1**	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.1**	1.1**	1.1**	1.0
			(0.0)	(0.0)	(0.0)	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Gender (ref: Men)	1,455		<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>
Women	1532		1.0	1.3	0.5*	0.8	1.0	1.5	0.6**	1.2	0.7	1.5	1.3	1.2	1.8
			(0.1)	(0.2)	(0.1)	(0.1)	(0.8)	(0.4)	(0.1)	(0.3)	(0.2)	(0.3)	(0.2)	(0.4)	(0.7)
Education (ref:															
<High School)	695		<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>
High school	785		0.8	0.7	1.0	0.8	0.8	0.5	0.5**	0.4**	0.7	0.3**	0.6	0.4*	0.3**
			(0.2)	(0.2)	(0.4)	(0.2)	(0.7)	(0.3)	(0.1)	(0.1)	(0.3)	(0.1)	(0.2)	(0.2)	(0.1)
Some college	846		0.7	0.5*	0.5	0.6	0.6	0.5	0.4**	0.3**	0.6	0.2**	0.3**	0.2**	0.2**
			(0.2)	(0.1)	(0.2)	(0.2)	(0.5)	(0.4)	(0.1)	(0.1)	(0.3)	(0.1)	(0.1)	(0.1)	(0.1)
≥ Bachelors	651		0.5**	0.3**	0.3**	0.3**	0.2	0.4	0.2**	0.1**	0.4	0.1**	0.2**	0.1**	0.0**
			(0.1)	(0.1)	(0.1)	(0.1)	(0.3)	(0.4)	(0.1)	(0.0)	(0.2)	(0.1)	(0.1)	(0.1)	(0.0)
Ethnicity (ref: non-															
Hispanic White)	2,098		<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>
Black	507		1.1	1.3	2.9**	3.8**	0.0**	5.0*	3.4**	2.3**	6.1**	2.3**	1.9**	3.0*	1.8*
			(0.2)	(0.2)	(1.1)	(0.9)	(0.0)	(3.8)	(0.7)	(0.5)	(3.1)	(0.6)	(0.4)	(1.3)	(0.5)
Hispanic/Other	372		1.0	1.2	0.3	1.0	1.4	1.1	1.9	0.9	2.7	2.0	1.3	2.8*	1.5
			(0.2)	(0.3)	(0.3)	(0.3)	(0.8)	(0.7)	(0.7)	(0.3)	(1.5)	(0.9)	(0.4)	(1.4)	(0.4)
Marital status (ref:															
married/cohabiting)	1,844		<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>	<i>1.0</i>
Divorced/Separated	364		1.2	1.5	1.8	1.0	0.5	0.8	1.5	1.2	2.8	1.5	2.3**	0.7	2.5*
			(0.3)	(0.3)	(0.9)	(0.3)	(0.6)	(0.4)	(0.4)	(0.4)	(1.5)	(0.4)	(0.6)	(0.5)	(1.1)
Widowed/	769		0.8	1.2	1.7	1.8**	2.2	0.9	1.4	2.2**	2.2	1.3	1.9*	1.1	4.2**
Nevermarried			(0.1)	(0.3)	(0.7)	(0.4)	(1.9)	(0.5)	(0.3)	(0.6)	(1.0)	(0.3)	(0.5)	(0.4)	(1.7)

Note: Baseline category for all multinomial logit models is latent class I. Italicization denotes reference category.

* $p < .05$; ** $p < .01$

Table 3: Social Network Correlates of Latent Classes of Health Conditions from Multinomial Logit Models: Relative Risk Ratios (Standard Errors)

Network measures	N	IIa	IIb	IIc	IID	IIe	IIf	IIg	IIla	IIlb	IIlc	IIId	IIVa	IIVb	
1. TIES TO FRIENDS AND FAMILY															
Close relatives (#)	2772	1.1 (0.1)	0.8** (0.1)	1.0 (0.1)	1.0 (0.1)	0.9 (0.2)	1.3 (0.3)	1.1 (0.1)	0.9 (0.1)	1.1 (0.2)	1.0 (0.1)	0.9 (0.1)	0.9 (0.2)	0.8* (0.1)	
Reliance on family	2761	0.8 (0.1)	0.7** (0.1)	1.2 (0.4)	0.7 (0.2)	1.0 (0.4)	1.0 (0.4)	0.9 (0.1)	0.6** (0.1)	1.2 (0.4)	0.9 (0.2)	0.6** (0.1)	0.7 (0.2)	0.5** (0.1)	
Friends (#)	2783	1.0 (0.1)	0.8** (0.0)	1.1 (0.2)	0.9 (0.1)	0.8 (0.1)	1.3 (0.3)	1.0 (0.1)	0.8** (0.1)	1.0 (0.2)	0.9 (0.1)	0.8** (0.1)	0.7* (0.1)	0.6* (0.1)	
Reliance on friends	2644	0.9 (0.1)	0.8 (0.1)	1.1 (0.2)	0.8 (0.1)	0.8 (0.5)	0.5* (0.2)	0.7 (0.1)	0.6** (0.1)	1.2 (0.5)	0.9 (0.2)	0.7* (0.1)	0.5** (0.1)	0.6 (0.2)	
Socialized w. family/friends	2406	0.9 (0.1)	0.9 (0.1)	0.8 (0.1)	1.0 (0.1)	1.2 (0.3)	1.6 (0.4)	0.8 (0.1)	0.8* (0.1)	0.9 (0.2)	0.8 (0.1)	0.8** (0.1)	0.5** (0.1)	0.7* (0.1)	
2. OTHER SOCIAL ACTIVITIES															
Attended meetings	2434	1.0 (0.0)	1.0 (0.0)	1.0 (0.1)	0.9* (0.0)	1.1 (0.2)	1.0 (0.1)	1.0 (0.1)	0.9* (0.1)	0.9 (0.1)	0.8** (0.1)	0.9** (0.0)	0.7** (0.1)	0.7** (0.1)	
Volunteered	2434	1.0 (0.0)	1.0 (0.0)	1.0 (0.1)	0.9 (0.0)	1.1 (0.2)	1.0 (0.1)	1.0 (0.1)	0.8** (0.1)	0.9 (0.1)	0.7** (0.1)	0.8** (0.0)	0.8 (0.1)	0.7** (0.1)	
Attended services	2969	1.1* (0.0)	1.0 (0.0)	1.0 (0.1)	1.0 (0.0)	0.9 (0.2)	1.0 (0.1)	1.1 (0.1)	0.9 (0.1)	1.0 (0.1)	0.9* (0.1)	1.0 (0.0)	0.8* (0.1)	0.8** (0.1)	
Socialized w. neighbors	2350	1.1 (0.1)	0.9 (0.1)	1.1 (0.2)	1.1 (0.1)	0.9 (0.4)	1.1 (0.2)	0.9 (0.1)	0.9 (0.1)	1.1 (0.2)	0.9 (0.1)	0.8* (0.1)	0.8 (0.1)	0.9 (0.1)	
3. NETWORK PROPERTIES															
Alters (#)	2977	1.0 (0.0)	0.9 (0.1)	0.8* (0.1)	0.9* (0.0)	1.3 (0.4)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	0.9 (0.1)	1.1 (0.1)	0.7* (0.1)	0.8 (0.1)	
Alter-alter density	2566	0.9 (0.2)	0.5* (0.1)	1.7 (1.0)	0.9 (0.4)	2.6 (3.6)	1.2 (1.2)	1.2 (0.5)	1.2 (0.6)	1.7 (1.1)	1.5 (0.7)	1.3 (0.5)	2.3 (1.4)	1.7 (1.6)	
Ego-alter density	2904	0.9 (0.2)	0.5* (0.1)	1.9 (1.4)	1.2 (0.4)	0.4 (0.8)	1.9 (2.3)	1.0 (0.4)	0.7 (0.3)	1.5 (1.1)	1.5 (0.6)	1.1 (0.4)	2.1 (1.8)	0.7 (0.7)	
Network density	2904	0.8 (0.2)	0.3** (0.1)	1.7 (1.3)	0.9 (0.3)	1.6 (2.9)	1.5 (2.0)	1.0 (0.4)	0.8 (0.3)	1.6 (1.1)	1.4 (0.7)	1.2 (0.5)	2.2 (1.8)	0.9 (1.0)	
Closeness to alters	2902	0.7** (0.1)	0.6** (0.1)	1.9 (0.8)	0.7** (0.1)	2.1 (0.9)	0.8 (0.3)	0.8* (0.1)	0.4** (0.1)	0.5 (0.2)	0.9 (0.2)	0.5** (0.1)	0.6 (0.2)	0.4** (0.1)	
Kin proportion	2905	0.8 (0.2)	0.8 (0.2)	1.5 (0.5)	1.0 (0.3)	57.1 (127.9)	1.9 (1.3)	0.9 (0.2)	0.6 (0.2)	0.6 (0.3)	1.0 (0.3)	1.2 (0.4)	1.1 (0.8)	1.0 (0.6)	
Negative ties	2780	3.1* (1.5)	19.1** (8.7)	0.6 (0.9)	2.8 (1.7)	6.2 (15.0)	11.3* (13.1)	6.7** (4.2)	70.4** (39.9)	22.9** (23.1)	33.1** (31.4)	17.8** (13.4)	14.2 (23.9)	188.5** (146.1)	

Note: Each network measure was added one-at-a-time to basic controls: age, gender, race/ethnicity, education, and marital status. Baseline category for all models is latent class I.

* $p < .05$; ** $p < .01$