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HEALTH & WELL-BEING



Gallup-Healthways Well-Being™ Index: Methodology Report for Indexes





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Introduction

The Gallup-Healthways Well-Being Index was developed to establish official statistics on the state of well-being in the United States. Leveraging the work of psychology and medical science by blending Gallup's behavioral and polling research with Healthways' health and well-being support services, the index tracks the well-being of no fewer than 1,000 U.S. residents, aged 18 and older, 350 days per year. The index also includes findings from leading scientists in the areas of survey research, behavioral economics, and health.¹ This report summarizes the methods and analyses used to develop well-being indexes for states and other geographic entities.

The Well-Being Concept

Historically, definitions of well-being have fallen into two broad categories. The first category consists of traditional neoclassic measures such as income, GDP, life expectancy, and poverty rates. The second includes the subjective or psychological measures of well-being that seek to measure how people feel about their lives. Based on more recent research, the second category can be separated into two general types: those measures that tap into the evaluating or remembering self and those that tap into the experiencing self.

Nobel laureate Daniel Kahneman and University of Illinois psychology professor Ed Diener have been influential in conceiving the contemporary views of well-being. In the journal article *Guidelines for National Indicators of Subjective Well-Being and Ill-Being*, Diener defines subjective well-being as "all of the various types of evaluations, both positive and negative, that people make of their lives. It includes reflective cognitive evaluations, such as life satisfaction and work satisfaction, interest and engagement, and affective reactions to life events, such as joy and sadness."² Kahneman makes particular note of the distinction between experienced well-being and evaluative well-being. Experienced well-being is concerned with momentary affective states and the way people feel about experiences in real-time, while evaluative well-being is the way they remember their experiences after they are over. Experienced well-being seeks to bypass the effects of "judgment and memory" and historically has been measured using the experience sampling method or the day reconstruction method, both of which seek to capture feelings and emotions as close to the subject's immediate experience as possible.³

Inspired by the work of Kahneman and colleagues, the Gallup-Healthways Well-Being Index adapted these methods to a large-scale survey environment by framing a series of experience and emotion questions within the context of the past 24 hours. For example, the respondent is asked a series of questions that relate to experiences of positive and negative emotions, including feelings of enjoyment, happiness, stress, and anger. Respondents are also asked whether they felt well-rested the previous day, whether they were treated with respect, smiled or laughed a lot, had a lot of energy, worried about money, and learned or did something interesting, for example. They are also asked about time use, such as the amount of time spent socially or commuting to work.⁴

In the Gallup-Healthways Well-Being Index, the life evaluation aspect of well-being uses the Cantril "self-anchoring striving scale," which is a measure first developed in 1965 by Hadley Cantril and his colleagues at Princeton University.⁵ This question asks individuals to rate their lives on a ladder scale with steps numbered from 0 to 10, where "0" represents the worst possible life and "10" represents the best possible life. In addition, the "evaluative" dimensions of well-being are also captured through individual assessments of specific life domains such as one's standard of living, community, job, relationships, and personal health.



By design, the Well-Being Index overcomes the measurement challenge by bringing together “experience” and “evaluative” well-being. Synthesizing these two approaches into a single, large-scale survey will provide new understanding of the affect of well-being on Americans’ daily experiences and their overall lives.

About the Survey Process

The survey methods for the Gallup-Healthways Well-Being Index relies on live (not automated) interviewers conducting telephone interviews with randomly sampled respondents aged 18 and older, including cell phone users and Spanish-speaking respondents from all 50 states and the District of Columbia. For sample sizes of 1,000, the 95% margin of sampling error is ± 3 percentage points. Results are based on data combined from Jan. 2, 2008 to Dec. 30, 2008. For an annual sample of 355,000 respondents, the 95% margin of sampling error is less than ± 0.2 percentage points.

Given its size, the database can be divided to look at smaller segments within the larger population. For instance, any subgroup that represents 1% of the population includes more than 3,500 respondents. This allows scientists the opportunity to study well-being in much more detail than has previously been possible.

The survey includes many of the standard demographics, including race, religion, income, education, employment status, occupation, and household density. Location data, such as ZIP Codes, will allow researchers to map the responses to particular parts of the country and accumulate data for local-level comparison and interpretation.

The data collection design affords researchers the opportunity to study daily variation and to aggregate responses across different entities within the country to develop meaningful indexes that integrate with other secondary data. Additional studies will involve studying longitudinal panels within organizations, integrating psychological, healthcare utilization, and biometric and physiological data to assess the affect of interventions on the various measures of health and well-being.

Given the fundamental influence of health on overall well-being, the survey has a particularly large number of questions regarding health conditions and habits, including prevalence of overall disease burden and specific diseases, acute and chronic illnesses, subjective emotional and physical health, access to healthcare, health habits, Body Mass Index (BMI), and social support.

Gallup also conducts polls in more than 140 countries around the world, and many of the questions and domains within the Gallup-Healthways Well-Being Index are identical to those included in Gallup’s World Poll surveys. The core dimensions and primary well-being questions have been previously tested for reliability and validity evidence for residents in all regions of the world.⁶

History of Instrument Design

The foundation for questions included in the Gallup-Healthways Well-Being Index began in the 1930s with the work of George Gallup and colleagues. In 1960, Dr. Gallup published a study and subsequent book titled *The Secrets of Long Life*.⁷ Gallup Polls of well-being and human needs and satisfaction continued through the 60s, 70s, and 80s. In the 1990s, Gallup initiated a series of landmark studies. One nationwide study began in China in 1994, long before any other public opinion work was initiated in the country. In 1996, Gallup began a similar



nationwide study in India, and conducted baseline studies in Israel and the Palestinian Territories in 1999. Between 2001 and 2007, Gallup conducted tens of thousands of interviews with residents of nations that are predominantly Muslim or have substantial Muslim populations. The first World Poll representing 95% of the world's adult population began surveying residents in more than 140 countries in 2005 and 2006 and continues today.

Many of the question items used in past Gallup Polls are used in or influence question wording in the Gallup-Healthways Well-Being Index. In addition, Gallup and Healthways worked in conjunction to include specific health-related questions in the index.

Pilot Study

In October 2007, the Gallup Panel conducted a pilot study of well-being (a probability-based, nationally representative panel of U.S. households). Based on prior surveys, Gallup identified those in the panel who were considered to be healthy (no long-term illness or physical disability) and those suffering from a long-term illness or physical disability. Gallup also identified those who, based on prior self-reported weight and height, were determined to be overweight or normal weight via their BMI. Finally, the population was segmented by age to get roughly equal numbers of various age groups (under 40, 40 to 54, 55 and older). This resulted in 12 segments that were sampled and surveyed on different well-being items:

1. Healthy, under 40, normal weight
2. Healthy, 40 to 54, normal weight
3. Healthy, 55+, normal weight
4. Healthy, under 40, overweight
5. Healthy, 40 to 54, overweight
6. Healthy, 55+, overweight
7. Unhealthy, under 40, normal weight
8. Unhealthy, 40 to 54, normal weight
9. Unhealthy, 55+, normal weight
10. Unhealthy, under 40, overweight
11. Unhealthy, 40 to 54, overweight
12. Unhealthy, 55+, overweight

Conducting descriptive and inferential analyses, Gallup studied which items best differentiated these 12 groups and those that explained overall life evaluation and daily experience within each group. In addition to prior research, these analyses provided a basis for questions retained for the field study. The field instrument contains 42 core well-being items, in addition to many demographic items, and various items are rotated into the series based on relevant events. As such, the survey protocol contains a degree of flexibility, while maintaining the core foundational elements for tracking and aggregation purposes. The survey itself takes the average respondent 12 to 15 minutes to complete.



Methods

The data set used for analyses in this report comes from Gallup Poll Daily tracking interviews of no fewer than 1,000 U.S. adults, aged 18 and older, for the period beginning Jan. 2 through Dec. 30, 2008. Survey respondents are asked a series of questions associated with health and well-being.⁸ As previously discussed, the survey measures evaluative domains (such as overall life, standard of living, and satisfaction with community, work, relationships, and personal health) and daily experience. The daily experience questions measure respondents' experienced well-being -- who they were with, what they did, and how they felt -- on the day before the survey. For instance, respondents are asked a series of experience and affect questions, in addition to questions about incidence of a headache, cold, and the flu. Personal health questions also probe about prior history of disease burden. For example, respondents are asked if a doctor or nurse has ever told them they have each of several disease conditions, including high blood pressure, high cholesterol, diabetes, depression, heart attack, cancer, and asthma.

The survey methods for the Gallup-Healthways Well-Being Index rely on live (not automated) interviewers, dual-frame random-digit-dial sampling (which includes landlines as well as cell phone sampling to reach those in cell phone-only households), and a random selection method for choosing respondents within a household. Additionally, the survey includes Spanish-language interviews for respondents who speak only Spanish, interviews in Alaska and Hawaii, and relies on a multical design to reach respondents not contacted on the initial attempt. The data are weighted daily to compensate for any disproportion in selection probabilities and non-response. Also, the data are weighted to match targets from the U.S. Census Bureau by age, sex, region, gender, education, ethnicity, and race. With inclusion of the cell phone-only households and the Spanish language interviews, the sample represents 98% of the U.S. adult population. By comparison, typical landline-only methodologies represent approximately 85% of the U.S. adult population.

Analyses: Definition of Well-Being Dimensions

The content of the survey was determined based on expert judgment and prior statistical analyses. The Gallup-Healthways Well-Being Index was designed to measure several broad conceptual domains (with particular emphasis on health), including:

- Overall Life Evaluation
- Daily Affect (positive and negative experiences and emotions)
- Basic Access (including access to food, shelter, and healthcare)
- Safety (access to a good place to live, with low fear of crime)
- Physical Health (including disease burden and short-term illnesses)
- Economics (perception of standard of living)
- Work (satisfaction and a quality workplace)



Factor Analyses

In addition to studying the intercorrelation among items, factor analyses were used during each iteration of quantitative instrument development as a guide to parsimony of item selection. Factor analyses were conducted at the individual respondent level, and after aggregating, they were conducted at the state and congressional district level. Principal components factor analysis with varimax and direct oblimin rotation was used. Results of both methods were similar. Using a minimum eigenvalue of 1.0 as a guide, the exploratory factor analysis revealed nine factors:

1. Life Evaluation (overall view of life in the present and future)
2. Access to Food/Shelter/Medicine
3. Emotional Health/Daily Affect
4. Disease Burden and Physical Health
5. Community Satisfaction and Access to Community Basics (clean water, medicine, produce, safety)
6. Recent Physical Health (pain and sick days in the past month)
7. Work Environment Quality
8. Acute Health (colds and flu)
9. Healthy Behavior

As might be expected, while the exploratory factor solution maximized orthogonality, some dimensions were highly correlated with one another. For instance, items from factor 2 and factor 5 were highly correlated (both representing access to basics), and items from factors 4, 6, and 8 were highly correlated (all representing physical health). Items measuring personal standard of living were redundant with overall life evaluation items. As such, the most statistically and conceptually redundant factors were combined into single scales, resulting in six well-being domains:

1. Life Evaluation
2. Emotional Health
3. Physical Health
4. Healthy Behavior
5. Work Environment
6. Basic Access

The Gallup-Healthways indexes that these domains represent provide a comprehensive look at key aspects of well-being for states, communities, and other geographic entities. While the indexes are comprehensive, they are not intended to represent all aspects of well-being. Other domains may be added to the Well-Being Index as content is expanded in the future. Also, specific areas within each domain -- such as specific aspects of emotional health (happiness, stress, or depression), basic access (safety, access to healthcare, food and shelter), or other specific elements of well-being within the broad dimension categories -- can be reported on and studied.



The Gallup-Healthways Well-Being Indexes

Life Evaluation Index

This index combines the evaluation of one’s present life situation with one’s anticipated life situation five years from now. Building on the earlier work by Hadley Cantril and The Cantril Ladder Scale, the Gallup-Healthways Well-Being Index asks Americans to evaluate their lives today as well as their lives five years from now by imagining a "ladder" with steps numbered from 0 to 10, where "0" represents the worst possible life and "10" represents the best possible life.

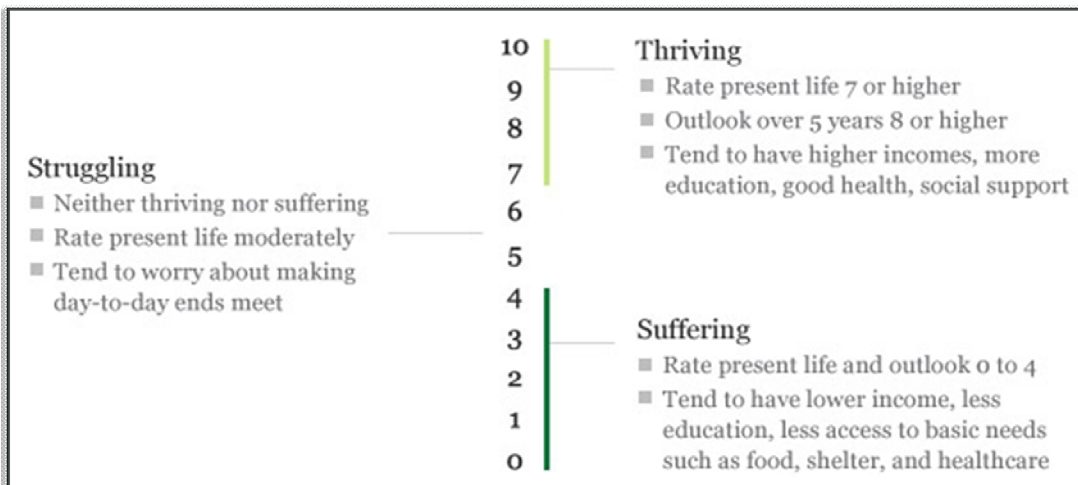
In 2008, less than half of Americans (45%) said that they presently stand on step 7 or higher of the ladder and expect to stand on step 8 or higher five years from now. Gallup considers this group of Americans to be "thriving." Thriving Americans have their basic needs (such as food and shelter) met, have higher incomes, are less burdened by disease, report fewer sick days, and have better work environments.

On the low end of the spectrum, 4% of U.S. residents said in 2008 that they presently stand on steps 0 to 4 of the ladder and expect to stand on step 4 or lower in five years. Gallup considers this group of Americans to be "suffering." Suffering Americans report that they have less access to basic needs such as food, shelter, and healthcare. They are also more likely to be burdened by disease, report more sick days, and are more likely to be divorced or widowed.

Americans that Gallup does not classify as thriving or suffering are considered to be "struggling." The percentage of U.S. residents who were struggling in 2008 stood at 51%.

As a point of comparison to 97 countries that Gallup surveyed worldwide in 2008, the percentage of citizens thriving ranges from 1% in Togo to 82% in Denmark. While the percentage of citizens suffering ranges from less than half a percent in Ireland to 40% in Zimbabwe.

Geographic entities are ranked on this domain according to the percentage of thriving less suffering respondents (net thriving).



Based on The Cantril Ladder Scale



Emotional Health Index

The Emotional Health Index is primarily a composite of the daily experiences of residents of each state. It includes one item that asks about prior history of diagnosed depression. With the remaining items, respondents are asked to think about yesterday, from the morning until the end of the day, and consider whom they were with, what they did, and how they felt. The index is based on responses to the following 10 items:

- smiling or laughter
- learning or doing something interesting
- being treated with respect
- enjoyment
- happiness
- worry
- sadness
- anger
- stress
- diagnosed with depression

Physical Health Index

The Physical Health Index is composed of a composite of nine items, including estimates of BMI, disease burden, sick days, physical pain, and daily energy. This index combines history of disease and daily health experiences:

- sick days in the past month
- disease Burden
- health problems that get in the way of normal activities
- obesity
- feeling well-rested
- daily energy
- daily colds
- daily flu
- daily headaches

Healthy Behavior Index

The Health Behavior index includes items measuring lifestyle habits with established relationships to health outcomes. The index is based on four key items related to smoking, a healthy diet, and exercise:



- Do you smoke?
- Did you eat healthy yesterday?
- weekly consumption of fruits and vegetables
- weekly exercise frequency

Work Environment Index

The Gallup-Healthways Well-Being Index surveys workers on several factors to gauge their feelings and perceptions about their work environment. Prior large-scale meta-analyses have shown important linkages between worker engagement and several organizational performance outcomes, such as worker attendance, retention, productivity, profitability, safety, and customer ratings. Positive work environments are characterized as those where workers express satisfaction with their work, report using their strengths in their area of work, and work in a culture of trust and partnership. Conversely, negative work environments lack satisfying work and are characterized by poor supervision. The Work Environment Index consists of four questions:

- Are you satisfied or dissatisfied with your job or the work you do?
- At work, do you get to use your strengths to do what you do best every day, or not?
- Does your supervisor at work treat you more like he or she is your boss or your partner?
- Does your supervisor always create an environment that is trusting and open, or not?

These questions do not measure all elements that are relevant to a quality workplace, but they do tap into areas that extensive research has found are indicators of quality work.

Basic Access Index

The Basic Access Index is based on 13 items measuring residents' access to food, shelter, healthcare, and a safe and satisfying place to live:

- satisfaction with community or area
- area getting better as a place to live
- clean water
- medicine
- safe place to exercise
- affordable fruits and vegetables
- feel safe walking alone at night
- enough money for food
- enough money for shelter
- enough money for healthcare
- visited a dentist recently
- have a doctor
- have health insurance



Results: Index Statistics

The well-being indexes are calculated based on responses to a set of items ranging from 2 to 13 items per index, and each index is measured on a scale of 0 to 100. As evident in Table 1 and 2, the index scores show greater variability between individuals within the total national population than between states or congressional districts, with the aggregation reducing the variability to some extent. The Life Evaluation Index shows the most variability of all the indexes at the individual, state, and congressional district level. These indexes display a high degree of internal consistency, as Cronbach's Alpha reliabilities were at .72 or higher at the state and congressional district level and at .60 or higher at the individual level (with the exception of the Healthy Behavior Index, which is more multidimensional at the individual level). The average reliability is .62 at the individual level, .83 at the state level, and .79 at the congressional district level. Since the indexes have been designed to be reported at the aggregate level, the state- and congressional district-level reliability is most appropriate and meaningful in this analysis. Future work might involve expanding the number of items in the Healthy Behavior Index to increase its reliability for individuals; however, it is important to note that the items within the Healthy Behavior Index reliably explain differences across states, and, as will be seen later in this report, the index explains relevant external indicators of health consistently across states.

Table 1: State-Level Descriptive Statistics

	# of Items	Individual			State			Cronbach's Alpha Based on Standardized Items	
		N	Mean	Std. Deviation	N	Mean	Std. Deviation	Individual	State
Life Evaluation Index	2	330,150	40.8	57.2	50	39.8	4.2	.66	.84
Emotional Health Index	10	346,073	79.1	21.7	50	78.9	1.4	.75	.91
Physical Health Index	9	331,011	76.9	22.0	50	76.5	1.9	.68	.89
Healthy Behavior Index	4	347,444	63.7	27.1	50	63.2	2.3	.32	.73
Work Environment Index	4	190,776	51.4	50.0	50	51.2	2.6	.6	.77
Basic Access Index	13	348,898	83.6	17.5	50	83.2	2.4	.71	.88
Composite					50	65.5	1.7		.79
							Avg.	.62	.83



Table 2: Congressional District-Level Descriptive Statistics

	Mean	Std. Deviation	Cronbach's Alpha Based (Std.)
LEI	40.3	6.3	.72
EHI	78.7	1.8	.84
PHI	76.8	2.5	.86
HBI	63.4	2.8	.64
WEI	50.7	4.6	.74
BAI	83.0	4.1	.93
COMPOSITE	65.5	2.6	.8

Avg. .79

Tables 3, 4, and 5 provide the intercorrelation matrix of the indexes at all levels of analysis (the individual, state, and congressional district level), which underscores the distinctiveness of each of the six indexes. At the individual level, the Emotional Health, Basic Access, and Physical Health Indexes were most highly correlated with each other, with correlations ranging from .35 to .48. But apart from these three indexes, correlations fell below .30 for all pairs. As expected, correlations at the aggregate state and congressional district level are higher than the individual level, with the Physical Health Index most highly correlated with the other indexes. However, there remains substantial independence between indexes. The highest correlation at the individual level as well as at the state level is that between the Physical Health Index and the Emotional Health Index. At the congressional district level, the highest correlation is between the Life Evaluation Index and the Physical Health Index.

Table 3: Individual-Level Intercorrelation Matrix

	Life Evaluation Index	Emotional Health Index	Physical Health Index	Healthy Behavior Index	Work Environment Index	Basic Access Index
Life Evaluation Index	1					
Emotional Health Index	-.27**	1				
Physical Health Index	-.25**	.48**	1			
Healthy Behavior Index	-.12**	.25**	.18**	1		
Work Environment Index	-.12**	.21**	.13**	.09**	1	
Basic Access Index	-.26**	.35**	.29**	.19**	.13**	1

** Correlation is significant at the .01 level (two-tailed).



Table 4: State-Level Intercorrelation Matrix

	LEI	EHI	PHI	HBI	WEI	BAI	COMPOSITE
LEI	1						
EHI	.61**	1					
PHI	.64**	.74**	1				
HBI	.50**	.49**	.59**	1			
WEI	.19	.31*	.08	.33*	1		
BAI	.11	.31*	.56**	.38**	-.04	1	
COMPOSITE	.80**	.79**	.83**	.78**	.45**	.51**	1

** Correlation is significant at the .01 level (two-tailed).

* Correlation is significant at the .05 level (two-tailed).

Table 5: Congressional District-Level Intercorrelation Matrix

	LEI	EHI	PHI	HBI	WEI	BAI	COMPOSITE
LEI	1						
EHI	.50**	1					
PHI	.66**	.60**	1				
HBI	.45**	.37**	.54**	1			
WEI	.26**	.30**	.16**	.31**	1		
BAI	.36**	.52**	.51**	.25**	.20**	1	
COMPOSITE	.82**	.71**	.78**	.65**	.57**	.66**	1

** Correlation is significant at the .01 level (two-tailed).

Next, hierarchical regression analysis was conducted at the individual level to understand how the indexes explain emotional health and life evaluation beyond standard demographic variables. Given the large sample of individuals (n=355,327) compared with states (n=50) and congressional districts (n=436) and a higher collinearity at the state level, the study focused on regression analyses at the individual level. Individual-level data provide only one form of validation. State-level and congressional district-level correlations of indexes to external criterion variables were also examined, which are provided in the following sections.



Tables 6 through 11 summarize results from the hierarchical regression analyses that use specific indexes to predict the broad well-being levels represented by the Emotional Health Index (composed primarily of daily affect and experiences) and the Cantril ladder scores (life evaluation present and future). The first block of predictors entered in each regression model consists of demographic variables, including income, education, marital status, gender, and age, while the respective index variables are entered as a part of the second block of subjective variables. This analysis was conducted for the sample as a whole as well as for the full-time working population in particular. In each case, after entering the demographic and subjective index variable blocks into the regression analysis, each index explained significant variance in each of the three subjective criterion variables (emotional health, life evaluation [present], and life evaluation [future]).

The series of regression results in Tables 6, 7, and 8 are with reference to the entire sample. In each of these cases, the subjective block of index variables adds substantially to the explanatory power of the model. In Table 6, where the criterion variable is the Emotional Health Index, the addition of the three index variables (Basic Access Index, Healthy Behavior Index, and Physical Health Index) to the demographic block raises the percentage of explained variance from 5% to 30% (Multiple R rises from .23 to .55). The subjective block increases the percentage of explained variance in life evaluation (Cantril ladder present) from 8% to 16% (Multiple R rises from .28 to .40) and for the future dimension of the Cantril ladder from 10% to 13% (Multiple R rises from .32 to .37).

The Emotional Health Index is best predicted by the Physical Health Index, followed by the Basic Access Index and the Healthy Behavior Index, in order of influence. A 10% difference on the Physical Health Index relates to 4% on the Emotional Health Index, while a corresponding difference of 10% on the Basic Access Index and the Healthy Behavior Index relate to 2% and 1%, respectively, on the Emotional Health Index, after controlling for other demographic and subjective domains.

On the other hand, the present dimension of the Cantril ladder life evaluation variable is best predicted by the Basic Access Index, Physical Health Index, and the Healthy Behavior Index. A 10% difference on the Basic Access Index pertains to a third of a step on the present dimension of the Cantril ladder. The future dimension of the Cantril ladder is predicted by the Physical Health Index and the Basic Access Index, with a 10% difference in each of these indexes resulting in a change of a 10th of a step on the future dimension of the Cantril ladder.

Tables 9, 10, and 11 show similar regression analysis with respect to the full-time working population. As in the regressions for the overall population, the addition of the subjective block of index variables significantly increases the explained variance in the dependent variables. While the demographic variables account for only 3% of variation in the Emotional Health Index, the addition of the indexes to the model increases the proportion of explained variance to 26% (a rise in Multiple R of .16 to .51). There is a similar increase in explained variance from 7% to 15% in the case of the Cantril ladder present dimension (change in Multiple R of .27 to .39) and from 7% to 10% in the case of the Cantril ladder future dimension (change in Multiple R of .27 to .32).

As in the regression analysis for the overall population, among all of the indexes in the block of subjective predictors, it is the Physical Health Index that has the greatest affect on the Emotional Health Index score, with a 10% difference in the Physical Health Index explaining 4% on the Emotional Health Index. The corresponding difference of 10% on the Basic Access Index, Healthy Behavior Index, and the Work Environment Index relates to 2%, four-fifths of a percent, and three-fifths of a percent, respectively.



Again, mirroring the regression analysis results for the overall population, the Basic Access Index best predicts the present dimension of the Cantril ladder score. A 10% difference on the Basic Access Index explains about a fourth of a step on the present dimension of the Cantril ladder and one-tenth of a step on the future dimension of the Cantril ladder. Basic Access is more closely related to the present life evaluation of respondents, and Physical Health is most closely associated with Emotional Health.

Table 6: Regression Analysis -- Overall Sample

Dependent Variable: Emotional Health Index

	B	Std. Error	Beta	t	Sig.
(Constant)	16.62	.38		44.15	.00
Female	-1.25	.07	-.03	-17.31	.00
Age	.10	.00	.08	44.75	.00
Education	-.26	.02	-.02	-10.51	.00
Have Mate	.99	.08	.02	12.82	.00
Log Income	.16	.05	.01	3.24	.00
PHI	.41	.00	.42	232.40	.00
HBI	.10	.00	.12	69.72	.00
BAI	.23	.00	.19	98.51	.00

Table 7: Regression Analysis -- Overall Sample

Dependent Variable: Cantril Ladder Present

	B	Std. Error	Beta	t	Sig.
(Constant)	.51	.04		13.10	.00
Female	.22	.01	.05	29.85	.00
Age	.000	.00	.00	1.66	.10
Education	.05	.00	.04	18.69	.00
Have Mate	.09	.01	.02	11.77	.00
Log Income	.25	.00	.11	49.36	.00
PHI	.01	.00	.15	79.38	.00
HBI	.01	.00	.08	45.21	.00
BAI	.03	.00	.21	103.91	.00



Table 8: Regression Analysis -- Overall Sample

Dependent Variable: Cantril Ladder Future

	B	Std. Error	Beta	t	Sig.
(Constant)	5.35	.04		126.67	.00
Female	.29	.01	.07	35.77	.00
Age	-.04	.00	-.26	-134.88	.00
Education	.08	.00	.06	28.04	.00
Have Mate	-.01	.01	.00	-1.00	.32
Log Income	.15	.01	.06	28.07	.00
PHI	.01	.00	.12	58.62	.00
HBI	.00	.00	.05	27.65	.00
BAI	.01	.00	.10	46.96	.00

Table 9: Regression Analysis -- Working Population

Dependent Variable: Emotional Health Index

	B	Std. Error	Beta	t	Sig.
(Constant)	25.076	.52		48.01	.00
Female	-1.667	.09	-.04	-18.00	.00
Age	.057	.00	.04	15.65	.00
Education	-.257	.03	-.02	-8.00	.00
Have Mate	.711	.10	.02	7.11	.00
Log Income	-.129	.06	-.01	-2.00	.05
PHI	.377	.00	.36	149.17	.00
HBI	.076	.00	.10	44.14	.00
BAI	.202	.00	.16	64.53	.00
WEI	.057	.00	.14	61.54	.00



Table 10: Regression Analysis -- Working Population

Dependent Variable: Cantril Ladder Present

	B	Std. Error	Beta	t	Sig.
(Constant)	1.078	.051		20.940	.000
Female	.143	.009	.038	15.631	.000
Age	-.010	.000	-.068	-26.882	.000
Education	.083	.003	.069	26.175	.000
Have Mate	.133	.010	.035	13.448	.000
Log Income	.249	.006	.110	39.095	.000
PHI	.011	.000	.116	45.689	.000
HBI	.005	.000	.073	29.317	.000
BAI	.023	.000	.0205	75.230	.000
WEI	.003	.000	.078	31.881	.000

Table 11: Regression Analysis -- Working Population

Dependent Variable: Cantril Ladder Future

	B	Std. Error	Beta	t	Sig.
(Constant)	5.931	.06		107.24	.00
Female	.265	.01	.07	27.06	.00
Age	-.036	.00	-.25	-93.42	.00
Education	.084	.00	.07	24.60	.00
Have Mate	-.035	.01	-.01	-3.29	.00
Log Income	.127	.01	.05	18.60	.00
PHI	.008	.00	.08	30.50	.00
HBI	.003	.00	.05	18.54	.00
BAI	.011	.00	.09	33.50	.00
WEI	.002	.00	.05	19.62	.00

In summary, emotional health is best explained by physical health and basic access, followed by work environment quality and healthy behavior. Life evaluation is best explained by basic access and physical health. These empirical results match what might be expected, as life without basic needs (food, shelter, health insurance, safety) and good physical health is particularly unsatisfying. These dimensions likely take precedence when they are lacking.



State-Level Analyses

State-level index data were compared with external sources of health and well-being data to study criterion-related validity. A wide-ranging set of health and socioeconomic indicators of state-level well-being from external sources were used to validate the performance of the Gallup-Healthways indexes. Table 12 highlights some of the strongest relationships between the indexes and the external indicators, all of which are significant at the .05 level, and all display strong support for the criterion-related and construct validity of the index scores. The Life Evaluation Index correlates strongly with measures of income, age, and social class -- the correlation with income at .54 is among the highest for this index dimension. The Emotional Health Index is strongly correlated with external indicators of lifestyle, disease burden, life expectancy, poverty, and unemployment. The highest correlation at -.72 is between the Emotional Health Index and the number of deaths due to diseases of the heart per 100,000. As would be expected, the Physical Health Index relates strongly to external measures of health risk factors and disease burden, and the correlation with percentage of adults with a disability is highest at .81. The Healthy Behavior Index displays strong associations with external indicators across the board, and the some of the highest correlations are with external metrics of health risk factors, highlighting the construct validity of the index. The Work Environment Index relates to health risk factors, disease burden, and infant mortality indicators, and the highest correlation is with the percentage of adults who participate in some degree of physical activity. The Basic Access Index is highly related to several external indicators of health risk, poverty, and healthcare infrastructure at the state level, with a high correlation to the number of people without health insurance.

Table 12: State Correlations

Health Risk Factors	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Percentage of Adults Who Smoke, 2007	-.59**	-.45**	-.68**	-.74**	-.2	-.62**	-.80**
Tobacco Consumption (% 18 and older), 2004-2006	-.64**	-.49**	-.67**	-.68**	-.37**	-.51**	-.82**
Percentage of Adults Who Participated in Moderate or Vigorous Physical Activities, 2007	.24	.56**	.50**	.66**	.44**	.37**	.62**
Obesity (% age 20 and older), 2004-2006	-.40**	-.37**	-.64**	-.85**	-.16	-.54**	-.69**
Percentage of Adults Who Visited the Dentist or Dental Clinic Within the Past Year, 2006	.19	.26	.60**	.48**	-.23	.85**	.48**
Life Expectancy and Infant Mortality Rates	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Life Expectancy (years), 2005	.31*	.57**	.73**	.68**	.11	.75**	.71**
Infant Mortality Rate, 2002-2004	-.12	-.38**	-.52**	-.69**	-.38**	-.54**	-.58**
Under 5 Mortality Rate, 2002-2004	.00	.08	-.35*	-.40**	.18	-.61**	-.24
Disease Burden	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Number of Deaths Due to Diseases of the Heart per 100,000 Population, 2005	-.39**	-.72**	-.73**	-.72**	-.39**	-.59**	-.79**
Age-Adjusted Invasive Cancer Incidence Rate per 100,000 Population, 2004	-.41**	-.30*	-.14	-.01	-.26	.34*	-.22
Percentage of Adults Reporting Poor Mental Health	.22	.02	.14	.36*	.17	.12	.27
Percentage of Adults With a Disability, 2007	-.46**	-.48**	-.81**	-.33*	.11	-.54**	-.58**
Diabetes (% age 18 and older), 2004-2006	-.19	-.57**	-.64**	-.59**	-.28*	-.58**	-.62**
Percentage of Adults Who Have Ever Been Told by a Doctor That They Have Diabetes, 2007	-.25	-.62**	-.65**	-.59**	-.32*	-.55**	-.66**



Table 12: State Correlations (continued)

Health Infrastructure	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Child Immunization Rate (%), 2006	-.21	-.12	.07	-.06	-.21	.65**	.00
Teenage Pregnancy (per 1,000 girls aged 15-19)	.06	-.26	-.43**	-.44**	.03	-.82**	-.38**
Practicing Physicians (per 100,000 population)	.06	-.09	.24	.37**	-.35*	.58**	.19
Income and Demographics	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Universe: TOTAL POPULATION: Median Age; Total (Estimate)	-.52**	-0.22	-.18	0.12	-.32*	.27	-.26
Percentage Enrolled in School	.40**	.09	.30*	-.01	.14	.13	.30*
Percentage Families below Poverty Line	-.31*	-.55**	-.71**	-.54**	-.05	-.73**	-.64**
Universe: HOUSEHOLDS: Median Household Income in the Past 12 Months (in 2007 inflation-adjusted dollars) (Estimate)	.54**	.39**	.66**	.55**	-.14	.56**	.62**
Percentage Households Receiving Food Stamps	-.54**	-.56**	-.79**	-.57**	-.14	-.49**	-.72**
Food-Insecure Households, 2005	.06	-.19	-.36*	-.22	.29*	-.59**	-.19
People Without Health Insurance (%), 2004-2006	.07	-.17	-.32*	-.15	.27	-.82**	-.22
Crime and Violence	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Violent Crime Offenses Rate per 100,000 Inhabitants, 2006	.21	-.18	-.13	-.16	-.1	-.49**	-.14
Number of Deaths Due to Motor Vehicle Accidents per 100,000 Population, 2005	-.15	-.08	-.45**	-.42**	.22	-.69**	-.36**
Unemployment	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Unemployment Rate 2007	-.31*	-.44**	-.37**	-.31*	-.30*	-.38**	-.49**

** Correlation is significant at the .01 level (two-tailed).

Congressional District Analyses

Table 13 summarizes results of correlations between the Gallup-Healthways indexes and socioeconomic indicators at the congressional district level. The results are based on a sample of 436 congressional districts and include the District of Columbia. The results show a strong relationship between the Life Evaluation Index and measures of income and disability, while the Emotional Health Index, Work Environment Index, and Basic Access Index correlate most strongly with measures of poverty. The Physical Health Index demonstrates its construct validity in that it correlates most strongly with the disability statistics. The Healthy Behavior Index is most related to life expectancy. The Composite Index shows consistently high correlations with all measures of life expectancy, income, poverty, and disability.



Table 13: Congressional District-Level Correlations

	LEI	EHI	PHI	HBI	WEI	BAI	Composite
Life Expectancy at Birth (Years)	.29**	.25**	.60**	.65**	.13**	.45**	.52**
Median Age, 2007	-.16**	.11*	-.02	.07	-.01	.52**	.09
Percentage With Income Below Poverty Line	-.35**	-.49**	-.55**	-.34**	-.24**	-.81**	-.63**
Percentage Household Received Food Stamps in Past 12 Months	-.46**	-.49**	-.63**	-.47**	-.30**	-.66**	-.69**
Percentage Males (21-64) With Two or More Types of Disability	-.55**	-.39**	-.80**	-.51**	-.12*	-.47**	-.65**
Percentage Females (21-64) With Two or More Types of Disability	-.56**	-.41**	-.82**	-.56**	-.13**	-.50**	-.67**
Median Household Income in Past 12 Months	.59**	.42**	.67**	.50**	.20**	.72**	.73**

** Correlation is significant at the .01 level (two-tailed).

* Correlation is significant at the .05 level (two-tailed).

Note. From Sharps-Burd, S., Lewis, K., & Drapper, W.H. (2008). *The measure of America: American human development report, 2008-2009*. New York: Columbia University Press and the 2007 American Community Survey.

To understand the strength of the relationships between the indexes and broad criterion variables such as life expectancy, standard demographic variables including income, age, race, and immigrant status were controlled. The results of partial correlations with these control variables show that the Emotional Health Index, Physical Health Index, Work Environment Index, and the Basic Access Index account for unique variance in the congressional district life expectancy beyond these demographic variables.

Table 14: Congressional District Partial Correlations

			LEI	EHI	PHI	HBI	WEI	BAI	Composite
Log Median Income, Median Age; Total (Estimate), % Black, % Not a U.S. Citizen (Estimate)	Life Expectancy at Birth (Years)	Correlation	-.11	.19	.27	.28	-.15	.36	.09
		Significance (Two-tailed)	.02	.00	.00	.00	.00	.00	.07
		df	430	430	430	430	430	430	430

Note. From Sharps-Burd, S., Lewis, K., & Drapper, W.H. (2008). *The measure of America: American human development report, 2008-2009*. New York: Columbia University Press.



Summary

The Gallup-Healthways Well-Being Index was developed based on a long history of well-being research, evidence from extensive Gallup Polls of world citizens, and comprehensive pilot testing within the United States. This report highlights the instrument development and validation work carried out thus far. Since the Well-Being Index and its validation are based on cumulative data gathered from a random sample of no fewer than 1,000 U.S. residents daily, the opportunity for further research and index development is nearly unlimited. This report serves as a beginning to what Gallup and Healthways anticipate will be volumes of research studies that aim to inform leaders interested in improving the well-being of U.S. residents.



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