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Well-Being Assessment: An Evaluation of Well-Being Scales for Public Health and Population Estimates of Well-Being among US Adults

Rosemarie Kobau*

National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, USA

Joseph Sniezek

National Center for Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, Atlanta, GA, USA

Matthew M. Zack

National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, USA

Richard E. Lucas

Michigan State University, USA

Adam Burns

Porter Novelli Public Services, Washington, DC, USA

In 2008, the Centers for Disease Control and Prevention (CDC) supported testing of a number of well-being scales for potential use on public health surveillance systems. The purpose of this study was to examine the descriptive and psychometric properties of the scales (i.e. Satisfaction with Life, Meaning in Life, Positive and Negative Affect, Autonomy, Competence and Relatedness, and global and domain-specific life satisfaction) and to examine the distribution of well-being levels in a representative sample of community-dwelling US adults

* Address for correspondence: Rosemarie Kobau, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Adult and Community Health, 4770 Buford Highway, NE, Mailstop K-51, Atlanta, GA 30341, USA. Email: RKobau@cdc.gov

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($N = 5,399$) using a stratified analysis. The scales demonstrated acceptable psychometric properties. Responses were negatively skewed, with most respondents reporting mildly positive levels of subjective well-being. With the exception of autonomy, competence, and relatedness scales, all scales demonstrated good variability across socio-demographic subgroups. Older age and higher levels of education, and income, were associated with higher levels of subjective well-being. Most of the examined scales and related items merit consideration for continued testing in telephone surveys used in public health surveillance.

Keywords: population health, psychometric analysis, US population surveys, well-being assessment

INTRODUCTION

Following largely a medical and epidemiologic model of disease and risk factor prevention, public health has made great strides in preventing illness and disease associated with communicable and chronic diseases and in increasing lifespan (Kinsella & Velkoff, 2001; CDC, 2003; Breslow, 2006). But, also critical to understanding disease prevention, is the need to understand well-being and the promotion of protective factors related to resilience, disease resistance, and recovery (Ryff & Singer, 1998; National Research Council, 2001). To assess population well-being, measurable indicators for surveillance systems need to go beyond the morbidity, mortality, and risk factor assessments common in public health. Many of these indicators fail to capture the actual experiences of people's lives that track with well-being—the quality of their relationships, the range of their emotions, their physical and mental functioning, and the realisation of their potential (Breslow, 1999; Diener & Seligman, 2004; New Economics Foundation [NEF], 2009).

Well-being, viewed as an integration of mental, physical, and social domains, is associated with numerous benefits to health, family, work, and economic status (Lyubomirsky, King, & Diener, 2005). For example, positive emotions and evaluations of life are associated with decreased risk of disease, illness, and injury; better immune functioning; better coping and speedier recovery; and increased longevity (Pressman & Cohen, 2005; Ostir, Markides, Black, & Goodwin, 2000; Ostir, Markides, Peek, & Goodwin, 2001; Fredrickson & Levenson, 1998; Tugade, Fredrickson, & Barrett, 2004; Lyubomirsky et al., 2005). Individuals with high levels of well-being are not only healthier, but they are also more successful at work, earn higher incomes, have more fulfilling relationships, and are more likely to contribute to their communities (Tov & Diener, 2008; Lyubomirsky et al., 2005; Frey & Stutzer, 2002; Warr, 1999). Nations with high levels of well-being are wealthier, have longer life expectancies, have more political engagement and stability, lower divorce rates, more equality, and better records of civil liberty (Inglehart, 1990; Larsen & Eid, 2008; Frey & Stutzer, 2002; Diener & Suh, 1999).

Well-being indicators can supplement economic indicators, particularly in affluent societies like the United States (Diener, 2000; Diener & Seligman, 2004; Schwarz & Strack, 1999; Dolan & White, 2007). Economic indicators can only measure economic development, but do not measure much of what people typically value (e.g. time spent with family and friends, personal accomplishment) (Kahneman, Diener, & Schwarz, 1999). Economic indicators can even mask negative social trends (e.g. expansion of jails, less leisure time, longer commutes, social isolation, environmental degradation) despite economic development (Diener & Seligman, 2004; Diener, Lucas, Schimmack, & Helliwell, 2009).

Although current research describes the theoretical underpinnings of well-being, its numerous determinants, and methodological issues associated with its measurement (Kahneman et al., 1999; Diener et al., 2009; Eid & Larsen, 2008; Easterlin, 2003; Keyes, Shmotkin, & Ryff, 2002, Diener, 2009), it is beyond the scope of this paper to address these issues. Instead, given the substantial progress in well-being assessment and its potential usefulness for public policy, this paper contributes to efforts under way to develop national indicators of well-being for policy purposes (Dolan & White, 2007; NEF, 2009; Matthews, 2006; Ferring et al., 2003; International Wellbeing Group, 2006; Samman, 2007; Diener et al., 2009; Gallup, Inc. & Healthways, Inc., 2009). US public health surveillance systems have used some questionnaires that assess well-being or related domains. For example, the 1971–75 National Health and Nutrition Examination Survey included the General Well-Being Schedule (Dupuy, 1978; Fazio, 1977). The National Health Interview Survey (NHIS) has included different versions of the Quality of Well-being Scale (Kaplan & Anderson, 1988) and, in 2001, a set of questions related to well-being (i.e. feeling happy in the past 30 days, and social participation) (CDC, 2009b). The Behavioral Risk Factor Surveillance System (BRFSS) includes health-related quality of life (HRQOL) measures (Moriarty, Zack, & Kobau, 2003). With limited support, some states have also included on their BRFSS surveys single global items on life satisfaction and satisfaction with emotional and social support (Strine, Chapman, Balluz, & Mokdad, 2008a; Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008b).

After an extensive 2-year-long literature review and development process around well-being assessment described elsewhere (Kobau, Sniezek, & Zack, 2009), CDC crafted a working definition of well-being: "a dynamic and relative state where one maximizes his or her physical, mental, and social functioning in the context of supportive environments to live a full, satisfying, and productive life". This multidimensional conceptualisation of well-being is congruous with the WHO definition of health and is parallel to health promotion literature (WHO, 1949, 1995). Grounded in public health science and practice, the working definition also encompasses an ecological perspective that considers the reciprocal relationship between individuals and the

environment, and assumes that all sectors of society have a responsibility for population well-being (Breslow, 1999; Institute of Medicine, 2003; WHO, 1995). In 2008, CDC supported testing of scales that assess well-being in a large, representative sample of US adults. Although further studies are planned (see "Future Directions"), the purpose of this study was to examine the descriptive (means, response category frequencies, refusal rates) and psychometric properties of the scales and to examine the distribution of well-being levels in a stratified analysis of community-dwelling US adults.

MEASURES

CDC supported testing some of the well-being scales identified by the UK Oxford Poverty and Human Development Initiative (Samman, 2007). These scales cover (1) Satisfaction with life (Diener, Emmons, Larsen, & Griffin, 1985); (2) Meaning in life (Steger, Frazier, Oishi, & Kaler, 2006); (3) basic psychological needs of autonomy, competence, and relatedness (Deci & Ryan, 2000); (4) domain-specific life satisfaction (Diener, Suh, Lucas, & Smith, 1999); and (5) select positive and negative affect items (Dolan, Peasgood, & White, 2006; Samman, 2007; Watson, Clark & Tellegen, 1988).[1]

Domain-specific life satisfaction questions focused on satisfaction with ("your") education; present job or work; well-being from spiritual, religious, or philosophical beliefs; housing; family life; health; friends and social life; neighborhood overall; ability to help others; achievement of your goals; leisure; physical safety; and energy level. The inclusion of several domain-specific life satisfaction items is especially relevant for public health purposes because such measures add to the understanding of well-being assessment and could provide important practical information about public health programs to improve well-being in communities (Diener et al., 1999). Additionally, CDC included validated items to assess physical well-being (e.g. operationalised with select BRFSS HRQOL measures; CDC, 2000).

Porter Novelli's HealthStyles Survey

Together these scales and other related items were suggested for inclusion on Porter Novelli's 2008 HealthStyles Survey for pilot testing. The HealthStyles survey, conducted annually since 1995, is designed by Porter Novelli with input from public health agencies such as the CDC and the Substance Abuse and Mental Health Services Administration (SAMHSA). The survey assesses people's attitudes and beliefs about chronic and infectious diseases; health behaviors and risks; exposure to health information and communication

[1] CDC obtained permission from scale authors to use scales and/or items.

campaigns; and self-reported symptoms, diseases, and disorders. The survey is conducted in a nationally representative sample of ~5,400 community-dwelling adults, and has been shown to give comparable prevalence estimates on risk factors with the random sampling methodology used on BRFSS (Pollard, 2002). CDC and SAMHSA programs have licensed data from HealthStyles to validate attitudinal questions for public health survey research (Kobau, Dilorio, Anderson, & Price, 2006; Kobau, Dilorio, Chapman, & Delvecchio, 2009).

Styles 2008 is based on the results of four consumer mail panel surveys administered in three waves. Synovate, Inc. samples and collects data for Styles 2008 from its consumer mail panel of approximately 340,000 potential respondents. Respondents are recruited to join the mail panel through a four-page recruitment survey. In return for their participation, respondents are given a small monetary incentive (cash or coupon cash totaling less than $5) and are entered into a sweepstakes with a first-place prize of $1,000 and 20 second-place prizes of $50.[2]

The initial wave—*ConsumerStyles*—fielded May through June 2008, consists of three stratified random samples totaling 20,000 potential respondents. The main sample ($N = 11,000$) was stratified on region, household income, population density, age, and household size to create a nationally representative sample. A low income/minority supplement ($N = 3,000$) and a households with children supplement ($N = 6,000$) were used to ensure adequate representation of these groups. In 2008, 10,108 respondents completed the *ConsumerStyles* survey, yielding a response rate of 50.6 per cent.[3]

The second wave, administered July through August 2008, consisted of the *Healthstyles* survey. A total of 7,000 *Healthstyles* surveys were sent to mail panel households that returned the *ConsumerStyles* survey. Responses were received from 5,399 *Healthstyles* participants, yielding a response rate of 77.1 per cent.

With the exception of the global life satisfaction and domain-specific life satisfaction items, response scales for all items were changed to 5-point scales to maintain comparability with the *HealthStyles* survey format, and to minimise cognitive burden for respondents completing a lengthy survey.[4] To avoid order effects as much as possible, scales were interspersed throughout the survey in the following order: Section 1 of the survey ("Attitudes") posed

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[2] ConsumerStyles and HealthStyles respondents were entered into a sweepstake for their participation in the corresponding survey.

[3] The response rate for the nationally balanced sample was 53.0 per cent. The response rates for the minority/low income and households with children supplements were 50.4 per cent and 46.0 per cent, respectively.

[4] CDC obtained permission from scale authors to change response scales, and the authors confirmed that the change should have minimal impact.

a series of questions on various health beliefs (e.g. "*Keeping cuts clean and covered, washing hands regularly, and not sharing personal items like towels can help prevent the spread of MRSA*"; "*Treatment can help people with mental illness lead normal lives*"). This section also included the global life satisfaction question. Immediately preceding the global life satisfaction question, the following was put to both men and women, "*People with atrial fibrillation or missed or extra heart beats are at an increased risk of stroke*." Following this item, women only were also asked the following question preceding the global life satisfaction question, "*It would be OK with me if I got pregnant in the next few months*." Immediately following the global life satisfaction question, respondents were asked the domain-specific life satisfaction questions. After a number of questions on additional health topics, the Meaning in Life scale was administered, immediately followed by the Autonomy, Competence, and Relatedness scale, and then the positive and negative affect items. Section 2 of the survey ("Your Health") included the questions on self-rated health, physically unhealthy days, and days with vitality. These questions were followed by questions on activity limitations and self-reported diseases and disorders. Section 3 of the survey included a number of questions on behavioral risk factors, and nutrition and physical activity. Remaining survey questions focused on special populations (e.g. parents; women only; men only, etc.).

ANALYSIS

Data were analysed with SPSS 14.0 and were weighted for analysis to account for differences by sex, age, race/ethnicity, income, and household size. Responses indicating don't know/refused were coded as missing and excluded from analyses. Response distributions were examined and item analysis was conducted to examine item-level statistics (i.e. mean, standard deviation, skewness, and kurtosis). Scale scores were constructed following scale author and related guidelines, but means were reported rather than sums (Samman, 2007). Inter-item correlation coefficients and overall scale reliabilities (Cronbach's α) were examined for each scale and subscale where relevant. Univariate analyses using parametric and non-parametric statistics were conducted to examine scale scores by selected demographic characteristics (e.g. sex, age, race/ethnicity, educational status, household income, marital status). Means and 95 per cent confidence intervals were examined. Non-parametric analyses were used to account for skewed data and the ordinal-level response scales. Kruskal-Wallis omnibus tests, followed by pairwise Mann-Whitney-U tests adjusting for multiple comparisons between groups, were used to assess statistically significant differences within socio-demographic categories. Means and 95 per cent confidence intervals were calculated for the CDC unhealthy days and vitality days measures. Results from parametric statistics

are reported for comparison purposes with other studies. However, statistical differences among groups in this study will focus on non-parametric analyses that more appropriately account for the ordinal response scales. Effect sizes are not reported because they are inappropriate for non-parametric statistics.

RESULTS

Item means and scale scores were negatively skewed with substantial kurtosis, suggesting a non-normal distribution for most items.

Scale Reliability

The Satisfaction with Life Scale demonstrated acceptable internal consistency reliability ($\alpha = 0.88$). The three-item (short-form) Meaning in Life scale also demonstrated acceptable internal consistency reliability ($\alpha = 0.89$). The internal consistency reliability for the summed nine-item Autonomy, Competence, Relatedness scale was $\alpha = 0.87$. Comparing each three-item subscale of this scale with the two other subscales, the inter-item correlation coefficient for the relatedness subscale and the autonomy subscale was $r = 0.51$; for relatedness and competence subscales, $r = 0.55$; and for competence and autonomy subscales, $r = 0.59$. The positive affect subscale demonstrated acceptable inter-item consistency reliability ($\alpha = 0.91$), as did the negative affect subscale ($\alpha = 0.86$).

Construct Validity

Correlation coefficients between the Satisfaction with Life, Meaning in Life, Autonomy, Competence and Relatedness scales, positive affect subscale, negative affect subscale, global life satisfaction, and global happiness items show that these constructs generally had good convergent validity and discriminant validity (data available upon request). For example, satisfaction with life was strongly correlated with global life satisfaction ($r = 0.75$) and global happiness ($r = 0.62$) but was moderately negatively correlated with negative affect ($r = -0.39$). Autonomy, competency, and relatedness overall was somewhat strongly correlated with meaning in life ($r = 0.63$) but less strongly and inversely correlated with negative affect ($r = -0.42$). Finally, whereas the global happiness item asking about happiness in general was moderately and positively associated with positive affect (happiness in the past 30 days) ($r = 0.68$), global happiness was inversely but less strongly associated with negative affect (negative affect in the past 30 days) ($r = -0.50$).

Associations between Domain-Specific Life Satisfaction and Global Life Satisfaction

Domain-specific life satisfactions were all positively and moderately to fairly strongly correlated with global life satisfaction (Table 1). Of particular interest were the associations between global life satisfaction and "achievement of goals" ($r = 0.66$), family life ($r = 0.65$), friends and social life ($r = 0.58$), leisure ($r = 0.57$), and energy level and health (both $r = 0.56$). The association between satisfaction with health and energy level was the largest of all ($r = 0.69$) (Table 1).

Subjective Well-Being by Self-Rated Health

With the exception of negative affect, significantly lower scores were seen in adults who reported fair or poor health compared to those who reported good to excellent self-rated health across all subjective well-being scale scores. For example, adults who reported fair or poor health had a mean satisfaction with life score of 2.7 (95% CI = 2.7–2.8) compared to a score of 3.5 (95% CI = 3.5–3.5) for adults who reported good to excellent self-rated health. Adults with fair or poor health had a mean score on positive affect of 3.1 (95% CI = 3.1–3.2), compared to a score of 3.7 (95% CI = 3.7–3.7) among those with good to excellent self-rated health. Adults who reported good to excellent health had significantly lower scores on negative affect (1.8, 95% CI = 1.8–1.9) than adults who reported fair or poor health (2.4, 95% CI = 2.4–2.5).

Population Descriptive Results

Generally, about half of all respondents agreed that their life was close to their ideal and that their life conditions were excellent (Table 2). Most respondents believed that they experienced meaning in life and perceived themselves to be autonomous, competent, and to have good social relatedness (Table 2). Small percentages of respondents indicated infrequently (3.2–12.2%) or rarely (0.7–3.5%) feeling different domains of positive affect over the past 30 days, with small percentages reporting frequent (3.6–10.1%) or constant (1.3–3.2%) negative affect in the past 30 days (Table 2). In some cases, up to 10 per cent of the population was dissatisfied with specific life domains (Table 3).

Parametric and non-parametric analyses of scores are seen in Tables 4 and 5. While many statistically significant differences (non-parametric analyses) probably result from the large sample sizes in the groups being compared, such differences are quite small and thus may have less practical importance.

Sex. Women had slightly but significantly higher scores than men on Satisfaction with Life, global life satisfaction, and the Relatedness subscale

TABLE 1
Correlation Coefficients of Domain-Specific Life Satisfaction with Global Life Satisfaction*—2008 HealthStyles Survey (n = 5,399)

	Global	*Education*	*Job*	*Beliefs*	*Housing*	*Family*	*Health*	*Friends/ social*	*Neighborhood*	*Help others*	*Goals*	*Leisure*	*Phys. Safety*	*Energy Level*
Global life satisfaction	1													
Education	.40	1												
Present job or work	.51	.44	1											
Well-being from spiritual, religious, philosophical beliefs	.46	.38	.40	1										
Housing	.52	.39	.41	.44	1									
Family life	.65	.35	.41	.45	.58	1								
Health	.56	.37	.39	.40	.45	.53	1							
Friends and social life	.58	.39	.44	.46	.50	.59	.58	1						
Neighborhood	.49	.33	.37	.38	.58	.48	.42	.55	1					
Ability to help others	.46	.37	.39	.41	.41	.46	.45	.53	.48	1				
Achievement of your goals	.66	.54	.56	.48	.55	.56	.54	.60	.51	.63	1			
Leisure	.57	.40	.45	.42	.50	.52	.50	.61	.46	.50	.66	1		
Phys. Safety	.53	.37	.40	.43	.48	.51	.56	.52	.51	.53	.58	.60	1	
Energy level	.56	.36	.40	.39	.40	.45	.69	.52	.39	.47	.56	.57	.61	1

* All correlations are significant at the 0.01 level (two-tailed) (given large sample size).

TABLE 2
Distribution of Responses to Well-Being Scales—2008 HealthStyles Survey

		Response Scales				
Scales & items	N	*1*	*2*	*3*	*4*	**5**
Satisfaction with Life Scale		*Strongly disagree (%)*	*Moderately disagree (%)*	*Neutral (%)*	*Moderately agree (%)*	*Strongly agree (%)*
In most ways my life is close to my ideal.	5,309	6.6	14.1	33.5	36.1	9.8
The conditions of my life are excellent.	5,361	6.5	15.2	32.5	35.5	10.4
I am satisfied with my life.	5,373	5.1	11.3	24.4	40.3	18.9
So far I have gotten the important things I want in life.	5,369	4.7	10.7	22.4	42.0	20.1
If I could live my life over, I would change almost nothing.	5,347	12.7	20.8	25.6	27.0	13.8
Meaning in Life Scale		*Not at all true (%)*	*(%)*	*Neutral (%)*	*(%)*	*Completely true (%)*
My life has a clear sense of purpose.	5,346	3.3	6.0	31.6	38.5	20.7
I have a good sense of what makes my life meaningful.	5,373	1.9	3.8	17.5	46.2	30.6
I have discovered a satisfying life purpose.	5,360	3.3	7.6	29.4	37.7	22.1
Autonomy, Competence & Relatedness Scale						
I feel like I am free to decide for myself how to live my life.	5,376	2.6	5.3	14.7	36.0	41.4
I generally feel free to express my ideas and opinions.	5,371	1.2	3.7	12.5	42.7	39.9
I feel like I can pretty much be myself in daily situations.	5,367	0.8	3.5	11.2	42.5	42.0
People I know tell me I am competent at what I do.	5,349	1.4	2.4	14.8	37.1	44.2
Most days I feel a sense of accomplishment from what I do.	5,345	2.0	6.6	19.6	43.8	27.9
I often feel very capable.	5,369	1.1	3.8	15.1	45.3	34.7
I get along well with people I come into contact with.	5,368	0.7	1.5	10.3	41.4	46.1
I consider the people I regularly interact with to be my friends.	5,371	2.0	5.2	20.0	39.7	33.0
People in my life care about me.	5,373	1.2	2.4	12.9	38.9	44.6

TABLE 2 *Continued*

How often in the past 30 days have you felt?		*None of the time (%)*		*Some of the time (%)*		*All of the time (%)*
Cheerful	5,375	0.7	3.2	29.8	55.6	10.6
In good spirits	5,372	0.5	3.7	24.7	56.8	14.3
Extremely happy	5,367	3.5	12.2	35.9	39.9	8.4
Calm and peaceful	5,370	1.4	7.8	28.9	47.3	14.7
Satisfied	5,340	2.0	8.2	26.8	47.5	15.6
Full of life	5,325	3.2	11.9	32.4	39.0	13.4
So sad that nothing could cheer you up	5,349	53.4	26.3	13.5	5.6	1.3
Nervous	5,359	26.0	34.4	27.8	9.4	2.5
Fidgety or restless	5,355	29.5	32.2	26.0	9.9	2.4
Hopeless	5,355	60.9	19.6	12.2	5.4	1.7
That everything was an effort	5,346	34.7	25.7	26.3	10.2	3.2
Worthless	5,361	68.6	16.3	10.2	3.6	1.4
All things considered, would you say you are.....?		*Very happy (%)*	*Happy (%)*	*Neutral (%)*	*Not very happy (%)*	*Not happy at all (%)*
	5,360	20.4	55.0	18.6	5.2	0.9

TABLE 3
Percent Distribution to Life Satisfaction Items—Global and Domain-Specific, HealthStyles—2008

Life satisfaction items	N	*Very dissat-isfied (1)*	*(2)*	*(3)*	*(4)*	*Neutral (5)*	*(6)*	*(7)*	*(8)*	*(9)*	*Very Satis-fied (10)*
					%						
Life as a whole	4,682*	1.7	2.5	4.2	4.2	12.3	8.5	15.4	25.9	15.7	9.7
Education	5,356	2.3	1.9	4.5	5.5	13.8	8.9	14.8	18.1	11.2	19.0
Present job or work	4,979	5.8	3.3	3.9	5.3	17.1	7.0	11.0	18.3	12.2	16.0
Spiritual, religious, or philosophical beliefs	5,326	1.2	1.0	2.0	4.6	21.0	6.3	10.1	16.3	15.5	21.9
Housing	5,342	3.1	2.1	3.2	5.1	10.8	7.3	10.7	17.9	18.5	21.3
Family life	5,333	1.9	1.8	2.7	4.4	10.4	6.6	11.8	16.3	19.3	24.9
Health	5,342	2.5	2.0	4.0	6.7	11.8	8.9	14.3	21.7	16.3	11.9
Friends and social life	5,346	2.1	2.1	3.2	5.3	13.9	8.5	13.5	18.5	17.2	15.6
Neighborhood overall	5,338	3.2	2.5	3.1	4.9	14.0	7.7	13.0	19.7	16.5	15.4
Ability to help others	5,341	1.1	1.0	1.7	2.9	11.7	7.5	12.6	20.6	20.5	20.6
Achievement of your goals	5,330	2.9	2.6	3.5	6.0	12.3	9.3	14.0	20.2	17.9	11.3
Leisure	5,339	2.4	2.3	4.0	6.0	14.3	9.0	12.5	19.2	16.0	14.3
Physical safety	5,339	1.3	1.0	1.8	2.4	12.0	7.0	11.0	19.9	22.5	21.0
Energy level	5,364	3.7	3.7	5.4	8.4	11.6	10.8	14.9	19.3	13.0	9.2

* Larger number of missing cases for the global life satisfaction item might have resulted from a systematic error in the survey design. The question appeared immediately preceding a section break in the survey, and may have resulted in being skipped over by some respondents.

TABLE 4
Well-Being Domains by Select Demographic Groups, HealthStyles 2008

	N	*Well-being Scales or Subscales*							
		Meaning in Life Mean (95%CI)	*Satisfaction with Life Mean (95%CI)*	*Positive Affect Mean (95%CI)*	*Negative Affect Mean (95%CI)*	*Global Happiness Mean (95%CI)*	*Autonomy Subscale Mean (95%CI)*	*Competence Subscale Mean (95%CI)*	*Relatedness Subscale Mean (95%CI)*
Sex									
Male	2,611	3.8 (3.7–3.8)	3.3 (3.3–3.4)*	3.6 (3.6–3.6)	1.9 (1.9–2.0)	3.9 (3.8–3.9)	4.1 (4.1–4.2)	4.1 (4.0–4.1)	4.1 (4.1–4.1)*
Female	2,782	3.8 (3.8–3.8)	3.4 (3.4–3.4)*	3.6 (3.6–3.6)	2.0 (1.9–2.0)	3.9 (3.9–3.9)	4.1 (4.1–4.2)	4.1 (4.0–4.1)	4.2 (4.2–4.2)*
Age									
18–24	686	3.7 (3.6–3.7)*+	3.5 (3.5–3.6)*	3.7 (3.6–3.7)*+	2.1 (2.0–2.1)*o	3.9 (3.9–4.0)	4.1 (4.1–4.2)*	4.0 (4.0–4.1)	4.2 (4.2–4.3)*
25–44	2,002	3.7 (3.7–3.8)o‡	3.3 (3.2–3.3)+	3.5 (3.5–3.6)*o■	2.1 (2.0–2.1)+■	3.8 (3.8–3.9)*o	4.1 (4.0–4.1)+o	4.0 (4.0–4.0)o+	4.1 (4.1–4.1)+
45–64	1,833	3.8 (3.8–3.8)*‡	3.3 (3.3–3.3)*o	3.6 (3.6–3.7)o^	1.9 (1.8–1.9)*+^	3.9 (3.9–3.9)*^	4.2 (4.1–4.2)o^	4.1 (4.0–4.1)o	4.1 (4.1–4.1)o
65+	873	3.9 (3.9–4.0)o+	3.6 (3.6–3.7)+o	3.8 (3.8–3.8)+^■	1.8 (1.7–1.8)o^■	4.0 (4.0–4.1)o^	4.4 (4.3–4.4)*+^	4.1 (4.1–4.2)+	4.4 (4.3–4.4)*+o
Race/Ethnicity									
White	3,679	3.8 (3.8–3.8)*	3.4 (3.4–3.4)*o	3.6 (3.6–3.6)*	1.9 (1.9–1.9)*o	3.9 (3.9–4.0)*o	4.2 (4.1–4.2)*o	4.1 (4.0–4.1)*	4.2 (4.2–4.2)*o
Black	635	3.8 (3.8–3.9)+	3.2 (3.1–3.3)*+	3.7 (3.6–3.7)o	2.0 (2.0–2.1)*	3.8 (3.7–3.8)*	4.2 (4.2–4.3)^	4.1 (4.0–4.1)	4.1 (4.1–4.2)*
Hispanic	717	3.8 (3.7–3.9)o	3.4 (3.3–3.4)+^	3.7 (3.6–3.7)*^	2.0 (2.0–2.1)o	3.8 (3.8–3.9)	4.2 (4.1–4.2)*+	4.0 (4.0–4.1)	4.1 (4.0–4.2)
Other	362	3.6 (3.4–3.7)*+o	3.2 (3.2–3.3)o^	3.5 (3.4–3.6)o^	2.0 (1.9–2.1)	3.8 (3.7–3.9)o	4.0 (3.9–4.1)o^+	4.0 (3.9–4.0)*	4.0 (3.9–4.1)o
Education									
Did not complete HS	344	3.7 (3.6–3.8)*	3.3 (3.2–3.4)o	3.7 (3.6–3.8)*	2.3 (2.2–2.4)*o^	3.6 (3.5–3.7)*o+	4.2 (4.1–4.2)*	4.0 (3.9–4.1)*	4.1 (4.0–4.2)
High school graduate	1,199	3.7 (3.6–3.7)+o	3.2 (3.2–3.3)^+	3.5 (3.5–3.6)*^+	2.1 (2.1–2.2)+$■	3.8 (3.7–3.8)^$•	4.1 (4.1–4.1)	4.0 (3.9–4.0)o+•	4.2 (4.1–4.2)*
Some college	2,026	3.7 (3.7–3.8)^■	3.3 (3.3–3.4)	3.6 (3.6–3.6)^	1.9 (1.9–2.0)*+•◇	3.9 (3.8–3.9)*^■	4.1 (4.1–4.2)o	4.1 (4.0–4.1)*^$	4.1 (4.1–4.1)*o^
College graduate	1,037	3.8 (3.8–3.9)+^$	3.5 (3.4–3.5)^	3.6 (3.6–3.7)+	1.8 (1.8–1.9)o$‡◇	4.0 (4.0–4.1)o$■	4.2 (4.1–4.2)+	4.1 (4.1–4.2)+^■‡	4.2 (4.2–4.2)o
Post-graduate	659	4.1 (4.0–4.1)*o■$	3.6 (3.6–3.7)o+	3.7 (3.7–3.8)	1.7 (1.7–1.8)^■•‡	4.1 (4.0–4.1)+•	4.3 (4.2–4.3)*o+	4.2 (4.2–4.3)*•$■‡	4.2 (4.2–4.3)^
Household income									
<$15K	719	3.6 (3.6–3.7)*o	3.1 (3.0–3.2)*o+	3.5 (3.4–3.6)*o	2.3 (2.2–2.4)*o+^	3.6 (3.6–3.7)*o	4.1 (4.0–4.1)*o	3.8 (3.7–3.9)■*o^	4.1 (4.0–4.1)
$15K–$24.9K	635	3.6 (3.6–3.7)+^	3.1 (3.1–3.2)•^■	3.5 (3.5–3.6)^	2.1 (2.0–2.1)*•‡	3.7 (3.7–3.8)+^	4.1 (4.1–4.2)+•	4.0 (3.9–4.0)*•	4.2 (4.1–4.2)
$25K–$39.9K	897	3.7 (3.6–3.7)•◇	3.3 (3.2–3.4)*•‡	3.6 (3.6–3.6)	2.0 (1.9–2.0)o■	3.8 (3.7–3.8)‡	4.1 (4.0–4.1)	4.0 (3.9–4.0)o$‡	4.1 (4.0–4.1)*
$40K–$59.9K	950	3.8 (3.8–3.9)*+•	3.4 (3.3–3.4)o^$	3.6 (3.6–3.7)*	1.9 (1.8–1.9)+•◇	3.9 (3.9–4.0)*+	4.2 (4.1–4.2)*+	4.1 (4.1–4.1)^$	4.2 (4.1–4.2)
$60K+	2,191	3.9 (3.9–3.9)o^◇	3.5 (3.5–3.6)+$■‡	3.7 (3.6–3.7)o^	1.8 (1.8–1.8)^■‡◇	4.0 (4.0–4.1)o^‡	4.2 (4.2–4.2)o•	4.2 (4.1–4.2)■•‡	4.2 (4.2–4.2)*

Note: Matching symbols within a cell (*,*; +,+) represent statistically significant differences between categories within groups following use of non-parametric tests (e.g. the symbol, ■, next to the 25–44 yrs and 65+ yrs categories in the Positive Affect score, denotes a statistically significant difference between groups [3.5 in 25–44 years of age versus 3.8 in the 65+ years of age]). Differences should be interpreted with caution given the large sample size.

TABLE 5
Domain-Specific Life Satisfaction* by Select Demographic Groups, HealthStyles 2008

	N	*Satisfaction with*						
		Global Life Satisfaction Mean (95%CI)	*Education Mean (95%CI)*	*Work Mean (95%CI)*	*Spiritual, religious/phil. beliefs Mean (95%CI)*	*Housing Mean (95%CI)*	*Family Life Mean (95%CI)*	*Health Mean (95%CI)*
Sex								
Male	2,597	6.9 (6.8–7.0)*	7.0 (6.9–7.1)	6.6 (6.5–6.7)	7.1 (7.0–7.2)*	7.3 (7.2–7.4)*	7.5 (7.4–7.6)*	7.0 (6.9–7.1)
Female	2,764	7.1 (7.0–7.2)*	7.1 (7.0–7.1)	6.7 (6.6–6.8)	7.5 (7.4–7.6)*	7.4 (7.3–7.5)*	7.7 (7.6–7.8)*	7.0 (6.9–7.0)
Age								
18–24	686	7.2 (7.0–7.4)*	6.9 (6.7–7.1)*+	6.1 (5.9–6.3)*o■	6.9 (6.7–7.0)*o	6.6 (6.4–6.8)*o	7.6 (7.5–7.8)*	7.2 (7.0–7.3)*
25–44	1,989	6.9 (6.7–7.0)+	6.7 (6.6–6.8)o	6.4 (6.3–6.5)*^	7.0 (6.9–7.1)^	6.8 (6.7–6.9)+	7.4 (7.3–7.5)o	6.8 (6.7–6.9)*o
45–64	1,826	6.9 (6.8–7.1)o	7.1 (7.0–7.2)*^	6.8 (6.7–6.9)o+	7.5 (7.4–7.6)*+	7.7 (7.6–7.8)*^	7.5 (7.4–7.6)+	6.9 (6.8–7.0)+
65+	861	7.4 (7.3–7.6)*+o	7.7 (7.5–7.8)+o^	7.5 (7.3–7.7)■^+	8.1 (7.9–8.2)o^+	8.3 (8.2–8.4)o+^	8.1 (7.9–8.2)*o+	7.3 (7.1–7.4)o+
Race/Ethnicity								
White	3,656	7.0 (7.0–7.1)	7.2 (7.1–7.2)*o	6.8 (6.7–6.9)*	7.3 (7.2–7.4)	7.6 (7.5–7.6)*o+	7.7 (7.6–7.8)*o	7.0 (6.9–7.1)*
Black	633	6.8 (6.6–7.0)*	6.8 (6.6–7.0)	6.0 (5.8–6.2)*o+	7.3 (7.1–7.5)	6.9 (6.7–7.1)*	7.2 (7.0–7.4)*+	6.7 (6.6–6.9)*o
Hispanic	714	7.1 (6.9–7.2)*	6.7 (6.5–6.9)*	6.5 (6.3–6.7)o	7.4 (7.3–7.6)*	6.9 (6.7–7.1)o	7.6 (7.4–7.8)+^	7.0 (6.8–7.2)o
Other	361	6.8 (6.5–7.0)	6.7 (6.5–7.0)o	6.5 (6.2–6.8)+	7.0 (6.7–7.2)*	6.7 (6.5–7.0)+	7.0 (6.8–7.3)o^	6.8 (6.6–7.1)
Education								
Did not complete HS	340	6.8 (6.5–7.1)o	5.5 (5.2–5.7)*o+^	6.0 (5.7–6.3)*o	7.0 (6.7–7.2)*o	6.8 (6.5–7.1)*o	7.3 (7.0–7.6)	6.6 (6.3–6.9)*o◇
High school graduate	1,188	6.7 (6.5–6.8)+^•	6.5 (6.3–6.6)*$•	6.2 (6.1–6.4)+•	7.2 (7.1–7.3)+	7.1 (6.9–7.2)+•	7.4 (7.3–7.6)*	6.7 (6.6–6.8)*^+
Some college	2,016	6.9 (6.9–7.0)■+‡	6.5 (6.4–6.6)o‡■	6.5 (6.4–6.6)■$	7.2 (7.1–7.2)^•	7.1 (7.0–7.2)$■	7.6 (7.4–7.7)+	6.8 (6.7–6.9)‡•■
College graduate	1,032	7.3 (7.2–7.4)^*‡	8.2 (8.0–8.3)+$‡◇	7.1 (6.9–7.2)*+■‡	7.5 (7.4–7.7)*^‡	7.8 (7.6–7.9)*+$‡	7.7 (7.5–7.8)o	7.3 (7.2–7.4)^◇■
Post graduate	653	7.6 (7.4–7.7)■•o	9.0 (8.8–9.1)^•■◇	7.6 (7.4–7.8)o•‡$	7.8 (7.6–7.9)o+‡•	8.2 (8.0–8.3)o•■‡	8.0 (7.8–8.1)*+o	7.5 (7.3–7.7)o+‡•
Household income								
<$15K	711	6.4 (6.2–6.7)*+■	6.6 (6.4–6.8)*o	5.5 (5.3–5.7)*o+	7.2 (7.1–7.4)*	6.6 (6.4–6.8)*o	7.0 (6.8–7.2)*o^	6.3 (6.1–6.5)*o^
$15K–$24.9K	631	6.4 (6.2–6.6)o‡◇	6.7 (6.5–6.9)+	5.9 (5.7–6.1)•^$	7.0 (6.9–7.2)	6.6 (6.4–6.8)+^•	7.2 (7.0–7.4)‡	6.6 (6.4–6.8)•‡
$25K–$39.9K	894	6.7 (6.6–6.9)o•^	6.6 (6.5–6.8)•^	6.4 (6.3–6.6)*•■‡	7.2 (7.1–7.4)	7.0 (6.8–7.1)+‡$	7.5 (7.3–7.6)*•	6.8 (6.6–6.9)*◇
$40K–$59.9K	944	7.2 (7.1–7.3)•*+‡	7.0 (6.9–7.2)*+•‡	6.9 (6.7–7.0)o^‡	7.4 (7.2–7.5)	7.4 (7.3–7.6)*■‡^	7.6 (7.5–7.8)o■	7.0 (6.9–7.1)o•■
$60K+	2,180	7.4 (7.3–7.5)^■◇	7.4 (7.4–7.5)o^‡	7.2 (7.1–7.3)+$■	7.4 (7.3–7.5)*	7.9 (7.8–8.0)o•$■	7.9 (7.8–8.0)^‡•■	7.3 (7.3–7.4)^‡■◇

TABLE 5 *Continued*

	N	*Friends & social life*	*Neighborhood*	*Ability to help others*	*Achievement of goals*	*Leisure*	*Physical safety*	*Energy level*
Sex								
Male	2,597	7.0 (6.9–7.1)*	7.0 (6.9–7.1)	7.6 (7.5–7.7)*	6.9 (6.8–7.0)	7.0 (6.9–7.0)	7.6 (7.6–7.7)	6.6 (6.5–6.7)*
Female	2,767	7.2 (7.1–7.3)*	7.1 (7.0–7.2)	7.7 (7.7–7.8)*	6.9 (6.9–7.0)	7.0 (6.9–7.1)	7.7 (7.7–7.8)	6.4 (6.3–6.5)*
Age								
18–24	686	7.0 (6.8–7.1)*	6.3 (6.2–6.5)*o^	7.8 (7.7–8.0)*o	7.0 (6.8–7.1)*o	6.9 (6.7–7.0)*	7.5 (7.3–7.6)*o	6.7 (6.5–6.9)*
25–44	1,989	6.9 (6.8–7.0)o	6.9 (6.8–7.0)*+	7.6 (7.5–7.7)*+	6.6 (6.5–6.7)*+	6.7 (6.5–6.8)o	7.6 (7.5–7.7)+	6.3 (6.2–6.5)*o
45–64	1,826	7.1 (7.0–7.2)+	7.1 (7.0–7.2)o•	7.6 (7.5–7.7)o^	7.0 (6.9–7.1)^	6.9 (6.8–7.0)+	7.7 (7.6–7.8)*•	6.5 (6.4–6.6)
65+	861	7.8 (7.7–8.0)*o+	7.8 (7.6–7.9)^+•	7.8 (7.7–8.0)+^	7.6 (7.5–7.8)o+^	7.8 (7.7–8.0)*o+	8.0 (7.9–8.2)o+•	6.7 (6.6–6.9)o
Race/Ethnicity								
White	3,656	7.2 (7.1–7.3)*	7.2 (7.1–7.3)*o^	7.7 (7.6–7.8)*o	7.0 (7.0–7.1)*+	7.0 (7.0–7.1)*o	7.8 (7.7–7.9)*o	6.5 (6.4–6.5)
Black	633	7.0 (6.8–7.1)	6.8 (6.6–7.0)*	7.5 (7.3–7.7)+	6.6 (6.4–6.8)*	6.7 (6.5–6.9)*	7.4 (7.2–7.6)*	6.6 (6.4–6.8)
Hispanic	714	7.1 (6.9–7.2)	6.7 (6.5–6.9)o	7.8 (7.7–8.0)*+^	6.9 (6.7–7.1)^	6.9 (6.7–7.1)	7.6 (7.4–7.7)	6.7 (6.5–6.9)
Other	361	6.7 (6.5–7.0)*	6.5 (6.2–6.7)^	7.3 (7.1–7.6)o^	6.5 (6.3–6.8)+^	6.7 (6.4–6.9)o	7.4 (7.1–7.6)o	6.4 (6.2–6.7)
Education								
Did not complete HS	339	6.9 (6.6–7.2)*	6.4 (6.1–6.7)*o+	7.6 (7.3–7.8)*	6.6 (6.3–6.9)*o	6.8 (6.5–7.0)*o	7.0 (6.8–7.3)*o+	6.4 (6.1–6.6)*o
High school graduate	1,189	7.0 (6.9–7.2)o	6.8 (6.7–7.0)^$	7.4 (7.3–7.6)o+	6.5 (6.3–6.6)+^‡	6.7 (6.6–6.8)+^	7.3 (7.2–7.5)^•$	6.0 (5.9–6.2)+•^
Some college	2,014	7.0 (6.9–7.1)+^	6.9 (6.8–7.0)*‡•	7.6 (7.5–7.7)•^	6.8 (6.7–6.9)+•$	6.8 (6.7–6.9)•	7.6 (7.5–7.7)*^‡■	6.3 (6.2–6.4)+‡€
College graduate	1,033	7.3 (7.2–7.5)+	7.4 (7.3–7.6)o^•	7.9 (7.8–8.0)o•‡	7.3 (7.2–7.5)*^•■	7.4 (7.2–7.5)*+	8.1 (8.0–8.2)o•‡	6.9 (6.8–7.0)*•‡
Post graduate	653	7.5 (7.3–7.6)*^o	7.6 (7.5–7.8)+$‡	8.2 (8.1–8.3)*+^‡	7.9 (7.8–8.1)o‡$■	7.5 (7.4–7.7)o^•	8.3 (8.1–8.4)+$■	7.2 (7.0–7.3)o^€
Household income								
<$15K	712	6.6 (6.4–6.8)*o	6.3 (6.1–6.5)*•+	7.1 (6.9–7.3)*o+	6.1 (5.9–6.3)*o+	6.6 (6.3–6.8)*o	7.0 (6.8–7.2)*o‡	6.0 (5.8–6.2)*o
$15K–$24.9K	631	6.8 (6.6–7.0)+•	6.4 (6.2–6.6)^‡$	7.5 (7.3–7.6)•	6.4 (6.2–6.6)^•	6.6 (6.4–6.8)+^	7.2 (7.0–7.3)•‡^	5.9 (5.7–6.1)+^•
$25K–$39.9K	895	7.0 (6.9–7.1)‡	7.0 (6.8–7.1)*^■	7.7 (7.6–7.8)*	6.7 (6.5–6.8)*‡■	6.7 (6.5–6.8)•$	7.5 (7.4–7.7)■$	6.3 (6.2–6.5)+‡$
$40K–$59.9K	946	7.2 (7.1–7.3)*+	7.1 (7.0–7.3)•‡o	7.8 (7.6–7.9)o	7.1 (6.9–7.2)o^‡$	7.1 (7.0–7.3)*+•	7.8 (7.7–8.0)o•■	6.6 (6.5–6.8)*^‡■
$60K+	2,180	7.4 (7.3–7.5)o•‡	7.4 (7.4–7.5)+$■o	7.8 (7.8–7.9)+•	7.4 (7.3–7.5)+•■$	7.2 (7.1–7.3)o^$	8.0 (8.0–8.1)*$^‡	6.9 (6.8–7.0)o•$■

Note: Matching symbols within a cell (*,*; +,+) represent statistically significant differences between categories within groups following use of non-parametric tests (e.g. the symbol, ■, next to the 18–24 yrs and 65+ yrs categories in the satisfaction with work score, denotes a statistically significant difference between groups [6.1 in 18–24 years of age versus 7.5 in the 65+ years of age]). Differences should be interpreted with caution given the large sample size.

(Table 4). Men and women reported similar levels of meaning in life, positive and negative affect, global happiness, autonomy, and competence. With respect to domain-specific life satisfaction, the greatest magnitude of difference by sex was seen for satisfaction with spiritual, religious, and philosophical beliefs (Table 5). Women also had slightly but significantly higher scores than men on satisfaction with housing, family life, friends and social life, and ability to help others. Men, however, reported more satisfaction with their energy level than did women.

Age. The youngest and the oldest adults generally had higher scale scores than middle-aged adults (e.g. Satisfaction with Life, Positive Affect, Relatedness subscale) (Table 4). However, younger adults (18–24 years and 25–44 years) had higher scores on negative affect than did older adults (45–64 years and 65+ years) (Table 4).

Respondents reported increasing satisfaction across life domains with increasing age. For example, for satisfaction with housing, for 18–24 years, 25–44 years, 45–64 years, and 65+, the scores went from 6.6, 6.8, 7.7, to 8.3, respectively (Table 5). Older adults reported more satisfaction with their education, work, spiritual, religious, and philosophical beliefs, family life, friends and social life, achievement of goals, leisure time, and sense of physical safety.

Race/Ethnicity. Differences in well-being domains by race/ethnicity varied only slightly (Table 4). For example, Hispanics and blacks generally had similar scores, except for Hispanics' significantly higher score on satisfaction with life. Whites and blacks had similar scores on positive affect, with blacks having significantly, but only slightly, higher scores on negative affect than whites (Table 4). Adults identifying themselves as having "other" race/ethnicity had significantly, but only slightly, lower scores on meaning in life than whites, blacks, and Hispanics. These "other" race/ethnicity adults also had significantly lower scores on positive affect than blacks or Hispanics but significantly more negative affect than whites. They generally had the lowest scores on the autonomy, competence, and relatedness subscales (Table 4).

Blacks have significantly lower global life satisfaction scores than Hispanics (Table 5). Whites were more satisfied with their education, housing, neighborhood, and physical safety than blacks, Hispanics, or those of other race/ethnicities. In other domains of life satisfaction, Hispanics generally had scores like those of whites but higher than those of blacks and other race/ethnicities (Table 5).

Education. Increasing educational levels were generally associated with higher well-being scores and more satisfaction across all life domains (Tables 4, 5). But, interestingly, while those at lower levels of education

experienced similar levels of positive affect as those with a post-graduate degree, they experienced significantly more negative affect and lower scores on global happiness.

Household Income. Lower annual household income levels (especially less than $40,000) were generally associated with lower levels of well-being (Table 4). Except for negative affect, global happiness, and competence, the middle income groups ($25,000–$39,999 and $40,000–$59,999) did not differ on their well-being. Income conferred clear advantages, with those at increasingly higher income levels reporting more satisfaction with life (Table 4) and higher scores on global life satisfaction (Table 5). Similarly, those with lower income levels generally reported lower levels of satisfaction across all life domains (Table 5).

CDC HRQOL Measures

The mean number of physically unhealthy days in the past 30 days was 3.9, and the mean number of days respondents indicated that they felt "very healthy and full of energy" in the past 30 days (i.e. "vitality days") was 18.9, comparable with previously reported findings (CDC, 2000). Vitality days were positively and moderately correlated with global happiness ($r = 0.46$) and positive affect ($r = 0.50$), positively but more weakly correlated with meaning in life ($r = 0.35$) and satisfaction with life ($r = 0.37$), and moderately but inversely correlated with negative affect (–0.45). Physically unhealthy days were negatively and weakly correlated with global happiness ($r = –0.23$), positive affect ($r = –0.22$), meaning in life ($r = –0.13$), satisfaction with life ($r = –0.21$), and vitality days ($r = –0.43$) and positively, but weakly correlated with negative affect ($r = 0.25$).

DISCUSSION

The results from this study confirm that scale scores were consistent with previous studies indicating a preponderance of mildly positive levels of subjective well-being in adults (Diener, 1984; Frey & Stutzer, 2002; Diener & Suh, 1999). With the exception of the autonomy, competence, and relatedness scales, all scales demonstrated good variability across socio-demographic subgroups, and differed in expected directions by socio-demographic and self-rated health subgroups. Of interest was the extensive variability seen in the domain-specific life satisfactions items—of particular interest for public health practitioners. The study findings justify the consideration of these scales for secondary data analysis.

The Satisfaction with Life Scale has a number of strengths for well-being assessment. It is one of the most extensively used and validated instruments

in well-being research; shows acceptable test–retest reliability over temporal intervals that range from 1 and 2 months to 4 years; is sensitive to life events; has been translated into multiple languages, and often serves as a criterion measure for new scales (Pavot, Diener, Colvin, & Sandvik, 1991; Magnus, Diener, Fujita, & Pavot, 1993; Pavot, 2008; Pavot & Diener, 2009; Larsen & Eid, 2008). Findings from the Satisfaction with Life Scale in this study parallel results from studies using select samples (e.g. college students, nurses) demonstrating that most respondents are classified as being slightly satisfied to satisfied with life (Pavot & Diener, 2009). However, in this large population-based study, those identifying themselves as "other" race/ethnicity, those with lowest levels of education, and those at lower household income levels were significantly less satisfied with life. These differences may reflect differences in the contextual or social conditions of these subgroups at the population level and highlight the benefits that higher education and income confer on satisfaction with life.

Findings from the single global life satisfaction item were comparable with several previous studies (World Values Study Group, 1994; Frey & Stutzer, 2002). A single common metric of overall life satisfaction is a suitable summary measure of well-being as it can tap into the quality of life relative to one's priorities (Kahneman, 1999; Dolan et al., 2006; Haybron, 2008). Global evaluations of life can be influenced by a respondent's current mood, but this is a less influential determinant of well-being than beliefs about progress toward major life goals (Morris, 1999). The robust correlation seen in this study between global life satisfaction and satisfaction with achievement of goals supports this finding.

Older adults, those with a post-graduate degree, and those living in households earning $60,000 or more reported the highest levels of global life satisfaction. Older adults may have accumulated more wealth, accomplished more goals over their lifespan, and have access to more health and social services that confer satisfaction with life. Education, occupational status, income, and associated social status may all function synergistically to positively influence global life satisfaction (Argyle, 1999).

Findings from this study using the Meaning in Life scale indicate that most adults perceive that their life has a sense of meaning and purpose, consistent with previous findings (Steger, Oishi, & Kashdan, 2009). In general, the response pattern for the Positive Affect subscale and for the global happiness item did not differ by demographic characteristics. For both measures, men and women reported similar levels of positive affect, consistent with some previous findings, but inconsistent with others perhaps due to interaction effects between age and gender (Fujita, Diener, & Sandvik, 1991; Haring, Stock, & Okun, 1984; Inglehart, 2002). The U-shaped distribution of positive affect by age was also consistent with previous studies (Argyle, 1999). Adults in the middle age groups might face more challenges associated with changing

life roles (e.g. marriage, parenthood, career transitions) and with the lack of economic and social service programs that buffer younger or older adults (e.g. student health insurance; Medicare benefits). The Positive Affect subscale varied slightly more than the global happiness item by race/ethnicity, education, and household income, highlighting differences in recent versus global assessments of positive emotions. But the findings by race/ethnicity might be confounded with education and income, as other studies have found (Veenhoven, 1994). Additional multivariate studies with these data are warranted and subgroup differences will be further elucidated with tests of differential item functioning.

Negative affect varied most consistently by education and income but less so by age. Those who did not complete high school had significantly more negative affect, perhaps indicating the life struggles (e.g. lower wages; unfulfilling work) that may accompany lower educational status and lower household income levels. How the ratio of positive to negative affect is distributed in these subgroups may merit additional study to help identify particularly vulnerable adults with low subjective well-being (Diener et al., 2009).

The Autonomy, Competence, and Relatedness subscales showed less variability within and across the demographic groups. But findings from this study suggest that American adults perceive substantial mastery and autonomy of their lives, feel fairly competent in their actions, and have positive experiences associated with their social connections. An important exception to this lack of variability was in the level of competence by household income, with those in households earning less than $15,000 per year reporting significantly less competence in their actions than those in households earning $40,000 or more. Significant but insubstantial differences in relatedness among subgroups were most likely due to the large sample size.

Perhaps the most interesting findings from this study are the observed differences in domain-specific life satisfaction. Few studies exist that have examined associations between domain satisfaction and global life satisfaction (Schimmack, 2008) but one study found less robust correlations among some domains (Heller, Watson, & Hies, 2004). In almost all cases, values in this study were above the midpoints of item scales. Except for satisfaction with spiritual, religious, philosophical beliefs, increasing education and income were associated with greater levels of satisfaction across all other domains, highlighting the importance of these critical resources on life. Contextual factors such as housing, education, work, family, work-life, and health are amenable to public policy intervention.

Societies and policy-makers need objective social indicators, economic indicators, and subjective indicators to appraise the full range of a population's well-being because each type of indicator offers complementary information in understanding population well-being (Diener & Suh, 1999; Dolan et al., 2006). For psychological studies, it is important to have very precise

and detailed measures for a multifaceted construct such as well-being (Frey & Stutzer, 2002). However, for surveillance, often a broad snapshot of what is going on in the population is often enough to inform more detailed studies (Teutsch & Churchill, 1994). Space is at a premium on surveillance systems, and extensive multi-item scales are expensive in cost and time and can rarely be supported and sustained. As seen in HRQOL assessment, brief, global items tapping into physical and mental health domains are psychometrically robust and useful as broad population outcomes relevant for public policy (Hagerty et al., 2001; Institute of Medicine, 2008; CDC, 2009a). Additionally, as seen in almost two decades of HRQOL assessment in the US, states and communities may be interested in and/or can financially support two to four specific items that indicate a few domains (i.e. physically and mentally unhealthy days, and activity limitation days) (CDC, 2009a). While single items have been supported in the past on public health surveillance systems, use of additional well-being items might help assess important differences between people in specific life domains (e.g. positive affect, negative affect, energy level, satisfaction with housing) that might help identify particularly vulnerable groups to guide intervention or to evaluate policy outcomes.

LIMITATIONS

This study has several limitations. First, these data are self-reported. Second, these data are cross-sectional so that no causal associations can be made between well-being levels and associated variables. Third, while the sampling design was designed to be representative, selection bias arising from differences in participants not accounted for by the sampling weights applied might have occurred (e.g. more optimistic orientation among respondents). Fourth, because HealthStyles requires fluency in English, ability to understand written questions, and functional capacity, this study may have excluded adults who did not speak English, adults with severe limitations, and those with limited education. Fifth, the psychometric findings in this preliminary evaluation are based only on classical test theory methods, thus limiting some conclusions regarding construct validity. However, exploratory and confirmatory factor analysis and IRT analyses are under way, and findings will be reported in future papers. Sixth, the data were substantially skewed. While non-parametric statistics were used to explore differences in scale scores, future studies could use ordinal regression or other statistical methods to more appropriately account for the ordinal response scales used in these well-being questionnaires. While parameter estimates will differ using such methods, it is unlikely to affect the overall conclusions regarding the distribution of well-being by subgroups found in this study. Finally and perhaps most importantly, while the large and representative sample of adults were

strengths of this study, well-being differences seen in some subgroups probably reflected the large sample size rather than any substantive differences between groups.

FUTURE DIRECTIONS

CDC plans to continue with advanced psychometric evaluation of the questions and scales used in this study to identify scales or IRT-derived short-forms that are valid, brief, and tap into physical, mental, and social well-being, and that are suitable for inclusion in telephone surveys. Following recent methods used to inform the development of the Patient-Reported Outcomes Measurement Information System (PROMIS), several psychometric evaluation studies beyond this initial study are planned (Reeve et al., 2007). Advanced psychometric methods including exploratory and confirmatory analyses and Item Response Theory (IRT) analyses will be conducted. Differential item functioning across key subpopulations using IRT-based approaches will also be examined. Finally, we will conduct confirmatory factor analyses to evaluate associations among latent constructs and will conduct multivariate analyses further examining associations between independent (e.g. domain-specific life satisfaction) and dependent (e.g. global life satisfaction) variables. Plans are under way to support some of these scales on several states' 2010 BRFSS to continue pilot testing. As part of an evolving and flexible process, additional questions that assess domains currently excluded (e.g. social support) due to study limitations will be included in future studies. As part of the Healthy People 2020 process, with advances in IRT and related methodologies, and with different stakeholder needs (cross-cultural use), different scales that measure physical, mental and social well-being may be tested.

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