

# Toward Health Promotion: Physical and Social Behaviors in Complete Health

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**Objective:** To examine the effects of physical and social behaviors on "complete health." **Methods:** "Complete health" was constructed from measures of physical and mental health collected through the National Survey of Midlife Development in the United States (MIDUS; n=3032). Multinomial regression models examined the association of complete health with physical and social behaviors. **Results:** The odds of complete health were greatest

among those who exercised, never smoked, attended church regularly, and had frequent contact with friends. Some "social" behaviors exerted effects comparable to "physical" behaviors. **Conclusions:** Interventions targeting social behaviors may yield similar gains to complete health as physical behaviors.

**Key words:** complete health, lifestyle, optimal health, health behaviors, social behaviors

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Conceptually, health promotion is devoted to helping individuals maintain or move toward optimal health, a state characterized by the absence of disease and the presence of both physical and mental health.<sup>1</sup> In practice, health promotion researchers and practitioners focus on behaviors that minimize the risk of morbidity, particularly physical morbidity. Thus, health promotion practice tends to be one-dimensional and pathogenic in nature. Because it imposes limits on individuals' abilities to achieve optimal health, morbidity pre-

vention is clearly an important step toward optimal health. However, risk factor reduction is not equivalent to promoting optimal health.

Indeed, Breslow<sup>2</sup> challenged health care professionals to move "from disease prevention to health promotion," a transition that requires 2 steps. First, researchers need comprehensive measures that simultaneously assess individuals' health status as well as their "capacities for living." This step requires viewing the absence of illness and the presence of well-being as separate and equally important concepts and the recognition that well-being is not unilaterally conditional upon the absence of illness or morbidity. Second, research must be undertaken using this comprehensive assessment of health as a benchmark and dependent variable to differentiate potential targets for intervention for achieving optimal health from those that yield one-dimensional gains in either morbidity reduction or enhancements to well-being.

Keyes and Grzywacz<sup>3</sup> offered a measurement scheme for capturing the multidimensional absence of morbidity as

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well as the multidimensional presence of well-being, and the measure behaved in expected ways in descriptive analyses. Paralleling the idea that members of socioeconomically advantaged groups represent the vanguard for optimal health, multivariate analyses indicated that the odds of being classified as "completely healthy" in contrast to "completely unhealthy" increased as education and household earnings increased. Likewise, paralleling evidence indicating that disease impacts the quality of life of younger adults more than that of older adults, the odds of being classified as having "incomplete health" (eg, good mental health but less than optimal physical health) in contrast to complete poor health were greater among older adults (eg, 55-74). Thus, although the authors openly acknowledge that the measurement scheme is not perfect, the operationalization of complete health was able to classify individuals in predictable ways.

Measurement schemes like complete health enable critical evaluation of different targets for intervention to promote enhanced capacities for living. Armed with epidemiological data indicating that lifestyle practices are highly predictive of disease, disability, and death,<sup>4,5</sup> health promotion professionals have constructed interventions that focus on behaviors such as exercise, smoking, and diet.<sup>6,7</sup> Unfortunately, whereas there is increasing evidence that lifestyle interventions reduce the burden of illness and poor health, particularly in the context of worksites,<sup>8,9</sup> there is little direct evidence indicating that wellness program interventions targeting these behaviors promote a state of health that is more than the absence of illness. Given the central role of these behaviors in practice, it is important to identify if these behaviors contribute to the conceptual target of health promotion: complete health.

Although the absolute impact of lifestyle behaviors such as exercise, diet, and smoking on optimal health is important, the *relative* impact of these personal health behaviors in contrast to other targets for potential intervention is equally important. In particular, socially integrative behaviors such as volunteering, group membership, and interpersonal contact with family and friends have comparably strong effects on early death and disability as do lifestyle practices such as exer-

cise and smoking.<sup>10-12</sup> Evidence from the Alameda County data indicated, for example, that premature death was over 2 times more likely among individuals with low, compared with high, levels of socially integrative behaviors, and the magnitude of this effect was similar to those for individual health behaviors alone or the composite index of health practices referred to as the "Alameda 7."<sup>13</sup> Moreover, earlier analyses of these data indicated that importance of social ties did not dramatically differ across the life span.<sup>11</sup> Echoing comments made in 1959 by one of the first contemporary proponents of "high-level wellness,"<sup>14</sup> scholars now contend that infrequent or sporadic human fellowship and engagement in social life is far more devastating to population health than are individual health practices.<sup>15,16</sup> Interventions promoting social ties and integration have not become standard features of the health promotion agenda, however, and "selective" oversights such as this are one common criticism of contemporary health promotion practice.<sup>17,18</sup> Therefore, an important next step is investigating the relative predictive power of socially integrative behavior and physical health behavior for complete health.

The specific aim of this study was to examine the unadjusted and adjusted associations between various personal (eg, exercise, smoking, diet) and social (eg, volunteerism, religious activity, group membership) lifestyle behaviors with categories of complete health.<sup>3</sup>

## METHOD

### Design

Cross-sectional data from the National Survey of Midlife Development in the United States (MIDUS) were used in this study. The data were collected in 1995 by the John D. and Catherine T. MacArthur Foundation Network on Successful Midlife Development to examine patterns, predictors, and consequences of successful midlife development in the areas of physical health, psychological well-being, and social responsibility. Given this explicit focus for the data generation and collection, the MIDUS is particularly well suited for studying optimal health.

### Sample

Random-digit dialing was used to select MIDUS respondents from



noninstitutionalized English-speaking adults aged 25-74 and living in the 48 contiguous states in a household that included at least one telephone. Respondents who agreed to participate in the study took part in a computer-assisted telephone survey that lasted about 30 minutes. Respondents were then mailed 2 self-administered questionnaire booklets that took approximately 1.5 hours to complete. Although there was some overlap in the content of the telephone and self-administered questionnaires (eg, aspects of employment, global self-reports of health), the self-administered questionnaires were much more expansive in scope (both sets of items are available through the ICPSR at <http://www.isr.umich.edu/src/midus/>). The analytic sample used in this study consisted of the respondents who completed both the telephone interview and the mailback questionnaires (n=3032).

The response rates for the telephone interview and mailback questionnaires were 70% and 86.8% respectively, yielding an overall response rate of 60.8% for both parts of the survey. Sampling weights correcting for selection probabilities and nonresponse allow this sample to match the composition of the US population on age, sex, race, and education based upon the October 1995 Current Population Survey (for detailed technical report regarding field procedures, calculation of estimated response rate for the telephone-administered portion of survey, and weighting, see <http://midmac.med.harvard.edu/research.html#tchrpt>).

**Dependent variables.** Complete health was operationalized using the strategy outlined by Keyes and Grzywacz.<sup>3</sup> The operationalization is based on a multifactorial, multidimensional model. The multifactorial portion of the model suggests that health has a physical, social, and psychological component; however, consistent with previous recommendations,<sup>19</sup> psychological and social health are collapsed into mental health because evidence suggests that these dimensions of health are intimately connected and perhaps reciprocal.<sup>20</sup> The multidimensional portion of the model suggests that each factor or domain of health (ie, physical and mental) is represented by objective and subjective dimensions. The objective dimensions are indicated by the relative presence of objective morbidity

(eg, diagnosable hypertension or depression), whereas the subjective dimensions are indicated by the subjective evaluations of physical and mental health.<sup>21,22</sup>

The construction of the complete-health construct proceeds in a 2-step fashion. First, optimal health was constructed within each factor or domain of health. Table 1 provides an outline of the indicators used at this step as well as the decision rule for characterizing domain-specific optimal health. Individual measures employed at this stage of the operationalization have been demonstrated to be reliable and valid, and they have been widely used in separate literatures. For example self-reported health status is widely accepted as a valid indicator of both objective and subjective health status,<sup>23,24</sup> and there is substantial evidence in the psychiatric, psychological, and sociological literatures supporting the reliability and validity of the mental illness and subjective well-being measures as they have been employed in these and other data.<sup>25-31</sup> (Because a specific reporting would be redundant, readers interested in the psychometric properties of the specific measures used at this stage are encouraged to review Keyes and Grzywacz's original presentation.) At the second step, complete health was constructed by cross-classifying physical and mental health creating several mutually exclusive categories, including (a) *complete health* (low/no physical morbidity and high physical well-being, coupled with low/no mental morbidity and high mental well-being), (b) *complete ill health* (high physical morbidity and low physical well-being coupled with high mental morbidity and low mental well-being), and (c) *incomplete health*. To be consistent with the original operationalization of complete health, 4 categories of incomplete health were specified: (a) physically healthy but mentally unhealthy, (b) physically unhealthy but mentally healthy, (c) partly physically healthy but mentally unhealthy, and (d) partly physically healthy but mentally healthy.

**Independent variables.** Proxies of 4 health behaviors were operationalized nominally or categorically to capture specific lifestyle practices related to health frequently encountered in health promotion practice. Regular vigorous exercise was coded 1 if respondents reported "engaging in vigorous physical activity long

**Table 1**  
**Overview of Strategy for Constructing a**  
**Measure of Complete Health**

	Objective	Subjective	Classification Rule
<b>Physical Health</b>	Presence of: * <i>Chronic conditions</i> assessed with a self-report index asking if the respondent had been treated in the past 12 months for 29 common chronic conditions (eg, asthma, high blood pressure, arthritis) * <i>Functional impairment</i> was assessed with indices of restrictions to daily living adapted from the Medical Outcomes Study. <sup>48</sup>	* <i>Self-appraised physical health status</i> on a scale ranging from 0 (worst possible health) to 10 (best possible health) * <i>Self-reported energy level</i> today in contrast to 5 years ago.	Individuals were classified as having optimal physical health if they reported: -one or fewer chronic conditions -one or fewer functional limitations -7 or higher physical health status -same or better energy level today.
<b>Mental Health</b>	Presence of: * Major depressive episode, generalized anxiety disorder, or panic disorder within the past 12 months assessed by Composite International Diagnostic Interview Short Form Scales. <sup>25</sup>	* Emotional well-being assessed using a single item of life satisfaction and a scale of positive affect. <sup>28</sup> * Psychological well-being assessed using a 6-dimensional scale assessing the extent to which individuals see themselves thriving in their personal lives. <sup>29</sup> * Social well-being assessed using a 5-dimensional scale assessing the extent to which individuals see themselves thriving in their social life. <sup>31</sup>	Individuals were classified as having optimal mental health if they: -Did not meet DSM-III-R criteria for panic, generalized anxiety, or major depressive disorders AND -Scored in the upper tertile of 1 of the 2 measures of emotional well-being and 6 of the 11 positive functioning measures (ie, psychological and social well-being scales)

enough to work up a sweat" several times per week or more during both the summer and winter months. Likewise, regular moderate activity was coded 1 if respondents reported "engaging in moderate physical activity" several times per week or more during the summer and winter months. Although it is difficult to ascertain if the reported activity is attributed to occupation or leisure time, short self-report items such as those used in this study are highly correlated with scores from more extensive self-reports of physical activity as well as physiological markers of fitness.<sup>32,33</sup> A dichotomous obesity measure constructed from self-reported height and weight served as a proxy for eating habits and was calculated using the Quetelet index; individuals

whose body mass index was greater than 30 were coded as 1. Finally, smoking status was operationalized into 3 categories representing individuals who had never smoked, those who were former smokers, and those who were current smokers.

Four behaviors reflecting social integration were also operationalized categorically or nominally. Using a single question asking, "How often do you usually attend religious or spiritual services?" 3 categories of church attendance were constructed reflecting regular/weekly attendance (ie, more than once a week or about once a week), monthly attendance (ie, one to three times a month), or rare attendance (ie, less than once a month or never). Individuals who reported volun-



**Table 2**  
**Bivariate Associations Between Lifestyle Behaviors**  
**and Complete Health**

		Completely Unhealthy	Partly Physically Healthy, Mentally Unhealthy	Physically Healthy, Mentally Unhealthy	Physically Unhealthy, Mentally Healthy	Partly Physically Healthy, Mentally Healthy	Completely Healthy	$\chi^2$
	<b>Total</b>	567 18.7%	228 7.6%	85 2.8%	804 26.6%	761 25.2%	574 19.0%	
<b>Vigorous Exercise</b>								$\chi^2=206.05$
Several Times/week	25.1%	15.5%	7.0%	4.1%	14.6%	29.3%	33.4%	df = 5
<Several Times/week	74.4%	24.8%	7.8%	2.4%	30.6%	23.8%	14.2%	P < .001
<b>Moderate Activity</b>								$\chi^2=102.45$
Several Times/week	47.4%	14.9%	8.2%	3.6%	21.1%	28.5%	23.7%	df = 5
<Several Times/week	52.1%	22.4%	7.0%	2.2%	31.5%	22.1%	14.8%	P < .001
<b>Body Mass Index</b>								$\chi^2=111.99$
Non obese	76.4%	17.1%	8.2%	3.4%	23.5%	26.4%	21.5%	df = 5
Obese (BMI = 30)	21.2%	25.7%	5.8%	6%	36.2%	21.1%	10.0%	P < .001
<b>Smoking Status</b>								$\chi^2=96.62$
Never Smoked	47.0%	14.4%	7.2%	2.5%	26.0%	27.4%	22.6%	df = 10
Former Smoker	28.6%	17.3%	6.7%	3.6%	29.9%	24.9%	17.6%	P < .001
Current Smoker	24.3%	29.0%	9.4%	2.6%	23.9%	21.3%	13.8%	
<b>Church Attendance</b>								$\chi^2=50.29$
Regular/Weekly	36.5%	14.5%	6.2%	2.0%	29.7%	26.2%	21.4%	df = 10
Monthly	13.2%	19.3%	5.8%	2.8%	24.3%	25.8%	22.3%	P < .001
Rarely	50.3%	21.7%	9.1%	3.5%	25.0%	24.3%	16.4%	
<b>Volunteering</b>								$\chi^2=36.73$
Yes	40.4%	14.0%	6.8%	2.5%	28.8%	26.8%	20.9%	df = 5
No	59.6%	22.0%	8.1%	3.0%	25.1%	24.1%	17.7%	P < .001
<b>Group Involvement</b>								$\chi^2=53.88$
Yes	39.9%	13.3%	6.4%	2.6%	27.5%	28.7%	21.6%	df = 5
No	60.1%	22.4%	8.4%	3.0%	26.0%	22.9%	17.3%	P < .001
<b>Contact with Friends</b>								$\chi^2=15.55$
Daily	30.3%	20.2%	7.3%	2.9%	28.2%	23.6%	17.9%	df = 10
Weekly	46.2%	18.2%	7.1%	2.5%	26.0%	27.5%	18.7%	P < .001
Monthly or less	23.5%	17.4%	9.0%	3.5%	25.1%	23.1%	21.8%	

**Note.**

Weighted estimates from the National Survey of Midlife Development in the United States (MIDUS) collected in 1995 by the John D. and Catherine T. MacArthur Foundation's Network on Successful Midlife Development.

teering for an hour or more in the past month were coded as 1 for this behavior, zero otherwise. A proxy for social group involvement was constructed from 2 items asking, (a) "In a typical month, about how many times do you attend meetings of sports or social groups?" or (b) "In a typical month, about how many times do you attend meetings of other groups other than those required by your job?" Individuals who responded 1 or more to either question were coded as 1 for group involvement, zero otherwise. Finally, fre-

quency of contact with friends was categorized as daily (ie, several times a day or about once a day), weekly (ie, several times a week or about once a week), or monthly or less (ie, 2-3 times/month, about once a month, less than once a month, or never or hardly ever) in response to a question asking, "How often are you in contact with any of your friends, including visits, phone calls, letters, or electronic mail messages?"

**Covariates.** Age, gender, minority ethnic status, marital status, educational

**Table 3**  
**Multinomial Estimates of the Association Between Lifestyle Practices and Complete Health Status**

	Partly Physically Healthy, Mentally Unhealthy versus Completely Unhealthy		Physically Healthy, Mentally Unhealthy versus Completely Unhealthy		Physically Unhealthy, Mentally Healthy versus Completely Unhealthy		Partly Physically Healthy, Mentally Healthy versus Completely Unhealthy		Completely Healthy versus Completely Unhealthy	
	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)
Regular Vigorous Exercise	.29	1.33 (.89-1.99)	.66 <sup>a</sup>	1.93 (1.14-3.27)	-.04	.82 (.70-1.32)	.40 <sup>b</sup>	1.49 (1.11-2.01)	.94 <sup>a</sup>	2.57 (1.89-3.49)
Regular Moderate Activity	.44 <sup>b</sup>	1.56 (1.11-2.18)	.84 <sup>a</sup>	2.31 (1.39-3.85)	.10	1.11 (.87-1.41)	.54 <sup>a</sup>	1.71 (1.34-2.18)	.54 <sup>a</sup>	1.72 (1.32-2.24)
Not Obese	.62 <sup>b</sup>	1.86 (1.26-2.76)	2.08 <sup>a</sup>	8.03 (2.88-22.36)	.07	1.07 (.85-1.36)	.63 <sup>a</sup>	1.88 (1.45-2.44)	1.14 <sup>a</sup>	3.14 (2.29-4.31)
Smoking Status										
Never smoked	.48 <sup>c</sup>	1.62 (1.09-2.39)	.52 <sup>d</sup>	1.68 (.93-3.04)	.63 <sup>a</sup>	1.89 (1.42-2.50)	.86 <sup>a</sup>	2.36 (1.78-3.14)	1.00 <sup>a</sup>	2.73 (1.98-3.74)
Former smoker	.33	1.39 (.92-2.09)	.64	1.90 (1.04-3.49)	.29 <sup>c</sup>	1.33 (1.00-1.77)	.34 <sup>c</sup>	1.43 (1.06-1.92)	.46 <sup>b</sup>	1.58 (1.13-2.21)
Church Attendance										
Regular/Weekly	-.04	.96 (.65-1.39)	-.03	.92 (.57-1.67)	.06	1.06 (.82-1.36)	.14	1.15 (.89-1.49)	.50 <sup>a</sup>	1.65 (1.25-2.18)
Monthly	-.12	.89 (.54-1.47)	-.31	.73 (.34-1.58)	.20	1.22 (.87-1.72)	.14	1.15 (.81-1.63)	.40 <sup>c</sup>	1.49 (1.09-2.17)
Volunteering in Past Month	.15	1.16 (.82-1.65)	-.05	.96 (.57-1.59)	.23 <sup>d</sup>	1.26 (.97-1.60)	.13	1.14 (.89-1.46)	.09	1.09 (.84-1.42)
Group Involvement	-.07	.93 (.66-1.31)	-.09	.91 (.56-1.49)	.23 <sup>d</sup>	1.2 (.99-1.59)	.26 <sup>c</sup>	1.29 (1.02-1.65)	.08	1.09 (.84-1.41)
Contact with Friends										
Daily	-.08	.92 (.60-1.38)	-.20	.82 (.45-1.51)	.35 <sup>c</sup>	1.42 (1.06-1.90)	.40 <sup>b</sup>	1.49 (1.10-2.02)	.41 <sup>c</sup>	1.51 (1.08-2.10)
Weekly	-.08	.92 (.63-1.35)	-.02	.98 (.57-1.70)	.30 <sup>c</sup>	1.35 (1.03-1.76)	.45 <sup>a</sup>	1.58 (1.19-2.08)	.45 <sup>b</sup>	1.57 (1.16-2.13)
Intercept	-1.52		-3.35		-2.25		-2.63		-3.49	

**Note.**

Unweighted estimates from the National Survey of Midlife Development in the United States collected in 1995 by the John D. and Catherine T. MacArthur Foundation's Network on Successful Midlife Development Models adjust for the effects of age, gender, race, education, household earnings, and marital status.

a  $P < .001$  (2 tailed)

b  $P < .01$

c  $P < .05$

d  $P < .10$

attainment, and household earnings were controlled for in the multivariate analyses.

**Analyses**

Bivariate associations between the lifestyle factors and complete health were

first examined using chi-square analyses. Because demographic factors reflective of social location including age, gender, race, education, income, and marital status have been linked to both physical and mental health as well as various lifestyle practices,<sup>34,35</sup> multivariate analy-



ses were also undertaken. The multivariate analyses present 2 perspectives on the issue. First, based on the concept of salutogenesis, which argues that – given the sheer prevalence of disease – poor health is the normative state of the human organism and that good health is actively constructed,<sup>36,37</sup> multinomial regression models were first specified to examine the independent effects of each of the lifestyle practices on the relative odds of being in various categories of incomplete health or complete health in contrast to complete ill health. Second, to better identify the pathogenic processes or the extent to which good health deteriorates, models were also specified to identify which behavioral practices increase the relative odds of being in incomplete health in contrast to complete health. In all the multivariate models age, gender, race, education, income, and marital status were adjusted to attenuate for spuriousness. Findings were unchanged by applying the sampling weights to the data (see reference above); consequently, only the results of the unweighted results are presented.<sup>38</sup>

## RESULTS

The analytic sample for this study was middle-aged ( $M=45.3$ ;  $SD=13.5$ ), predominantly white (81.9%), and married (68.1%). The modal level of education in the sample was a high school degree or general equivalency degree, and the modal household income was between \$25,000 and \$49,000.

As reported in the earlier study with these data,<sup>3</sup> 18.7% of this noninstitutionalized sample were in complete ill health, 2.8% were physically healthy but lacked mental health, whereas another 26.6% were mentally healthy but lacked physical health (Table 2). In addition, 7.6% had partial physical health (either good subjective health or lacked physical morbidity) and were mentally unhealthy, and another 25.2% had partial physical health and good mental health. About one in 5 respondents or 19.0% were completely healthy. Less than one third of adults engaged in regular vigorous activity, although nearly one half of the population reported engaging in regular moderate activity. One in 5 adults in this sample was categorized as being obese in contrast to the Behavioral Risk Factor Surveillance Systems esti-

mate of 30% for 1995 (the year these data were collected). Nearly one in 4 respondents in this sample was a current smoker, reflecting a somewhat higher estimate from the same period from the BRFSS (ie, 22.4%).

Approximately one half of the sample reported attending religious or spiritual services weekly or once a month, and about 40% reported volunteering an hour or more in the previous month, and 40% were members of a social group. In contrast, fully 3 quarters of the sample reported either daily or weekly contact with friends.

Bivariate analyses indicated that levels of all physical and social behaviors (except for contact with friends) were associated with complete health (Table 2). Individuals who engaged in regular vigorous and moderate activity were disproportionately represented in the complete health and partially physically healthy and mentally healthy categories, whereas those who were not physically active were more commonly found in the completely unhealthy or the incomplete health category of physically unhealthy but mentally healthy. A greater percentage of obese than non obese respondents were categorized as completely unhealthy whereas more non obese than obese respondents were classified as completely healthy. Nearly one in 4 individuals who never smoked was completely healthy, compared with less than one in 5 former smokers and one in 7 current smokers. By contrast, nearly one in 3 current smokers was completely unhealthy compared with one in 7 individuals who had never smoked. In short, more completely healthy individuals participated in regular exercise, maintained a healthy weight, and were nonsmokers than incompletely healthy or completely unhealthy individuals.

Individuals who engaged in social health behaviors were more consistently represented in various "incomplete health" classifications. The prevalence of complete ill-health was lowest for individuals who attended church weekly and highest among those who attended rarely or never. Nearly 55% more people who rarely attend church than those who attend regularly or weekly completely lack mental health when they have complete or partial physical health, suggesting that religiousness may promote or maintain mental health regardless of an individuals'

**Table 4**  
**Multinomial Estimates of the Association Between Lifestyle Practices and Incomplete Health Status**

	Partly Physically Healthy, Mentally Unhealthy versus Completely Healthy		Physically Healthy, Mentally Unhealthy versus Completely Healthy		Physically Unhealthy, Mentally Healthy versus Completely Healthy		Partly Physically Healthy, Mentally Healthy versus Completely Healthy	
	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)	<i>b</i>	OR (CI)
Regular Vigorous Exercise	-.72 <sup>a</sup>	.49 (.33-.73)	-.30	.74 (.44-1.28)	-1.00 <sup>a</sup>	.37 (.28-.49)	-.55 <sup>a</sup>	.58 (.44-.74)
Regular Moderate Activity	-.08	.93 (.65-1.32)	.28	1.32 (.77-2.27)	-.40 <sup>b</sup>	.67 (.52-.87)	.04	1.04
Not Obese	-.58 <sup>b</sup>	.56 (.36-.88)	.87	2.38 (.84-6.77)	-1.00 <sup>a</sup>	.37 (.27-.50)	-.48 <sup>b</sup>	.62 (.81-1.34)
<b>Smoking Status</b>								
Never Smoked	-.40	.67 (.44-1.03)	-.25	.78 (.40-1.52)	-.27	.78 (.55-1.05)	-.17	.85 (.62-1.17)
Former Smoker	-.09	.92 (.57-1.47)	.53	1.70 (.86-3.35)	-.11	.89 (.63-1.27)	-.10	.90 (.64-1.27)
<b>Church Attendance</b>								
Regular/Weekly	-.57 <sup>b</sup>	.57 (.38-.83)	-.64 <sup>c</sup>	.53 (.30-.93)	-.43 <sup>a</sup>	.65 (.50-.85)	-.32 <sup>c</sup>	.73 (.56-.94)
Monthly	-.61 <sup>c</sup>	.54 (.32-.92)	-.64	.53 (.24-1.14)	-.28	.76 (.53-1.09)	-.22	.81 (.57-1.14)
Volunteering in Past Month	.06	1.06 (.73-1.53)	-.11	.90 (.53-1.53)	.16	1.17 (.91-1.51)	.04	1.04 (.81-1.33)
Group Involvement	-.16	.85 (.60-1.22)	-.11	.89 (.53-1.49)	.10	1.10 (.86-1.41)	.15	1.16 (.91-1.47)
<b>Contact with Friends</b>								
Daily	-.41	.66 (.42-1.04)	-.66 <sup>c</sup>	.52 (.27-.98)	-.01	.99 (.70-1.38)	.12	1.12 (.81-1.56)
Weekly	-.50 <sup>c</sup>	.61 (.40-.92)	-.57 <sup>d</sup>	.57 (.32-1.01)	-.06	.94 (.69-1.28)	.09	1.10 (.81-1.49)
Intercept	1.95		.39		1.27		.94	

**Note.**

Unweighted estimates from the National Survey of Midlife Development in the United States collected in 1995 by the John D. and Catherine T. MacArthur Foundation's Network on Successful Midlife Development Models adjust for the effects of age, gender, race, education, household earnings, and marital status.

a  $P < .001$  (2 tailed)

b  $P < .01$

c  $P < .05$

d  $P < .10$



physical health status. A higher percentage of people who do not volunteer were completely unhealthy; volunteers were more likely to be completely healthy or to be mentally healthy and partially physically healthy. Similarly, a higher percentage of people who are not members of civic groups were completely unhealthy, whereas a slightly greater percentage of those who were group members were completely healthy or were mentally healthy and partially physically healthy.

Table 3 contains the results of multinomial models testing whether lifestyle practices differentiate individuals in various types of incomplete health or complete health from those in complete ill health. The first 2 models contrast individuals who are physically healthy (ie, partially or fully) but mentally unhealthy with those who are completely unhealthy. The odds of being partially physically healthy but mentally unhealthy in contrast to completely unhealthy are greater for those who in engaged in regular moderate activity, were not obese, and had never smoked. Similarly, the odds of being physically healthy but mentally unhealthy rather than complete ill health were greater for those who were not obese and those who engaged in regular vigorous and moderate activity.

The next 2 models reported in Table 3 differentiate individuals who lack all or some of the attributes of physical health but have good mental health, with those who are completely unhealthy. The odds of being physically unhealthy but mentally healthy rather than completely unhealthy are greater for nonsmokers (particularly those who never smoked) and individuals who have daily or weekly contact with their friends (Model 3). Individuals who are partially physically healthy and mentally healthy are differentiated from those who are completely unhealthy by engaging in regular vigorous and moderate activity, not being obese, never smoking or being a former smoker. Social behaviors like group involvement and contact with friends (daily or weekly) also differentiated individuals who have partially good physical health and good mental health from those who are completely unhealthy.

The final model reported in Table 3 differentiated individuals who were completely healthy from those who were completely unhealthy. The odds of being

completely healthy were significantly greater for individuals who engaged in regular vigorous exercise and regular moderate physical activity, as well as for those who were not obese and who were not smokers. Additionally, in contrast to those who rarely attend religious services or visit friends infrequently (ie, less than monthly), individuals who attend religious services weekly or several times a month, and those who have more frequent contact with their friends, were more likely to be completely healthy. In short, completely healthy individuals are different from completely unhealthy individuals in terms of both risk-reduction behaviors (ie, not smoking and exercise) as well as socially integrative behaviors (ie, religious and civic group involvement).

Whereas the results so far suggest that physical and social behaviors may minimize the risk of complete ill health, they do not systematically demonstrate whether these behaviors contribute to complete health. Table 4 changes the contrast group to investigate whether physical and social behaviors differentiate individuals in complete health from those in incomplete health. Across nearly all the models, the odds of being in categories of incomplete health were significantly lower for individuals who engaged in regular vigorous exercise and those who were not obese. Smoking status and regular moderate activity, however, did not differentiate individuals in complete health from those in incomplete health. Additionally, in contrast to those who rarely attend religious services, those who attended regularly or weekly had lower odds of being in various types of incomplete health. Results also suggest that regular (ie, daily or weekly) social contact with friends may contribute to complete health by decreasing the odds of having good physical health but poor mental health.

## DISCUSSION

The primary goal of this study was to develop a better understanding of the behavioral underpinnings of complete health to promote a more comprehensive approach to health promotion. Such understanding is essential to assure that health promotion research and practice are focused on determinants that actually bring about a state of health that is characterized by more than the absence of illness. Findings suggest that the be-



havioral lifestyle factors typically targeted in health promotion programs such as exercise and smoking cessation can contribute to complete health and that other behaviors infrequently targeted for intervention are also associated with health states characterized by the absence of physical and mental morbidity and the presence of physical and mental vitality. That is, a lifestyle characterized by socially integrative behaviors may also promote complete health.

Given the nature of this study, it is appropriate to emphasize its limitations before discussing the results of the study and possible implications for health promotion practice. First, the direction of causality in the current study cannot be asserted with these cross-sectional data. Although longitudinal evidence indicates that the kinds of behaviors examined in this study do affect physical and mental health, health is also an important resource that enables participation in regular exercise,<sup>39</sup> and physical and mental illnesses may compromise or inhibit involvement in social activities. Although future research should fully examine the possibility of reverse causality, this limitation does not minimize the important finding suggesting that social behaviors may be equally important as health behaviors for promoting complete health. More specifically, reverse causality may inflate the parameter estimates of association; however, there is no reason to suspect that this inflation would be greater the social behaviors in contrast to the health behaviors. Indeed, if anything, the biases should be strongest for the health behaviors such as exercise because they would be most sensitive to health status.

Overfitting is another possible limitation. Despite the fact that it is large and nationally representative, the division of the sample into groups based upon individuals' health profiles created some small cells in the overall contingency table underlying these analyses (eg, there were only 85 people in the physically healthy/mentally unhealthy category, and this subgroup was further divided in the multivariate analyses). Thus, although diagnostic analyses suggest that the parameter estimates should be stable, interpretation should focus on the overall pattern of findings as opposed to specific individual findings. Finally, all of the mea-

asures were based on self-reported data, which may be subject to a variety of forms of measurement error.<sup>40</sup> Although we used measures and scales that have been validated and have adequate psychometric properties, we cannot be certain of the accuracy of reports. For example, the underestimate of obesity in this sample in contrast to estimates obtained from the BRFSS could reflect inaccurate self-reports of height and weight. Likewise, whether the respondent or an unknown individual completed the mailback questionnaire cannot be verified across the sample. Finally, self-reported chronic conditions must be interpreted cautiously because they can be influenced by a host of socio-structural and psychological issues (eg, access to health care, somatic amplification).

Despite these possible data limitations, findings from this study suggest several important directions for future research and consideration in health promotion practice. First, the pattern of results clearly suggest that health practices such as exercise, healthy diet, and nonsmoking differentiate individuals who are completely unhealthy from those with partial or complete health; however, these results are relatively intuitive given the role of these lifestyle behaviors in physical morbidity. Of greater relative interest are the analyses indicating that some of these behaviors, specifically regular vigorous exercise and not being obese, differentiated the incompletely healthy from those who completely healthy. Thus, these analyses suggest that targeted interventions that promote regular vigorous exercise and those that reduce obesity will not only reduce physical morbidity, they may also enhance complete health.

However, findings also suggest that lifestyle behaviors do not consistently promote complete health. For example, regular vigorous exercise was more common among individuals who were physically healthy but also were mentally unhealthy (ie, incomplete health) than among those who were completely unhealthy. Similarly, there were no differences between the "completely healthy" and the "incompletely healthy" in terms of regular moderate physical activity and smoking behavior. These results raise compelling questions about the role of these health behaviors in promoting complete health, because they suggest that the extent to



which lifestyle behaviors contribute to complete health may be influenced by additional individual or contextual circumstances.

There are several possible theoretical explanations for why personal health behaviors may not contribute to complete health. Some research suggests that health behaviors that are initiated or maintained in response to coercive forms of social control or negative reinforcement are accompanied by increased levels of distress,<sup>41</sup> suggesting that the effects of behavioral change on complete health are influenced by circumstances surrounding the behavior change. Similarly, Barksy<sup>42</sup> contends that the use of fear appeals to motivate lifestyle change is creating an "epidemic of apprehension" (p. 414) that undermines objective gains to physical health. This explanation suggests that the underlying reasons for engaging in a particular behavior (eg, quitting smoking because of fear of lung cancer versus quitting smoking to spend quality time with family) may affect whether the adoption of healthier behaviors will fall short of complete health—ie, yielding incomplete health. Finally, it is also possible that length of adoption of behaviors is a pivotal factor that conditions whether or not health behaviors contribute to complete or incomplete health. For example, individuals with an established history of regular moderate activity or maintaining a healthy weight may have accumulated confidence or interpersonal exchanges that reinforce good mental health, whereas those individuals with a more modest history of these behaviors may not yet have experienced these gains. Each of the explanations has important implications for practice because they suggest that common strategies (eg, risk-rated insurance that invokes a penalty for unhealthy behavior, cues to action focused on susceptibility and fear) may facilitate behavior change but simultaneously undermine mental health. The primary issue raised here, then, is not whether adoption of healthier lifestyle behaviors can bring about complete health—because they clearly are implicated in complete health. Rather, the primary issue is that more research is needed to explain why personal behaviors sometimes may not yield complete or optimal health and how individuals make transitions from each state of incomplete

health into complete health.

In addition to physical health behaviors, socially integrative behaviors were strongly associated with complete health. The results of this study suggest that complete health may be achieved through ways other than, or in addition to, those focusing on individuals' patterns of exercise, eating, and smoking. In many cases, the estimated effects of behaviors such as regular church attendance and contact with friends were comparable in magnitude with lifestyle behaviors such as moderate physical activity or quitting smoking. These results parallel extant studies highlighting the importance of social integration and social capital for individual and population health.<sup>16,43,44</sup> Although the results of this single study should not be overinterpreted, its convergence with the health literature on social network and social capital raises compelling issues for future consideration.

One such issue involves the theoretical and practical utility of interventions targeting social behaviors in health promotion practice. Theoretically, social behavioral interventions are compelling because they may promote benefits at both the individual and community levels, and the enhancements at the community level can, in turn, support individual health through higher levels of social capital. Although our analyses as well as others demonstrating the importance of social integration to individual health or illness provide indirect support for possibility that social behavioral interventions may have direct effects on individual health and wellness, recent evidence from the Gatehouse Project for adolescent health promotion<sup>45</sup> provides direct support for the importance of social behavioral interventions for promoting individual health. The Gatehouse Project targeted student social involvement and social connectedness, and preliminary evaluation suggests that these strategies produced notable declines in adolescent smoking. Although far from conclusive, these results raise the possibility that a shift in empirical and practical focus from behaviors implicated in disease, such as exercise and smoking, toward behaviors that promote social connectedness may offer effective solutions for promoting individual behavior change and individual health promotion, as well as provide a community foundation for



addressing population health.

Interventions targeting social behavior also raise other philosophical and pragmatic issues. Social pundits have described declines in social activities like church-going, PTA membership, and membership in unions or scouts<sup>46</sup>: These declines occurred during the "era of health promotion" when individuals were encouraged to become more actively involved in their own health. Clearly the social trends are driven by multiple factors, but all else being equal, the more time spent in activities to promote individual health like exercise or relaxation techniques, the less time may be available for activities that contribute to the social good. Thus, supplementing health promotion practice with interventions targeting social behaviors provides an opportunity to diffuse criticisms that health promotion is creating a new ego-centric morality.<sup>17</sup> Pragmatically, social behaviors may be more conducive to change than behaviors like exercise, diet, and smoking, which individuals sometimes associate with pain, denial, and discomfort. Of course social behaviors are not a panacea either because it is also clear that processes resulting from social involvement can also undermine individual health;<sup>47</sup> the fundamental point raised here is that social behaviors have been largely overlooked in health promotion practice, yet they may hold significant promise for enhancing individual and population health.

In conclusion, the results of this study provide evidence that personal health behaviors such as regular vigorous exercise and maintenance of a healthy body weight are positively associated with optimal health. The results also highlight the potential for health promotion interventions targeting social behaviors such as involvement in church-related activities and social activities with peers. Although much more research clearly needs to be undertaken, the results of this study partially validate traditional approaches, and they offer new insights for interventions that not only prevent disease but promote complete health and, thereby, a greater capacity for living a full and productive life.

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