Journal of American College Health
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/vach20

The Relationship of Level of Positive Mental Health With Current Mental Disorders in Predicting Suicidal Behavior and Academic Impairment in College Students

Corey L. M. Keyes PhD [a], Daniel Eisenberg PhD [b], Geraldine S. Perry DrPH, RD [c], Shanta R. Dube PhD, MPH [c], Kurt Kroenke MD [d] & Satvinder S. Dhingra MPH [e f]

[a] Department of Sociology, Emory University, Atlanta, Georgia

[b] Department of Health Management and Policy, University of Michigan, Ann Arbor, Michigan

[c] Division of Adult and Community Health, Centers for Disease Control and Prevention, Atlanta, Georgia

[d] Office on Smoking and Health, Centers for Disease Control and Prevention, Atlanta, Georgia

[e] Regenstrief Institute, Indiana University School of Medicine, Indianapolis, Indiana

[f] Richard Roudebush VA HSR&D Center of Excellence, Indianapolis, Indiana

Accepted author version posted online: 28 Nov 2011.Version of record first published: 08 Feb 2012.

To cite this article: Corey L. M. Keyes PhD, Daniel Eisenberg PhD, Geraldine S. Perry DrPH, RD, Shanta R. Dube PhD, MPH, Kurt Kroenke MD & Satvinder S. Dhingra MPH (2012): The Relationship of Level of Positive Mental Health With Current Mental Disorders in Predicting Suicidal Behavior and Academic Impairment in College Students, Journal of American College Health, 60:2, 126-133

To link to this article: http://dx.doi.org/10.1080/07448481.2011.608393

Suicide and Suicide Prevention

The Relationship of Level of Positive Mental Health With Current Mental Disorders in Predicting Suicidal Behavior and Academic Impairment in College Students

Corey L. M. Keyes, PhD; Daniel Eisenberg, PhD; Geraldine S. Perry, DrPH, RD; Shanta R. Dube, PhD, MPH; Kurt Kroenke, MD; Satvinder S. Dhingra, MPH

Abstract. Objective: To investigate whether level of positive mental health complements mental illness in predicting students at risk for suicidal behavior and impaired academic performance. **Participants**: A sample of 5,689 college students participated in the 2007 Healthy Minds Study and completed an Internet survey that included the Mental Health Continuum–Short Form and the Patient Health Questionnaire screening scales for depression and anxiety disorders, questions about suicide ideation, plans, and attempts, and academic impairment. **Results**: Just under half (49.3%) of students were flourishing and did not screen positive for a mental disorder. Among students who did, and those who did not, screen for a mental disorder, suicidal behavior and impaired academic performance were lowest in those with flourishing, higher among those with moderate, and highest in those with languishing mental health. **Conclusions**: Positive mental health complements mental disorder screening in mental health surveillance and prediction of suicidal behavior and impairment of academic performance.

Keywords: flourishing, happiness, Mental Health Continuum–Short Form (MHC-SF), mental illness, Patient Health Questionnaire (PHQ), positive mental health, subjective well-being

Dr Keyes *is with the Department of Sociology at Emory University in Atlanta, Georgia.* ***Dr Eisenberg*** *is with Department of Health Management and Policy at the University of Michigan in Ann Arbor, Michigan.* ***Dr Perry*** *and* ***Mr Dhingra*** *are with the Division of Adult and Community Health at the Centers for Disease Control and Prevention in Atlanta, Georgia.* ***Dr Dube*** *is with the Office on Smoking and Health at the Centers for Disease Control and Prevention in Atlanta, Georgia.* ***Dr Kroenke*** *is with Regenstrief Institute at Indiana University School of Medicine in Indianapolis, Indiana, and the Richard Roudebush VA HSR&D Center of Excellence in Indianapolis, Indiana.*

Attending college represents an important and stressful developmental period.[1] Several mental disorders have first onset during this period,[2] are prevalent,[3] and appear to be increasing in college student population.[4–6] Mental disorders in college students co-occur with increased rates of smoking, illicit substance use and abuse, conduct disorders, academic problems, and dropout.[7–9] However, individuals free of mental disorder are not necessarily mentally healthy[10–12] and, therefore, measuring positive mental health may be essential for understanding college students' adjustment to this period.[12]

Mental health is conceived of as subjective well-being: individuals' evaluations of how good they feel about and how well they see themselves functioning in life. To that end, the Short Form of the Mental Health Continuum (MHC-SF) consists of items, shown in Table 1, that represent emotional well-being and positive functioning, the latter of which consists of psychological well-being (items 9 to 14)[13,14] and social well-being (items 4 to 8).[15] The MHC-SF was created to address the problem of the diagnostic threshold and number of items in the MHC Long Form (MHC-LF). Whereas the MHC-LF consisted of 40 items, the MHC-SF consists of 14 of the most prototypical items representing each facet of emotional, psychological, and social well-being. The response option for the Short Form was changed to measure the frequency (from "never" to "every day") with which respondents experienced each sign of mental health during the past month, which provides a clear standard for the assessment and a categorization of levels of mental health that is similar to the survey assessment of mental major depressive episode according to the *Diagnostic and Statistical Manual*

TABLE 1. Type of Well-Being, *DSM*-Type Categorical Diagnosis, and Questions in the Mental Health Continuum Short Form

Emotional Well-Being: Flourishing requires "almost every day" or "every day" and languishing requires "never" or "maybe once or twice" during the past month on 1 or more of the 3 symptoms of emotional well-being.

"How often during the past month did you feel . . ."

1. happy
2. interested in life
3. satisfied

Positive Functioning: Flourishing requires "almost every day" or "every day" and languishing requires "never" or "maybe once or twice" during the past month on 6 or more of the 11 symptoms of positive functioning.

"How often during the past month did you feel . . ."

4. that you had something important to contribute to society. (*Social contribution*)
5. that you belonged to a community (like a social group, your school, or your neighborhood). (*Social Integration*)
6. that our society is becoming a better place for people like you. (*Social growth*)
7. that people are basically good. (*Social acceptance*)
8. that the way our society works made sense to you. (*Social coherence*)
9. that you liked most parts of your personality. (*Self acceptance*)
10. good at managing the responsibilities of your daily life. (*Environmental mastery*)
11. that you had warm and trusting relationships with others. (*Positive relationships with others*)
12. that you had experiences that challenged you to grow and become a better person. (*Personal growth*)
13. confident to think or express your own ideas and opinions. (*Autonomy*)
14. that your life has a sense of direction or meaning to it. (*Purpose in life*)

of Mental Disorder (*DSM*) criteria.[10,11] In the same way that depression requires symptoms of *an*hedonia, mental health consists of symptoms of hedonia, or emotional well-being. But, feeling good, in the same way as only feeling sad or losing interest in life, is not sufficient for the diagnosis of a clinical state. Rather, and in the same way that major depression consists of symptoms of *mal*functioning, mental health must also consist of symptoms of positive functioning. As such, individuals with flourishing mental health must report at least 7 of the 14 signs of mental health "almost every day" or "every day," with at least 1 sign of mental health coming from the emotional well-being domain.

The Short Form of the MHC has shown excellent psychometrics,[12,16–18] and it permits assessment of level of positive mental health—from flourishing to moderate to languishing mental health—that is modeled after the diagnosis of mood and anxiety disorders in the *DSM*. Using the novel MHC-SF approach to mental health, our study aims to answer the following questions: (1) What is the prevalence of mental health and mental disorder in college students? (2) Does the level of mental health reliably distinguish among individuals who screen positive across several mental disorders using the Patient Health Questionnaire–9 (PHQ-9), with percent with a mental disorder increasing with each drop in level of mental health? and (3) Does the level of mental health, in addition to mental disorder defined by the PHQ, reliably distinguish between students reporting suicidal behavior and impaired academic performance? In short, this study aims to investigate whether the MHC-SF is a complementary to the PHQ as a tool for the surveillance of the health and well-being of college students and, thereby, possibly other populations.

METHODS

Procedure

Data are from the 2007 Healthy Minds Study, a Web-based survey. The study was to colleges and universities nationwide. The only inclusion criterion was that participating institutions were required to contribute their share of the cost of the study, and in return they received a detailed report and complete data set for their students. The 13 schools that participated represent diverse geography (at least 2 from each US Census region), funding (10 public, 3 private), demographics (the median school is 34% nonwhite; range is 0% to 63%), enrollment size (median is 16,000; range is 5,000 to 43,000), and graduation rate (median is 82%; range is 37% to 92%). These median characteristics are similar to the national medians for institutions granting master's and doctoral degrees.[19] The study was approved by the institutional review boards at all participating colleges and universities.

Sample

Each institution randomly selected 1,000 students from the full student population and invited them to participate via a postal letter and e-mail reminders. A $1 bill was included with the introductory letter and notified all recruited students that they were being entered into a sweepstakes for cash prizes. Of the 13,000 recruited students, 5,689 completed the survey (3,962 undergraduates, 1,727 graduate students), corresponding to an overall response rate of 44% (range by campus is 33% to 62%).

We followed recommendations of survey methodologists to investigate differences between responders and nonresponders.[20–22] We used the administrative data (available

at most, but not all, institutions) to construct response propensity weights, equal to 1 divided by the estimated probability of response, which was estimated in a logistic regression as a function of sex, race/ethnicity, academic level, and grade point average. Including the propensity weight in all analyses assures that the estimates are representative in terms of sex, race/ethnicity, academic level, and grade point average.

Measures

Mental Health

The MHC–SF consists of 14 items that measure the degree of emotional well-being (EWB) (items 1 to 3) as defined in terms of happiness, satisfaction, and interest in life; social well-being (items 4 to 8) including 1 item each on social acceptance, social actualization, social contribution, social coherence, and social integration[15]; and psychological well-being (items 9 to 14) including 1 item each on autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance.[13,14]

The MHC-SF and its subscales scores have shown high internal consistency and good discriminant validity with the hypothesized 3-factor structure in a nationally representative sample of US adolescents, ages 12 through 18.[12,15] Students were diagnosed with flourishing mental health if they experienced at least 1 of the 3 symptoms of EWB and at least 6 of the 7 symptoms of positive functioning "almost every day" or "every day" during the past month. Students were diagnosed with languishing mental health if they experienced at least 1 of the 3 symptoms of EWB and at least 6 of the 7 symptoms of positive functioning "never" or "once or twice" during the past month. Students who were neither languishing nor flourishing were diagnosed with moderate mental health.

Mental Disorders

Depression was measured using the PHQ-9, a 9-item instrument based on the 9 *DSM-IV* criteria. This instrument asks the respondent to indicate the frequency of various symptoms over the past 2 weeks, and following the standard algorithms for interpreting the PHQ to diagnose major depression.[23] The PHQ is validated against diagnosis by mental health professionals and other depression assessment tools in a variety of populations, including young adults.[24–28] Meta-analyses have demonstrated a sensitivity of 77% to 80% and a specificity of 92% to 94% of the PHQ for diagnosing major depression.[29,30]

Anxiety was also measured using items from the PHQ. These items ask about symptoms of panic disorder and generalized anxiety disorder over the past 4 weeks. The standard algorithm was used to define persons with panic disorder, generalized anxiety disorder, both, or neither.[23] Sensitivity and specificity of the PHQ Anxiety scale are 81% and 99%, respectively, for panic disorder, and 63% and 97% for generalized anxiety disorder.[23] Subsequent studies have substantiated the validity of the PHQ Anxiety scale.[31,32]

Suicide Behavior and Impaired Academic Performance

Three questions—separate from the PHQ—measured suicidal behavior during the past year: "In the past year, (1) did you ever seriously think about committing suicide, (2) did you make a plan for committing suicide or (3) did you attempt suicide?" An affirmative response to any of these questions operationalized suicidal behavior. Students also were asked, "How many days, during the past four weeks, did you feel that emotional or mental difficulties had hurt your academic performance." The response options were "none," "1–2 days," "3–5 days," to "6 or more days." We operationalized academic impairment as 6 or more days where emotional or mental difficulties hurt academic performance.

Statistical Analysis

All statistical analysis was conducted using SPSS 18.0 software and weighted to be representative of the full random sample recruited for the study. Internal reliability of each scale was determined using Cronbach's alpha. Frequencies were generated to estimate the prevalence of level of positive mental health. Cross-tabulation was used to assess the association of level of mental health with mental disorders, any suicide behavior, and academic impairment, and the chi-square statistics was used for statistical inference. Logistic regression generated prevalence odds ratios of any suicidal behavior, as well as any impaired academic performance, as a function of level of positive mental health, any current mental disorder, and the covariates of age, sex, and race.

RESULTS

The sample included 54.2% females. The racial/ethnic composition was 10.3% Asian, 6.1% African American, 6.3% Hispanic, 66.7% Caucasian (non-Hispanic), 4.7% multiple race/ethnicities, and 5.9% other race. Two-thirds (66.0%) of the sample was between the ages of 18 and 22, 12.5% between ages 23 and 25, 10.6% between ages 26 and 30, and 10.8% above the age of 30. Nearly three-quarters (73.7%) were undergraduate students, 23.4% were graduate students, and 2.9% had an indeterminate academic level. Most (92.5%) were US citizens or US residents, whereas 7.5% were international students (data not shown).

The MHC-SF displayed good internal consistency for both the total scale and 3 subscales, with Cronbach alphas above .80 (Table 2).

Prevalence of Mental Disorder and Mental Health

The mental disorder most frequently reported was major depression (7.9%), followed by generalized anxiety (5.9%), and panic disorder (3.8%) (Table 3). The prevalence of any mental disorder (ie, major depression, panic disorder, or generalized anxiety) was 12.7%. The proportion of students classified as flourishing, moderate, and languishing mental health was 51.8%, 44.6%, and 3.6%, respectively.

There was a strong and inverse association between level of mental health with each specific mental disorder and with any mental disorder. For example, 49.8% of students

TABLE 2. Descriptive Statistics of the MHC-SF Subscales and Total MHC-SF Score, 2007 Healthy Minds Study (*N* = 5,689)

MHC-SF dimensions	*M*	*SD*	Cronbach's alpha	1	2	3
1. Emotional Well-Being	3.78	0.93	.86	1.0	0.62	0.71
2. Social Well-Being	2.80	1.09	.81		1.00	0.64
3. Psychological Well-Being	3.69	0.94	.87			1.00
Total MHC-SF	3.39	0.88	.92			

Note. MHC-SF = Mental Health Continuum–Short Form. Each scale ranges from 0 to 5. All correlations significant at $p < .0001$ (2-tailed).

categorized as languishing screened positive for major depression, compared to 11.6% of students with moderate, and 1.7% of students with flourishing mental health.

Of the students who screened for a current mental disorder (ie, 12.7%), only 2.0% were languishing; 8.2% had moderate and 2.5% had flourishing mental health. In other words, the presence of a mental disorder does not imply the absence of some level of (moderate or flourishing) mental health. In turn, of the student free of mental disorder, 1.6% had languishing, 36.4% had moderate, and 49.3% had flourishing mental health. In other words, the absence of mental disorder does not imply the presence of good (ie, flourishing) mental health.

Any Suicidal Behavior and Academic Impairment

A total of 5.8% of students thought about ending their lives, 1.4% planned their suicide, 0.5% attempted suicide. Separately, the 3 measures of suicidal behavior were significantly associated with level of mental health and screening for mental disorder (data not shown); we therefore present only the findings with all 3 measures combined into a single measure of any suicidal behavior.

Among students who screened for a current mental disorder, suicidal behavior was lowest among those flourishing (7.0%), was 2.5 times higher among students with moderate (18.1%), and 4 times higher among those with languishing (28.3%) mental health. A similar relationship was observed among students who screened free of a current mental disorder. Here, suicidal behavior was lowest among students who were flourishing (1.3%), 3 times higher (3.9%) among those with moderate, and nearly 12 times higher (15.4%) among students with languishing mental health.

Figure 1 presents the adjusted (ie, covariates included age, sex, and race) odds ratio of any suicidal behavior. Students with a current mental disorder have, on average, a higher odds ratio of suicidal behavior than students free of a mental disorder. However, level of mental health differentiates risk of suicidal behavior among students with a current mental disorder. Among those with a mental disorder, flourishing students are nearly 6 times, those with moderate mental health are over 19 times, and students languishing are 32 times more

TABLE 3. Weighted Prevalence with Unweighted Cell Size and Association of Level of Mental Health With Positive Screen for Current Mental Disorder, 2007 Healthy Minds Study (*N* = 5,689)

	Languishing mental health 3.6% ($n = 202$)		Moderate mental health 44.6% ($n = 2,522$)		Flourishing mental health 51.8% ($n = 2,965$)				Total	
	Weighted prevalence	Unweighted cell size	Weighted prevalence	Unweighted cell size	Weighted prevalence	Unweighted cell size	χ^2	*p* value	%	*n*
Any current mental disorder	55.6%	110	18.4%	460	4.8%	138	570.1	.0001	12.7	708
Major depression[†]	49.8%	97	11.6%	292	1.7%	44	638.8	.0001	7.9	433
Generalized anxiety	28.9%	58	8.7%	226	1.9%	56	314.4	.0001	5.9	340
Panic disorder	11.2%	21	4.9%	124	2.3%	67	52.8	.0001	3.8	212

Note. All χ^2 $p < .001$ (2-tailed).
[†]Patient Health Questionnaire–9 score = 15–27.

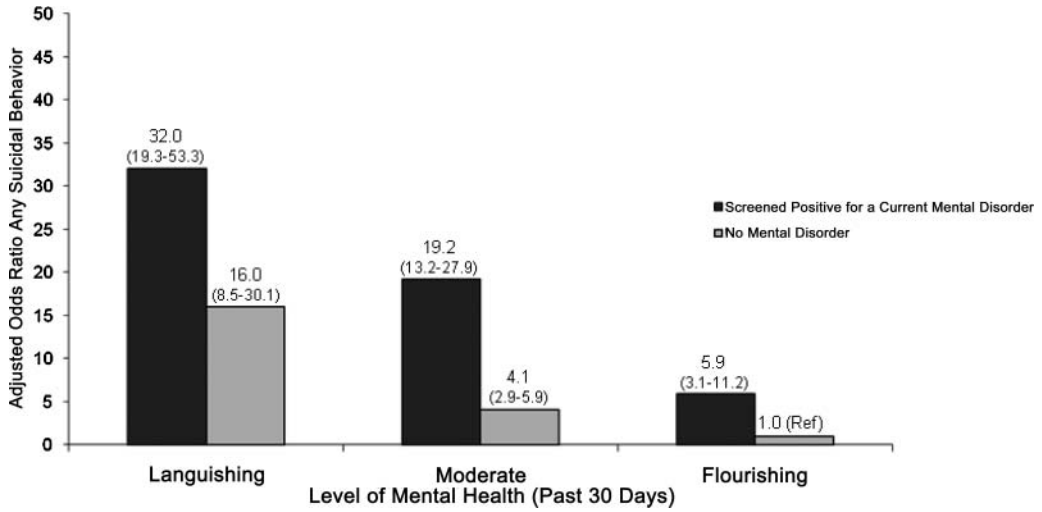

FIGURE 1. Adjusted odds ratio (95% CI) of reporting any suicidal behavior by any current mental disorder and by level of mental health (unweighted $N = 5{,}689$; sample weighted; all odds ratio p values < .0001; Hosmer-Lemeshow $\chi^2 = 11.8$, $df = 8$, $p = .162$, and 94.1% predictive accuracy of model).

likely than flourishing students (free of mental disorder) to report any suicidal behavior. Thus, level of mental health also differentiates risk of suicidal behavior among students who screen free of a mental disorder. Here, students with moderate mental health are nearly 4 times, and those languishing are 16 times, more likely than flourishing students (free of mental disorder) to report any suicidal behavior.

A total of 10.8% of students reported academic impairment (ie, of 6 or more days in the past 4 weeks) that they attributed to their mental, emotional health. Students who screened for a current mental disorder were more likely to report academic impairment than students who did not screen for a current mental disorder. Yet, level of mental health distinguished amount of academic impairment among students who screened with, and among students who did not screen for, a current mental disorder. Among students with a current mental disorder, over half (52.0%) with languishing, 34.6% with moderate, and 20.4% with flourishing mental health reported academic impairment. Among students free of a mental disorder, 3 times as many with languishing mental health (17.0%) had academic impairment as those with moderate mental health (5.6%). In turn, over twice as many students with moderate mental health had academic impairment as those with flourishing mental health (2.4%).

Figure 2 presents the adjusted odds ratio of academic impairment. Students with a current mental disorder report a higher odds ratio of impaired academic performance than student free of a mental disorder. However, level of mental health differentiates risk of academic impairment among students with a current mental disorder. Here, flourishing students are nearly 16 times, those with moderate mental health are over 28 times, and students languishing are over 50 times more likely than flourishing students (free of mental disorder) to report academic impairment. Level of mental health also differentiates risk of impaired academic performance among students free of a mental disorder. Here, students with moderate mental health are nearly 4 times, and those languishing are over 11 times, more likely than flourishing students (free of mental disorder) to report academic impairment.

COMMENT

This article provides several noteworthy findings. First, mental illness in the form of depression and anxiety is prevalent among college students, a finding consistent with previous studies.[23,31,33,34] Second, students who screen positive for a current mental illness are at greater risk of suicidal behavior and academic impairment. Third, level of mental health distinguishes risk of suicidal behavior and academic impairment among student with, and those without, a current mental disorder. Thus, increasing levels of mental health are protective against suicidal behavior and academic impairment for students with, and students free of, a current mental illness. Fourth, the MHC-SF and PHQ are brief and complementary surveillance measures that allow colleges to better monitor the well-being of students.

Our findings support the 2-continua model of mental health, which argues that the absence of mental disorder does not imply that an individual is mentally healthy.[11] Over three-quarters of college students did not screen for any current mental disorder, but just under half (49.2%) were free of any mental disorder *and* flourishing. Thus, the absence of mental disorder does not mean the presence of mental health—ie, the prevalence of those without a mental disorder does not equal the prevalence of those who fit the criteria for flourishing mental health. The prevalence of good mental health (ie, flourishing and free of mental disorder) is only

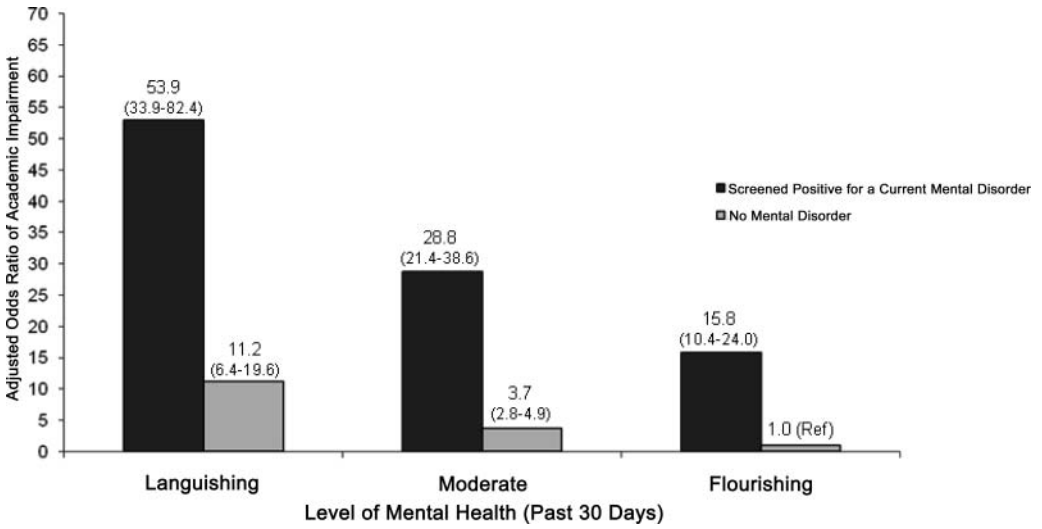

FIGURE 2. Adjusted odds ratio (95% CI) of reporting academic impairment (6 or more days in past 4 weeks) due to mental-emotional health by any current mental disorder and by level of mental health (unweighted N = 5,689; sample weighted; all odds ratio p values < .001; Hosmer-Lemeshow $\chi^2 = 10.1$, $df = 8$, $p = .259$, and 89.6% predictive accuracy of model).

12% higher in this college student sample compared with the prevalence of good mental health in the US adolescent population (ages 12 to 18), where 37% are flourishing and free of mental disorder.[17] One reason for this difference may be the inherent developmental differences between adolescent and young adult populations; adolescence is characterized by not only psychological and social changes, but physiological changes, which in turn, may be why the percent flourishing and free of mental disorder is lower than in a sample of college students.

Also supportive of the 2-continua model of mental health is the fact that level of positive mental health differentiates functioning for students screening with, and without, a current mental disorder. Even among students with a current mental disorder, suicidal behavior and academic impairment were lowest among flourishing students, intermediate among students with moderate mental health, and highest among languishing students; the same relationship was found for students free of a current mental disorder. In sum, the MHC-SF is a reliable, valid, and brief measurement tool that provides a comprehensive understanding of mental health that moves beyond the traditional dichotomization of presence or absence of mental disorder.

Limitations and Strengths

First, the moderate response rates, along with the use of screening scales, suggest using some caution against generalizing the findings from this article to the population of US universities and colleges. Data from a follow-up study of 500 nonresponders to the 2007 main survey revealed that nonresponders were slightly less likely to have depressive symptoms and use mental health services. Three percent fewer nonresponders used mental illness therapy during the past year compared to responders to the main survey.[35]

Our measure of depression and anxiety do not reflect a clinical diagnosis, even though PHQ-9 is validated as being highly correlated with diagnosis by mental health professionals and other depression assessment tools in a variety of populations, including young adults.[24–28] Although diagnostic cutoffs were utilized based on the algorithm validated in clinical settings and phone-based population surveys, these data were gathered using a Web-based survey, thus, these are probable cases of mental disorders. However, the PHQ has been well validated for detecting depression and anxiety in multiple clinical and population-based studies, and nonresponse bias was handled by including response propensity weights in all analyses. Notably, this is the first study to examine the utility of the MHC-SF in a large sample of college students with findings that add to a growing literature on the importance of 2-continua model of mental health,[17,36] and merits further investigation.

Second, the measures were based on self-reports, which are subject to both recall and response bias, especially for sensitive topics. Although self-report may be the most practical approach for measuring suicidal behavior and academic impairment, future research can and should amend our measure of academic impairment with inclusion of grade point averages when possible to obtain. Nonetheless, our study was meant to provide a preliminary understanding of the utility of the MHC-SF using cross-sectional data; further studies are needed to examine other health outcomes associated with

flourishing, moderate, and languishing mental health among college students, especially over time using longitudinal data.

Conclusion

The MHC-SF in public health surveillance may provide the opportunity to highlight mental health promotion at a population level, especially as our society seeks to invest in young people's futures through the promotion of well-being. Further research is needed to understand other psychosocial factors that may contribute to positive mental health, as well as intervention research that may demonstrate how to promote positive mental health and thereby prevent undesirable outcomes.

DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

NOTE

For comments and further information, address correspondence to Corey L. M. Keyes, Department of Sociology, Emory University, Room 225 Tarbutton Hall, 1555 Dickey Drive, Atlanta, GA 30322, USA (e-mail: ckeyes@emory.edu).

REFERENCES

1. Settersten RA, Furstenberg FF, Rumbaut RG, eds. *On the Frontier of Adulthood: Theory, Research, and Public Policy*. Chicago, IL: University of Chicago Press; 2005.

2. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey replication. *Arch Gen Psychiat.* 2005;62:593–602.

3. Blanco C, Okuda M, Wright C, et al. Mental health of college students and their non-college-attending peers: results from the National Epidemiologic Study on Alcohol and Related Conditions. *Arch Gen Psychiat.* 2008;65:1429–1437.

4. Twenge J, Gentile B, DeWall CN, Ma D, Lacefield K, Schurtz DR. Birth cohort increases in psychopathology among young Americans, 1938–2007: a cross-temporal meta-analysis of the MMPI. *Clin Psychol Rev.* 2010;30:145–154.

5. American College Health Association. *American College Health Association National College Health Assessment: Reference Group Data Report, Spring 2008*. Baltimore, MD: American College Health Association. Available at: http://www.acha-ncha.org/reports_ACHA-NCHAII.html. Accessed March 11, 2011.

6. Gallagher RP. *National Survey of Counseling Center Director, 2008*. Washington, DC: International Association of Counseling Services. Available at: http://www.education.pitt.edu/survey/nsccd. Accessed March 11, 2011.

7. Angold A, Costello EJ. Depressive comorbidity in children and adolescents: empirical, theoretical, and methodological issues. *Am J Psychiatry.* 1993;150:1779–1791.

8. Berndt ER, Koran LM, Finkelstein SN, et al. Lost human capital from early-onset chronic depression. *Am J Psychiatry*. 2000;157:940–947.

9. Kessler RC, Foster CL, Saunders WB, Stang PE. Social consequences of psychiatric disorders, I: educational attainment. *Am J Psychiatry.* 1995;152:1026–1032.

10. Keyes CLM. The Mental Health Continuum: from languishing to flourishing in life. *J Health Soc Behav.* 2002;43:207–222.

11. Keyes CLM. Mental illness and/or mental health? Investigating axioms of the complete state model of health. *J Consult Clin Psychol.* 2005;73:539–548.

12. Keyes CLM. Mental health in adolescence: is America's youth flourishing? *Am J Orthopsychiatry.* 2006; 76:395–402.

13. Ryff CD, Keyes CLM. The structure of psychological well-being revisited. *J Pers Soc Psychol.* 1995;69:719–727.

14. Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *J Pers Soc Psychol.* 1989;57:1069–1081.

15. Keyes CLM. Social well-being. *Soc Psychol Q.* 1998;61:121–140.

16. Keyes CLM. The subjective well-being of America's youth: toward a comprehensive assessment. *Adolesc Fam Health.* 2005;4:3–11.

17. Keyes CLM. The nature and importance of positive mental health in America's adolescents. In: Gilman R, Huebner ES, Furlong MJ, eds. *Handbook of Positive Psychology in Schools*. New York, NY: Routledge; 2009:9–23.

18. Westerhof GJ, Keyes CLM. Mental illness and mental health: the two continua model across the lifespan. *J Adult Dev.* 2010;17:110–119.

19. National Center for Education Statistics. *Integrated Postsecondary Education Data*. Washington, DC: National Center for Education Statistics. Available at: http://nces.ed.gov/ipeds/. Accessed June 10, 2009.

20. Galea S, Tracy M. Participation rates in epidemiologic studies. *Ann Epidemiol.* 2007;17:643–653.

21. Porter SR, Umbach PD. Student survey response rates across institutions: why do they vary? *Res High Educ.* 2006;47:229–247.

22. Groves RM. Nonresponse rates and nonresponse bias in household surveys. *Public Opin Q.* 2006;70:646–675.

23. Spitzer RL, Kroenke K, Williams JBW, and the Patient Health Questionnaire Primary Care Study Group. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. *JAMA*. 1999;282:1737–1744.

24. Diez-Quevedo C, Rangil T, Sanchez-Planell L, Kroenke K, Spitzer RL. Validation and utility of the Patient Health Questionnaire in diagnosing mental disorders in 1003 general hospital Spanish inpatients. *Psychosom Med.* 2001;63:679–686.

25. Henkel V, Mergl R, Kohnen R, Allgaier AK, Moller HJ, Hegerl U. Use of brief depression screening tools in primary care: consideration of heterogeneity in performance in different patient groups. *Gen Hosp Psychiatry*. 2004;26:190–198.

26. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16:606–613.

27. Lowe BG, Zipfel S, Witte S, Loerch B, Herzog W. Diagnosing ICD-10 depressive episodes: superior criterion validity of the Patient Health Questionnaire. *Psychother Psychosom.* 2004;73:386–390.

28. Martin A, Winfried R, Klaiberg A, Braehler E. Validity of the Brief Patient Health Questionnaire Mood Scale (PHQ-9) in the general population. *Gen Hosp Psychiatry*. 2006;28: 71–77.

29. Gilbody S, Richards D, Brealey S, Hewitt C. Screening for depression in medical settings with the Patient Health Questionnaire (PHQ): a diagnostic meta-analysis. *J Gen Intern Med.* 2007;22:1596–1602.

30. Wittkampf KA, Naeije L, Schene AH, Huyser J, van Weert HC. Diagnostic accuracy of the Mood Module of the Patient Health Questionnaire: a systematic review. *Gen Hosp Psychiatry*. 2007;29:388–395.

31. Spitzer RL, Williams JBW, Kroenke K, et al. Validity and utility of the Patient Health Questionnaire in assessment of 3000 obstetric-gynecologic patients: the PRIME-MD Patient Health Questionnaire Obstetrics-Gynecology Study. *Am J Obstet Gynecol*. 2000;183:759–769.

32. Lowe B, Grafe K, Zipfel S, et al. Detecting panic disorder in medical and psychosomatic outpatients—comparative validation of the Hospital Anxiety and Depression Scale, the Patient Health Questionnaire, a screening question, and physicians' diagnosis. *J Psychosom Res*. 2003;55:515–519.

33. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry*. 1994;51:8–19.

34. Kroenke K, Spitzer RL, Williams JBW, Monahan PO, Lowe B. Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Ann Intern Med*. 2007;146:317–325.

35. Eisenberg D, Downs MF, Golberstein E, Zivin K. Stigma and help-seeking for mental health among college students. *Med Care Res Rev.* 2009;66:522–541.

36. Keyes CLM. Promoting and protecting mental health as flourishing: a complementary strategy for improving national mental health. *Am Psychol.* 2007;62:95–108.

Received: 18 September 2010
Revised: 18 July 2011
Accepted: 24 July 2011