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Invited Paper

CHRONIC PHYSICAL CONDITIONS AND AGING: IS MENTAL HEALTH A POTENTIAL PROTECTIVE FACTOR?

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Research has shown that risk of chronic disease increases with age. Mental disorders and chronic disease are highly comorbid, with studies showing reciprocal causal relations. However, research focuses exclusively on combinations of, or a specific, mental illness. This study investigates the hypothesis that complete mental health is a protective factor against, while mental illness is a risk factor for, chronic (physical) conditions with age. Mental health is conceived of as a syndrome of subjective well-being consisting of symptoms of hedonia (positive feelings toward life) and eudaimonia (positive functioning in life). A categorical diagnosis of the presence of mental health, described as flourishing, and the absence of mental health, characterized as languishing, are described and applied to data from the MIDUS study of 3,032 adults, 25-74 years old. Data were also collected regarding 12-month prevalence of major depressive episode (MDE), and complete mental health is the absence of any of MDE and the presence of flourishing. Descriptive findings revealed a strong association of the complete mental health diagnostic categories with 23 of the 27 self-reported chronic conditions. In multivariate regression, quantity of chronic disease increased with age and was higher among moderately mentally healthy and adults with MDE, compared with the completely mentally healthy. Chronic conditions increased exponentially with age among adults with pure languishing and adults with languishing and a MDE. At all ages, completely mentally healthy adults reported the fewest chronic conditions, suggesting it may act as a protective factor in aging.

Does level of mental health and mental illness influence the risk of chronic physical disease in adulthood? This study investigates whether high levels of positive mental health act as a protective factor against the accumulation of chronic physical diseases with age. Conversely and importantly, this paper investigates whether mental illness—specifically major depressive episode—

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and whether the absence of mental health—a condition described as "languishing"—act as a risk factors for chronic physical disease throughout adulthood.

Life expectancy in the United States increased dramatically during the twentieth century. Though individuals are living longer lives, rates of many chronic health conditions have increased. As such, the expansion of life expectancy has increased the number of years spent living with chronic physical disease and therefore disability (Olshanky et al., 1991). This has happened for at least two reasons. First, and by definition, biological aging consists of cellular degeneration. With time, all individuals will experience some physical decay, disorder, or disease. Thus, the risk of any physical disease increases with age, and the number of physical diseases increases with age.[1] Second, although risk of physical disease is rather low in youth and younger adults, the occurrence of some chronic disorders such as diabetes, asthma, and even cardiovascular diseases are now occurring at younger ages (Nusselder et al., 1996).

Risk factors are measurable characteristics or qualities of individuals, interpersonal relationships, contexts, and institutions that can elevate the probability of the occurrence of a discrete and undesirable outcome (e.g., alcohol abuse, physical inactivity) or the probability of change in levels of an undesirable outcome (e.g., severity of disease; Kraemer et al., 1997). Age has been shown to be an independent risk factor for the onset, severity, and duration of chronic physical disease. With increased age, individuals of all backgrounds (i.e., gender and race) exhibit higher rates of most chronic diseases—ranging from oral health problems (e.g., gum and teeth), arthritis, cancers, to cardiovascular disease (Jette, 1996). With regard to cardiovascular disease, for example, age has been consistently shown to be among the most potent risk factors (Grundy, 1999; Lakatta, 1999). In turn, chronic physical disease is a burden to society in terms of direct costs (e.g., healthcare, rehabilitation) and indirect costs (e.g., productivity losses and workdays missed). Using data from the National Institutes of Health, Keyes and Lopez (2002) computed the combined—direct and indirect—costs of specific chronic disorders. Cardiovascular disease was most costly, resulting in approximately $180 billion dollars in combined costs. Diabetes resulted in about $95 billion, cancers cost about $94 billion, arthritis costs about $61 billion, digestive disorders about $53 billion, stroke cost approximately $40 billion, while HIV-AIDS costs about $22 billion in combined costs.

In addition to age, mental illness—particularly major depression—has been shown to be an independent risk of chronic disease that has received little attention by the medical community traditionally focused on physiological rather than psychosocial causes and treatment of illness. In particular, major depression has been shown to be a cause and outcome of cardiovascular disease (Ford et al., 1998; Frasure-Smith & Lesperance, in press; Glassman & Shapiro, 1998; Mussleman et al., 1998). Heart attack survivors with and without a prior history of depression are at a high risk of an episode of major

depression (Lesperance et al., 1996), with some studies (Carney et al., 1997) showing that as much as two-thirds of patients are diagnosed with depression following myocardial infarction. In addition, depression has been implicated in the onset and course of asthma (Mancuso et al., 2000), stroke (Jonas & Mussolino, 2000), arthritis (Musil et al., 2001), diabetes (Anderson et al., 2001), cancer (Bodurka-Bevers et al., 2000), and obesity (McElroy et al., 2004).

Whether it is cause or an effect of chronic physical conditions, mental illness is also a social and economic burden to society. In fact, data show that, in terms of combined direct and indirect costs, mental illness is among the three most costly conditions in the United States (Keyes & Lopez, 2002). Worldwide, mental illness has been shown to be among the top five causes of "disability-adjusted life years" (DALYs), a composite measure of the burden of specific health conditions in terms of the number of years of life lost prematurely to death and the number of years lived with disability in a population (Murray & Lopez, 1996, 1997). Within the category of mental illness, major (unipolar) depressive episode has been shown to be among the leading specific causes of DALYs, second only to coronary artery disease (Murray & Lopez, 1996, 1997) and it is projected to become the second leading cause of DALYs in developing and developed nations by the year 2020. In the United States, major depressive episode has been estimated to cost in excess of $40 billion in combined direct and indirect costs (Greenberg et al., 1993). Mental illness in general, but depression in particular, is a burden whether it is causing chronic physical condition or it is the outcome of chronic physical conditions.

However, studies of the comorbidity of physical disease and mental illness suffer from an incomplete conception and diagnosis of mental health. Heretofore, research compared individuals diagnosed as mentally ill against individuals who did not meet the Diagnostic and Statistical Manual (DSM—American Psychiatric Association, 2000) criteria for a specific mental illness. In other words, individuals who are free of a mental illness diagnosis are treated as mentally healthy and as the reference group against which the risk and burden of physical conditions is compared with individuals deemed currently mentally ill. However, research shows that only 20% of individuals who had not suffered an episode of major depression fit the criteria for mental health as operationalized by Keyes (2002). Instead, nearly two-thirds of non-depressed adults were moderately mentally healthy, while 14% diagnosed as *languishing* in life with very low levels of subjective well-being (Keyes, 2002). Moreover, individuals who were mentally healthy missed fewer days of work and had fewer limitations of activities of daily living than moderately mentally healthy individuals. In turn, moderately mentally healthy adults missed fewer days of work and had fewer limitations of activities of daily living than languishing adults.

Therefore, Keyes (2002, 2003, 2005) has conceptualized and measured mental health as a complete state consisting of not merely the presence and absence of mental illnesses such as major depression, but the presence and

absence of levels of specific dimensions of subjective well-being (i.e., emotional well-being, psychological well-being, and social well-being). The complete mental health diagnosis classifies individuals into one of five states of mental health. Complete mental health is a state of mental health in which people are free of a major depressive episode and fit the criteria for flourishing in life with high levels of emotional, psychological, and social well-being. In contrast, *languishing* is a state of being mentally unhealthy in which individuals have lows levels of emotional, psychological, and social well-being but do not fit the criteria for major depression or even minor depression. Individuals who are *moderately mentally healthy* are not depressed, nor are they languishing, but they have not reached the diagnostic level of flourishing. Some individuals may fit the criteria for languishing in life but also the criteria for a major depressive episode during the past year. Last, some individuals may fit the criteria for moderately mentally healthy but also fit the criteria for a major depressive episode, the combination of which is labeled as "pure" episode of depression (*Note:* because there are so few individuals who are flourishing and also report a major depression, these individuals are collapsed into the category of "pure depression.")

Based on this diagnosis of complete mental health, recent research shows that barely one-quarter of individuals who had not suffered an episode of major depression during the past year fit the criteria for flourishing. Most non-depressed adults were moderately mentally healthy, while nearly one-quarter of non-depressed adults were diagnosed as *languishing* in life. Moreover, studies reveal that adults who were diagnosed as completely mentally healthy functioned superior to all others in terms of fewest workdays missed or cutback, lowest level of limitation of activities of daily living, and the lowest risk of cardiovascular disease (Keyes, 2002, 2004a).

A protective factor is connected directly with the concept of resilience (Keyes, 2004b; Masten, 2001), because it acts to avert or mitigate a risk factor, which in the present study is the rise of physical health conditions with age. Studies show that the presence of emotional well-being, an important component of the complete mental health diagnosis, prevents the onset of disability among older adults. In a sample of older (65 to 99 years old) Hispanic community-dwelling adults without limitations of daily life at baseline, Ostir and colleagues (Ostir et al., 2000; see also Danner et al., 2001; Penninx et al., 1998) found that those with high positive affect were half as likely as the adults with low positive affect to have died or to have acquired limitations of activities of daily life two years later. These findings controlled for sociodemographic variables, functional physical status, lifestyle (i.e., smoking and drinking), and negative affect scores at baseline.

Using the complete mental health diagnosis and the Midlife in the United States (i.e., MIDUS) data, findings revealed that adults with complete mental health had the lowest prevalence and adjusted risk of any cardiovascular disease (Keyes, 2004a). Why complete mental health (e.g., the absence of de-

pression and the presence of flourishing) may act as a protective factor is suggested by findings from a recent paper that examined the psycho–social resources of mentally healthy adults (Keyes, 2005). In this study, and compared with adults diagnosed as moderately mentally healthy, languishing, or depressed, adults who were completely mentally healthy reported the highest levels of psychosocial resources. That is, completely mentally healthy adults report the highest levels of direction in life (e.g., they know what they want out of life), intimacy (e.g., they feel really cared for by a friend or family member), resilience (e.g., they can change bad situations for the better and learn from difficult situations), and they report the lowest levels of helplessness (e.g., I cannot change important things in one's life).

In sum, the purpose of the current study is to extend the previous research on the nexus of mental illness with chronic physical conditions. Does complete mental health operate as a protective factor against the accumulation of chronic physical conditions with age? Current empirical understanding of the functioning and psychosocial resources of adults who are completely mentally healthy suggests the hypothesis that mental health may act as a protective factor against the accumulation of chronic physical conditions with age. Thus, the primary hypothesis is that adults who are completely mentally healthy should report significantly fewer chronic physical conditions at all ages than adults who are moderately mentally health, languishing, depressed, or languishing and depressed.

Methods

Sample

Data are from the MacArthur Foundation's Midlife in the United States survey. This survey was a random-digit-dialing sample of non–institutionalized English-speaking adults age 25 to 74 living in the 48 contiguous states, whose household included at least one telephone. In the first stage of the multistage sampling design, investigators selected households with equal probability via telephone numbers. At the second stage, they used disproportionate stratified sampling to select respondents. The sample was stratified by age and sex, and males between ages 65 and 74 were oversampled.

Field procedures were initiated in January of 1995 and lasted 13 months. Respondents were contacted and interviewed by trained personnel, and those who agreed to participate in the entire study took part in a computer-assisted telephone interview lasting 30 minutes, on average. Respondents then were mailed two questionnaire booklets requiring 1.5 hours, on average, to complete. Respondents were offered $20, a commemorative pen, periodic reports of study findings, and a copy of a monograph on the study.

The sample consists of 3,032 adults. With a 70% response rate for the telephone phase and an 87% response rate for the self-administered question-

naire phase, the combined response is 61% (.70 × .87 = .61). Descriptive analyses are based on the weighted sample to correct for unequal probabilities of household and within household respondent selection. The sample weight post-stratifies the sample to match the proportions of adults according to age, gender, education, marital status, race, residence (i.e., metropolitan and non-metropolitan), and region (Northeast, Midwest, South, and West) based on the October 1995 Current Population Survey.

Measures

Chronic Physical Conditions. During the telephone interview, respondents were asked whether they suspected, or had a medical doctor confirm, that they had any of 27 chronic physical health problems (Table 1). The measurement of chronic conditions in the MIDUS was adapted from the Medical Outcomes Study (Brazier et al., 1992), which provides validated measures of self-reported physical morbidity that have been used in epidemiological studies of comorbid psychiatric and physical conditions (Wells et al., 1989).

Mental Illness. The Midlife in the United States survey employed the Composite International Diagnostic Interview Short Form (CIDI-SF) scales, which was designed to measure most common mental disorders (Kessler et al., 1998), demonstrated excellent diagnostic sensitivity and specificity when compared with diagnoses based on the complete CIDI in the National Comorbidity Study (Kessler et al., 1999). During the telephone interview, the CIDI-SF was used to assess whether respondents exhibited symptoms indicative of major depression episode (MDE) during the past 12 months. Respondents were classified as having had a major depressive episode based on the criteria established by the DSM-III-R (American Psychiatric Association, 1987).

Complete mental health was measured with three established multi-item scales of subjective well-being and based on Keyes (2002, 2005).

Emotional Well-Being. By self-administered questionnaire, respondents indicated how much of the time during the past 30 days—"all," "most," "some," "a little," or "none of the time"—they felt six symptoms of positive affect. The positive affect symptoms are (1) cheerful, (2) in good spirits, (3) extremely happy, (4) calm and peaceful, (5) satisfied, and (6) full of life. The internal reliability of the positive affect scale is .91. Respondents also evaluated their life satisfaction as follows: "rate their life overall these days" on a scale from 0 to 10, where 0 meant the "worst possible life overall" and 10 meant "the best possible life overall."

Psychological Well-Being. Ryff's (1989) measures of psychological well-being operationalize how much individuals see themselves thriving in their personal life. The scales represent distinctive dimensions (Ryff & Keyes, 1995) of subjective well-being. The scales with a representative item in parenthesis are as follows: self-acceptance ("I like most parts of my personality"), positive relations with others ("maintaining close relationships has been difficult

and frustrating for me"), personal growth ("For me, life has been a continual process of learning, changing, and growth"), purpose in life ("I sometimes feel as if I've done all there is to do in life"), environmental mastery ("I am good at managing the responsibilities of daily life"), and autonomy ("I tend to be influenced by people with strong opinions").

Each scale consisted of three items with a relative balance of positive and negative items self-administered via the questionnaire. On a scale from 1 to 7 (with 4 as a middle category of neither agree nor disagree), respondents indicated whether they agreed or disagreed strongly, moderately, or slightly that an item described how they functioned (i.e., thought or felt). Negative items were reverse-coded. The three-item scales have shown modest internal consistency (i.e., around .50; see Ryff & Keyes, 1995), and the internal consistency of the combined 18 items is .81.

Social Well-Being. Keyes' (1998) measures of social well-being operationalize how much individuals see themselves thriving in their social life. The scales with a representative item in parentheses are as follows: social-acceptance ("People do not care about other peoples' problems"), social actualization ("Society isn't improving for people like me"), social contribution ("My daily activities do not create anything worthwhile for my community"), social coherence ("I cannot make sense of what's going on in the world"), and social integration ("I feel close to other people in my community").

Each scale consisted of three items with a relative balance of positive and negative items and was self-administered. On a scale from 1 to 7 (with 4 as a middle category of neither agree nor disagree), respondents indicated whether they agreed or disagreed strongly, moderately, or slightly that an item described how they functioned (i.e., thought or felt). Negative items were reverse-coded. The three-item scales have shown modest-to-excellent internal consistency (Keyes, 1998), and the internal consistency of the social well-being scale with all items combined is .81.

To diagnose mental health, all scales of well-being were divided by the number of constituent items, standardized, and tertiles were computed for each scale. Individuals with scores in the upper tertiles of one of the two emotional well-being scales and six of the 11 scales of psychological and social well-being were classified as flourishing. Individuals with scores in the lower tertiles of one of the two emotional well-being scales and six of the 11 scales of psychological and social well-being were classified as languishing. Adults who were neither flourishing nor languishing were classified as moderately mentally healthy.

Complete mental health status was constructed by cross–tabulating the depression diagnosis with the mental health diagnosis. This resulted in the following categories of complete mental health: complete mental health (i.e., absence of depression and the diagnosis of flourishing), moderately mentally healthy, languishing (i.e., without MDE), major depressive episode (MDE), and languishing and MDE.

Sociodemographic, Control Variables. Chronological age was coded as a continuous variable. Sex, race (white versus minority), marital status (currently married versus all other), whether the respondent engages in any physical exercise, and whether the respondent current smokes or ever smoked were coded dichotomously. Total household income was measured continuously, as was education, which was the highest grade or year or schooling completed.

Lastly, body mass index (BMI) was obtained from the self-report of a respondent's current weight, waist size, hip size, and height. The BMI measurements were obtained by including a tape measure with each self report questionnaire, which included instructions in both picture and word format. All respondents were instructed to take the measurements standing, to avoid taking measurements over clothing, to record their answers to the nearest one-fourth of an inch, and the use the provided diagram to specify the location of hips and waist. The BMI is an individual's weight in kilograms divided by height in meters squared. (BMI=kg/m^2), and is an indicator of body fat.

Results

Table 1 presents the unadjusted association of each of the 27 self-reported chronic physical conditions with the complete mental health diagnosis. The percentage of chronic disease is computed within each category of mental health. Findings reported in Table 1 strongly support the hypothesis that the mental health diagnosis is associated with chronic conditions, as mental health was associated with 23 of the 27 conditions (i.e., 85% of the chronic physical conditions). The risk of chronic conditions was highest among adults who are languishing and had an episode of major depression. In sharp contrast, adults who were completely mentally healthy reported the lowest risk of chronic physical conditions, even less than adults diagnosed as moderately mentally healthy. Compared with moderately mentally healthy adults, those who were languishing reported more chronic conditions and, in most cases, about the same amount of conditions as adults with a pure episode of depression.

Next, the count of the number of chronic physical condition (out of 27 possible) was treated as a dependent variable in a simple ANOVA with age coded into three groups (young = 25-39, midlife = 40-59, older = 60-74) and the categories from the complete mental health diagnosis. Results revealed a main effect of age ($F_{(2,2990)} = 47.8$, $p < .001$) and for complete mental health ($F_{(4,2990)} = 63.9$, $p < .001$). The average number of chronic physical conditions among young adults was 1.8 (*SD* = 2.2), among midlife adults it was 2.5 (*SD* = 2.6), and among older adults it was 3.1 (*SD* = 2.6). The mean number of chronic physical conditions was 4.5 (*SD* = 3.4) among adults who were languishing and had MDE, 3.1 (*SD* = 3.2) among adults with only MDE, 3.1 (*SD* = 3.0) among adults who were languishing, 2.1 (*SD* = 2.2) among adults who were moderately mentally healthy, and 1.5 (*SD* = 1.7) among adults who were

Table 1

Prevalence of Chronic Physical Conditions by Complete Mental Health

	Complete Mental Health Status					
Physical Condition Prevalence	Languishing and Major Depressive Episode *N* = 143	Pure Major Depressive Episode *N* = 285	Languishing *N* = 368	Moderately Mentally Healthy *N* = 1,716	CompletelyMentally Healthy *N* = 520	$\chi^2_{(df=4)}$
Stomach Problems[1] 20.6%	50.3%	24.2%	29.8%	18.6%	10.2%	136.7***
Back Problems[2] 20.5%	36.9%	26.7%	26.3%	18.8%	13.9%	54.1***
Arthritis[3] 19.6%	31.5%	21.9%	23.5%	18.8%	14.6%	25.9***
High Blood Pressure 18.1%	18.9%	18.9%	20.9%	18.1%	15.6%	4.3
Hayfever 15.8%	25.9%	19.4%	17.9%	15.0%	12.1%	21.0***
Urinary Problems 13.6%	20.4%	15.1%	16.5%	13.4%	9.3%	16.9**
Chronic Sleep Problems 12.9%	41.7%	25.3%	20.7%	9.4%	4.2%	217.4***
Asthma, Other Lung[4] 12.7%	25.2%	18.2%	13.5%	11.5%	9.8%	34.2***
Foot Problems[5] 11.7%	22.5%	11.5%	17.1%	10.7%	8.1%	34.5***
Piles or Hemorrhoids 11.5%	14.0%	14.7%	13.3%	11.0%	9.2%	7.9
Migraine Headaches 11.3%	28.0%	20.0%	12.4%	9.8%	5.8%	81.4***
Skin Problems[6] 10.6%	16.8%	16.8%	13.5%	9.1%	8.1%	28.2***
Teeth Problems[7] 10.4%	23.2%	10.2%	16.5%	10.1%	3.7%	43.8***
Gum Problems[8] 8.3%	23.1%	9.8%	13.5%	7.1%	3.9%	71.4***
Persistent Constipation 7.0%	11.1%	8.4%	9.6%	6.6%	4.4%	14.4**

Table 1 (cont.)

Gall Bladder 2.6%	8.4%	3.9%	1.9	2.6%	1.0%	26.7***
Neurological Disorder[9] 1.7%	0.7%	4.2%	2.2%	1.6%	0.8%	14.7**
Varicose Veins[10] 1.6%	2.8%	2.5%	2.5%	1.3%	1.0%	6.9
Autoimmune Disorder[11] 1.1%	2.8%	1.4%	0.8%	0.9%	1.0%	4.9
Stroke 1.0%	2.1%	2.1%	2.8%	0.6%	0.4%	20.9***
HIV/AIDS 0.4%	1.4%	1.1%	1.4%	0.1%	0.0%	24.4***
Tuberculosis 0.3%	0.0%	1.4%	1.1%	0.1%	0.0%	24.7***

Note: * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed).
[1]"Recurring stomach trouble, indigestion, or diarrhea"
[2]"Sciatica, lumbago, or recurring backache"
[3]"Arthritis, rheumatism, or other bone or joint disease"
[4]"Asthma, bronchitis, or emphysema"
[5]"Persistent foot trouble (e.g., bunions, ingrown toenails)"
[6]"Persistent skin trouble (e.g., eczema)"
[7]"Persistent trouble with your teeth"
[8]"Persistent trouble with your gums or mouth"
[9]"Multiple sclerosis, epilepsy, or other neurological disorder"
[10]"Trouble with varicose veins requiring medical treatment"
[11]"Lupus or other autoimmune disorders"

complete mentally healthy. In addition to the main effects, the ANOVA revealed an interaction of age and complete mental health ($F_{(8,2990)} = 3.1$, $p < .002$).

The interaction of age and complete mental health was scrutinized with multivariate regression using the number of chronic conditions as the dependent variable. Here, complete mental health was coded into dummy variables with complete mental health as the reference category. Age was treated continuously and multiplicative interaction terms were computed with each mental health category. Using the various controls, Table 2 reports the results of the multivariate regression model. Even with controls, moderately mentally healthy adults reported more chronic physical conditions than adults who were completely mentally healthy. Moreover, adults who had a major depressive episode reported an average of 1.4 more chronic physical conditions than completely mentally healthy adults. Both pure languishing and languishing with MDE interacted with age.

Table 2

Ordinary Least Squares Regression of Number of Chronic Physical Health Conditions onto Complete Mental Health Status and Controls (sample unweighted; *N* = 2,930)

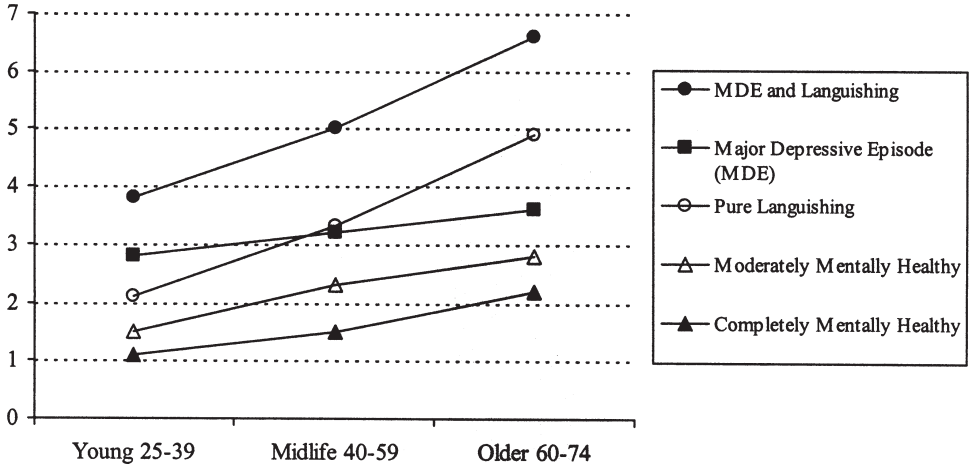
Predictor	*b*	β
Languishing with MDE	.91	.06
Pure Major Depressive Episode (MDE)	1.4***	.16
Pure Languishing	-.30	-.04
Moderately Mentally Healthy	.39***	.08
Pure Languishing × Age	.03*	.19
Languishing with MDE × Age	.04**	.15
Completely Mentally Healthy	-----	-----
Control Variables:		
Females (vs. males)	.45***	.09
Caucasians (vs. all ethnic minorities)	-.13	-.03
Married (vs. unmarried)	-.02	-.01
Level of Education	-.08***	-.04
Household Income	-.02	-.02
Age	.02***	.12
Does Not Exercise (vs. exercises)	.34***	.07
Whether Smokes (vs. never smoked)	.38***	.08
Body Mass Index	.06***	.13
α	-.79	-----
R^2	.18	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed).

The interaction terms indicate that the number of chronic conditions increase exponentially with age if one has pure languishing or is languishing and has an episode of major depression. Figure 1 portrays the interaction effects of pure languishing and languishing with MDE by age, showing the unadjusted mean level of chronic physical conditions. Young languishing adults have an average of one more chronic condition than flourishing young adults; midlife languishing adults report an average of about 1.7 more conditions than flourishing midlife adults; and languishing older adults have an average of 2.8 more chronic conditions than flourishing older adults. Similarly, young

Figure 1

Unadjusted Number of Chronic Physical Health Conditions by Age Group and Complete Mental Health Diagnosis



languishing adults with MDE report an average of 2.8 more chronic conditions than flourishing young adults; midlife languishing adults with MDE have an average of 3.5 more conditions than flourishing midlife adults; and languishing older adults who also had MDE have an average of 4.6 more chronic conditions than flourishing older adults.[2]

In addition, and with adjustments in the multivariate regression, the main effects of moderate mental health and pure major depressive episode provide support for the hypothesis that all levels of mental health are associated with chronic physical conditions. While chronic conditions increased an average of 0.02 for each yearly increment in age, findings also show that at all ages, moderately mentally healthy adults report 0.39 more chronic conditions than flourishing adults. Compared with flourishing adults, those with a pure episode of major depression report 1.4 more chronic health conditions at all ages.

Discussion

This study investigated whether mental health influences the risk of chronic physical disease throughout adulthood. Prior studies that have addressed this question have treated mental health dichotomously; that is, compared with adults not diagnosed and depressed, adults with depression are at elevated risk of a host of chronic physical conditions. In this study, mental health is conceived of and measured as a complete state consisting of five distinctive categories of mental health and illness. This study sought to extend past research by investigating whether flourishing—absence of depression and pres-

ence of emotional, psychological and social well-being—acts as a protective factor against the accumulation of chronic physical diseases with age.

The complete mental health diagnosis permits distinguishing between adults otherwise free of major depression but having moderate mental health or languishing in life with low levels of subjective well-being. This study, then, investigated whether the absence of mental health (i.e., languishing and moderate mental health) are risk factors for the chronic conditions with age in the same way that the presence of mental illness (i.e., major depressive episode with and without languishing) have been shown to be risk factors for chronic conditions.

Findings support the thesis that complete mental health is a potential protective factor against the rise of chronic physical disease with age. Descriptive analyses revealed that flourishing adults reported the lowest prevalence of 23 of a possible 27 chronic conditions, compared with all other adults. Compared with flourishing adults, moderately mentally healthy adults reported a higher prevalence of specific chronic conditions, and in the multivariate regression, reported slightly more chronic conditions on average. As in previous research (Keyes, 2002, 2005), the condition of pure languishing was associated with levels of impairment that were comparable to levels associated with major depressive episode. In turn, and similar to those previous studies, the condition of languishing with an episode of major depression was associated with the highest level of impairment. That is, individuals who were languishing and reported an episode of major depression reported the highest prevalence of specific chronic conditions and the highest total number of chronic conditions.

The interactions of pure languishing with age and of the condition of languishing and MDE with age revealed that the rate of accumulation of chronic physical conditions among these individuals increases with age. For example, young adults with pure languishing reported an average of 1.0 more chronic physical condition than completely mentally healthy young adults. By comparison, older adults with pure languishing reported an average of 2.7 more chronic physical conditions than completely mentally healthy older adults. Thus, older languishing adults had nearly three times as many chronic conditions as languishing younger adults. Moreover, completely mentally healthy young adults reported an average of 1.1 chronic conditions, compared with an average of 2.2 among completely mentally healthy older adults. That is, completely mentally healthy older adults had about one more chronic physical condition than completely mentally younger adults.

While the findings of this study suggest that flourishing may be a protective factor against chronic disease, several limitations warrant caution with any strict causal conclusion. First, the MIDUS data are cross-sectional, which preclude disentangling causal direction between mental and physical health. It is plausible that the incidence and presence of chronic conditions adversely affect emotional, psychological and social well-being. Regardless of causal-

ity, however, the conclusions of this study support the growing literature highlighting the importance of including mental health and mental illness into studies of population aging. Second, the measures and diagnosis of complete mental health and the chronic physical conditions were subjective, self-reports. Telephone interviews, furthermore might have biased self-reports of CIDI assessment criteria. While both sets of measures have shown excellent measurement qualities, the ability to buttress this research with clinical studies that use experts clinician assessment of a patient's complete mental health status with medical records of chronic conditions (and severity) would be important next steps.

Notes

1. Reasons for why age is a risk factor for physical health conditions are well established in the research literature on biological, cellular (e.g., free radicals and oxidative stress) and genetic (e.g., telomere shortening) response to stress and the normal adaptation to life's demands that produce long-term wear-and-tear (see Epel et al., 2004; McEwen, 1998).
2. Because neither of the main effects for pure languishing or languishing with MDE were statistically significant in the multivariate regression, this means that the average number of chronic conditions among young adults with languishing or who were languishing and had MDE were not different.

Biographical Note

Dr. Corey L.M. Keyes was a member of the prestigious MacArthur Foundation interdisciplinary research network on successful midlife development, and was co-chair (with then American Psychological Association President, Martin Seligman) of the historic First Summit of Positive Psychology held at the Gallup Organization in 1999. He is a founding steering committee member of the interdisciplinary Society for the Study of Human Development.

His recent work includes edited volumes entitled *Flourishing: Positive Psychology and the Life Well-Lived* (APA Press, 2003), and *Well-Being: Positive Development Through the Life-Course* (Erlbaum, 2003)), a special journal issue entitled *Risk and Resilience in Human Development* (in *Research on Human Development*), and *Women and Depression: A Handbook of Medical, Psychological and Social Perspectives* (Cambridge University Press, in press).

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