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Teasing Apart the Effects of Cognition, Stress, and Depression on Health

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Abstract

Objective—To test whether cognitive vulnerability could explain the link between depression and poor health.

Methods—A 4-week longitudinal design was used to examine health problems (eg, diabetes), health behaviors (eg, smoking), depressive symptoms, cognitive vulnerability, and life stress in a sample of 154 undergraduates.

Results—Contrary to hypotheses, depressive symptoms, but not cognitive vulnerability, were associated with health problems. However, as predicted, cognitive vulnerability was a better predictor of prospective changes in specific health behaviors than were depressive symptoms. Unexpectedly, life stress was the best predictor of prospective changes in specific health behaviors.

Conclusions—These results are among the first to show that the factors associated with health problems are different than those associated with specific health behaviors.

Keywords

health; depression; cognitive vulnerability; stress

There is a reliable association between depression and poor health.[1] For example, the rates of cancer, heart attack, disability, infections, immune dysfunction, and mortality are greatly increased for those suffering from depression.[2,3] Moreover, depression is associated with maladaptive behaviors that can lead to poor physical health such as smoking, poor diet, lack of exercise, poor sleep hygiene, and noncompliance with medical treatment recommendations.[4,5] Clearly, understanding the mechanisms responsible for the depression-health connection is vital to the improvement of both mental and physical health.

Most explanations of the depression-health connection focus on depression as a causal agent; depression directly disrupts stress, motivational, and immune systems, which in turn, leads to poor health outcomes.[6–8] The goal of this study was to test an alternative hypothesis that could explain the link between depression and poor health. In contrast to existing

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Human Subjects Statement

The study received approval from the university's institutional review board for human subjects research, and participants were fully informed about the study before consenting.

Conflict of Interest Statement

The authors have no conflicts of interest to report.

theories, we hypothesized that the negative effects of depression on health are not due to depression per se, but rather, the negative cognitions that causally contribute to depression. A growing body of research suggests that the negative cognitive processes associated with depression might lead to both poor health behaviors and poor health outcomes.[9] Whereas previous work has focused specifically on depression, our study examined an overlooked, but distinct, cognitive vulnerability factor that might better account for the depression-health connection. We theorized that negative cognitions would be a stronger predictor of health problems (eg, hypertension, obesity, etc.) and poor health behaviors (eg, smoking, lack of exercise, etc.) than depression.

We investigated our hypothesis in a college sample. It is particularly important to examine the depression-health connection in this population because undergraduates are at a vulnerable period for both the development of depression and health-related problems. Indeed, the prevalence and severity of depressive symptoms and depressive disorders are especially high among college students.[10–12] The years 18–24 are the peak risk ages for the onset of unipolar depression.[13] College students are also at high risk for health problems and the development of poor health behaviors. For example, college students are particularly susceptible to infectious diseases (eg, mononucleosis); moreover, they have high rates of STDs, and can suffer from major medical problems such as diabetes, asthma, obesity, and hypertension.[14] College students are also at an important age for developing and solidifying health-influencing behaviors such as eating habits, exercise participation, and tobacco use. The health behaviors developed during the college years can affect one's vulnerability to disease during adulthood.[15,16]

In the following sections we provide a brief literature review supporting our novel theory. First, we review the literature demonstrating the link between negative cognitions and depression. We then examine the association between negative cognitions and poor health. Within the broad category of "health," we distinguish between health *problems* and health *behaviors*. This distinction is important, particularly in college populations, as students might not yet have become symptomatic for physical health problems (eg, hypertension, high cholesterol, etc.); however, they are at a critical age for establishing poor health behaviors (eg, smoking, lack of exercise, etc.) that will affect their future health. We conclude with a discussion of the specific hypotheses to be tested.

Negative Cognitions and Depression

The cognitive theories of depression[17,18] are among the most widely tested models of depression. According to these theories, individual differences in the interpretation of stressful life events determine who is at risk for depression. Specifically, life stress activates *cognitive vulnerability*, which is a risk factor for future depression. One prominent cognitive theory of depression, the hopelessness theory,[18] defines cognitive vulnerability as the tendency to generate interpretations of stressful life events that have negative implications for one's future and for one's self-worth. Research shows that cognitive vulnerability is a trait-like risk factor that stabilizes in early adolescence, and confers risk for depression throughout the life span.[19,20]

Recent research has provided strong support for hopelessness theory's cognitive vulnerability hypothesis. [20,21] Prospective studies have consistently found that cognitive vulnerability interacts with stress to predict the development of depressive symptoms and depressive disorders.[22] These studies have shown that it is possible to take a group of individuals who have never experienced depression and predict which of them are most likely to develop a first episode of clinically significant depression based solely on differences in cognitive style for interpreting stressful events. Taken together, these studies establish that cognitive vulnerability in combination with stress (ie, their interaction) is an important contributor to depression.

Negative Cognitions and Health

An emerging body of research on the mind-body connection suggests that the same types of negative cognitions that contribute to depression may also lead to poor health outcomes.[23,24] Research shows that individuals who have a tendency to generate negative cognitions in response to stress are more likely to have higher cortisol levels and impaired functioning of the immune, endocrine, and cardiovascular systems than individuals who do not generate these types of cognitions.[25] For example, Segerstrom and Sephton[26] found that cognitive expectancies about future success predicted the strength of the immune response in a sample of first-year law students. Specifically, law students with more optimistic cognitions about their future exhibited a significantly stronger immune response to a cell-mediated immunity task than those with more negative expectancies.

Cognition also has been associated with poor health behaviors.[27] Research indicates that cognitive expectancies can predict changes in diet, exercise, and cigarette smoking.[28] In addition, individuals who have negative cognitions predicting their own premature mortality are significantly more likely to engage in risky behavior and to receive a future HIV/AIDS diagnosis.[29] Taken together, these findings support the hypothesis that negative cognitions, rather than depression specifically, are responsible for poor physical health and health-related behaviors.

Summary and Hypotheses

We hypothesized that the association between depression and poor health could be explained, in part, by an overlooked variable – negative cognitions (ie, cognitive vulnerability). Research suggests that the cognitive vulnerability factor that precedes and predicts depression also has the potential to lead to poor health and health-related behaviors. [23–27] To test our hypothesis, we used a 4-week longitudinal design with 2 time points to examine associations among depressive symptoms, cognitive vulnerability, life stress, and recent health problems (eg, hypertension, mononucleosis, irritable bowel syndrome, etc.) and specific health behaviors (smoking, poor diet, exercise, etc.). This design is a strong one because it is assesses both health problems and health behaviors. As noted earlier, it is not only important to understand risk factors for fully-developed physical ailments, but also for the development of poor health behaviors that can affect the future health of individuals. In addition, our study design measured stress. The assessment of stress was necessary for testing our primary hypothesis about negative cognitions. According to cognitive theory,

negative cognitions are activated by stressful life events. In other words, stress serves as the occasion-setter by which cognitive vulnerability exerts its effects. However, it is also possible that stress can exert an effect independent of cognitive vulnerability on participants' health.[30,31] Thus, our study design allowed us to test the hypothesized interaction of stress and cognitive vulnerability as well as the main effect of stress.

We tested 2 primary hypotheses. First, we predicted that cognitive vulnerability would be a stronger predictor of recent health problems than depressive symptoms. Specifically, we hypothesized that participants with higher levels of cognitive vulnerability would report a greater history of physical health problems than participants with lower levels of cognitive vulnerability. Our second prediction was that cognitive vulnerability would combine with stress to be a stronger predictor of prospective increases in poor health behaviors than depressive symptoms. Specifically, we hypothesized that participants with higher levels of cognitive vulnerability in the presence of stress would exhibit greater increases in maladaptive health behaviors over the 4-week prospective interval than participants with lower levels of cognitive vulnerability.

METHODS

Participants

Participants were 160 college students (mean age: 19.29 years; 57 males, 103 females; 73% Caucasian, 3% African-American, 10% Hispanic, 8% Asian, 6% Native American, Alaskan or Hawaiian) from a mid-sized private university in the Midwestern United States. Participants were recruited via the Psychology Department's on-line extra credit system. The study received approval from the university's institutional review board, and students were fully informed about the study before consenting. Participants completed 2 assessments separated by 4 weeks. Six participants were excluded from the sample because they did not complete both of the study time points. Thus, a total of 154 participants (101 women, 53 men) were included in the analyses.

Measures

Depressive symptoms—The Beck Depression Inventory[32] (BDI) is a widely used 21-item self-report inventory that assesses depressive symptoms. Participants rate symptoms of depression (eg, negative mood, pessimism, sleep disturbance, etc.) on 0–3 scales. Total scores on the BDI can range from 0 to 63, with higher scores indicating greater levels of depressive symptoms. The BDI has high internal consistency (coefficient alpha is typically greater than .8), test-retest reliability (r = .60–.83 for nonpsychiatric samples), and validity with both college and psychiatric samples.[33,34] The BDI was administered at both time points. Internal consistency in the current sample was acceptable; pre and post coefficient alphas were both > .85; test-retest reliability over the 4-week interval was .72.

Cognitive vulnerability—The Cognitive Style Questionnaire[35] (CSQ) was used to assess the cognitive vulnerability factor featured in the hopelessness theory of depression. The CSQ measures participants' causal attributions for the 12 hypothetical negative events (example event: *You take an exam and receive a low grade on it*). For each hypothetical event,

participants are instructed to write down what they believe to be the one major cause of the event. Participants then use a 7-point Likert-type scale to rate the cause on dimensions of stability and globality. They then rate the consequences and self-worth implications of the hypothetical event. An individual's CSQ score is the average rating across the scales (stability, globality, consequences, and self-worth characteristics) for the 12 hypothetical negative life events. This composite score can range from 1 to 7, with higher scores reflecting greater levels of cognitive vulnerability to depression. The CSQ has demonstrated excellent internal consistency (coefficient alpha typically > .90), reliability (eg, 1-year test-retest is .80),[22] and predictive validity.[35] The CSQ was administered at Time 1; coefficient alpha in the current sample was .91.

Health problems and health behaviors—The American College Health Association National College Health Assessment II (ACHA-NCHA-II) was used to assess health problems and health behaviors that are relevant to college students. The ACHA-NCHA-II is a widely used tool that has been administered twice a year since 2000 to over 900,000 students at 587 unique institutions. We used this tool to measure health problems that could have occurred over the previous year; health problems were rated as either 1 (no, not diagnosed or treated by a physician for the condition) or 2 (yes, diagnosed or treated by a physician for the condition). The following health problems were assessed in this study: back pain, diabetes, hypertension, cholesterol, irritable bowel syndrome, migraine headaches, mononucleosis, sinus problems, and strep throat.

The ACHA-NCHA-II was also used to assess specific health behaviors. Health behaviors are assessed by the ACHA-NCHA-II for frequency during the previous 2 weeks. The following health behaviors were assessed in this study: self-reported general health (1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor), insomnia (0–7 times in the past week), regular sunscreen use (1 = no, 2 = yes), help-seeking behavior (1 = no, would not seek professional mental help, 2 = yes, would seek professional mental help), number of sexual partners (self-reported number), fruit/vegetable consumption (1 = 0 servings per day, 2 = 1–2 servings, 3 = 3–4 servings, 4 = 5 or more servings), vigorous exercise (0–7 days in the past week), strength training (0–7 days in the past week), weight perception (1 = very underweight, 2 = slightly underweight, 3 = about the right weight, 4 = slightly overweight, 5 = very overweight), and alcohol, cigarette, and marijuana use, respectively (1 = never used, 2 = have used but not in past 2 weeks, 3 = 1–2 days, 4 = 3–5 days, 5 = 6–9 days, 6 = 10–13 days, 7 = used daily).

The ACHA-NCHA-II is a self-report measure with acceptable reliability and validity. Although self-report has limitations in many instances, research (both meta-analyses and experimental studies) demonstrates that humans are capable of accurately reporting this type of information.[36–41] For example, the authors of a recent large-scale 7-year longitudinal study[37] concluded that, "Self-reported health is stable from early and middle adolescence to young adulthood. Self-reported health is also a valid measure of a variety of physical and emotional dimensions of adolescent well-being." With regard to the specific self-report health measure used in this study, a number of research studies have found the ACHA-NCHA-II to have strong psychometric properties. An evaluation of data from 1998–1999 using several data sets (including the National College Health Risk Behavior Survey

conducted by the Centers for Disease Control and Prevention) found strong reliability (eg, test-retest over the course of one year) and validity properties (eg, self-reported behaviors associated with behavioral measures) for the ACHA-NCHA-II.[42,43] Consistent with prior work, test-retest correlations for the health behaviors in the current study were acceptable, typically falling within the range of .6 to .8 (note that the only one of the health behaviors had a test-retest correlation fall below .6 [test-retest for number of sexual partners was .53]).

Life stress—The Acute Life Events Questionnaire[44] (ALEQ) was used to assess stressful life events. The ALEQ is an updated and modified version of the Life Events Questionnaire (LEQ).[45] The LEQ was modified to create the ALEQ by decreasing the number of items to 30 and focusing on events that are relevant to college students, naturally occurring, and acute. Items assess a broad range of life events from school/achievement (eg, failed a course) to interpersonal/romantic (eg, unwanted final break-up of relationship with girlfriend/boyfriend). Participants were instructed to indicate which of the negative life events had occurred to them over the previous 2 weeks. Scores can range from 0 to 30 with higher scores indicating the occurrence of more negative events. Prior research indicates that the ALEQ has good reliability (test-retest correlations typically range from .60 to .80) and predictive validity.[45–48] Internal consistency in the current sample was acceptable with alpha = .70 and test-retest reliability = .58.

Procedure

At Time 1, participants completed measures of cognitive vulnerability (CSQ), depressive symptoms (BDI), stressful life events (ALEQ), and recent health history and health behaviors (NCHA-ACHA-II). Four weeks later (Time 2), participants completed the same measures with the exception of the CSQ because of its stability over time.[19]

Data Analytic Strategy

We tested 2 primary hypotheses. First, we hypothesized that cognitive vulnerability, in combination with stress, would be more likely to be associated with recent health problems than depressive symptoms. To test this hypothesis, we examined the cross-sectional associations (ie, bivariate correlations) among health problems occurring within the past year (eg, diabetes, hypertension, elevated cholesterol, IBS, etc.) and depressive symptoms, cognitive vulnerability, life stress, and the interaction of cognitive vulnerability and life stress.

Our second hypothesis was that cognitive vulnerability would combine with stress to be a stronger predictor of prospective increases in specific health behaviors (eg, substance use, exercise, diet, etc.) than depressive symptoms. Specifically, we hypothesized that students with higher levels of cognitive vulnerability in the presence of stress would exhibit greater increases in maladaptive health behaviors over the 4-week prospective interval than individuals with lower levels of cognitive vulnerability. It is important to note that we did not examine major health problems in the prospective analyses because the 4-week time interval was insufficient for these types of major health problems to emerge or change. Thus, the prospective analyses focused on predicting changes in specific health behaviors that could vary over days and weeks. We used hierarchical multiple regression[49] to analyze the data.

Predictor variables were entered into each regression equation in 2 steps. In step one, the requisite baseline health behavior was entered to create a residual change score for the same health behavior measure 4 weeks later (dependent variable). Baseline level of stress was also entered in step one to control for any individual differences in life stress at baseline; also, by controlling for baseline levels of stress, we could examine how changes in stress during the interval led to changes in health behaviors. In step 2, the main effects of depressive symptoms (baseline), cognitive vulnerability (baseline), and stress (time 2) were entered. In step 3, the interaction of cognitive vulnerability and stress was entered. Individual variables within a given step were not interpreted unless the set as a whole was significant, thereby reducing Type I errors. We did not make corrections to family-wise alpha for either the cross-sectional or longitudinal analyses because research suggests that these adjustments are not recommended, particularly in studies in which analyses are hypothesis driven.[50–54]

RESULTS

Hypothesis 1 (Cross-Sectional): Cognitive Vulnerability is Associated with Recent Health History

Means and standard deviations for the study variables are listed in Table 1. To test the association among cognitive vulnerability, stress, depressive symptoms and recent health problems (ie, current or having occurred within the past year), we examined their bivariate correlations. As shown in Table 2, our hypothesis was not supported. Cognitive vulnerability, either alone or in combination with stress, was not consistently associated with recent health problems. Rather, our results corroborated prior research and found that level of depressive symptoms was most likely to be associated with health problems. As participants' levels of depressive symptoms increased, so did their levels of hypertension, mononucleosis, poor general health, insomnia, and alcohol use. Higher levels of depressive symptoms were also marginally significantly related ($p < .10$) to increased rates of IBS and migraines. Depressive symptoms were also related to baseline behaviors. Participants reporting higher levels of depressive symptoms were significantly less likely to participate in vigorous exercise and marginally less likely to participant in strength training than participants with lower levels of depressive symptoms.

Hypothesis 2 (Prospective): Cognitive Vulnerability × Stress is Associated with Changes in Maladaptive Health Behaviors

Results of the regression analyses provided partial support for the hypotheses. As shown in Table 3, cognitive vulnerability, in combination with stress, was a significant predictor of maladaptive health behaviors including decreased consumption of fruits and vegetables, decreased sunscreen use, and decreased help-seeking motivation; it is important to note that these effects were significant even after controlling for baseline levels of depressive symptoms. Follow-up analyses of the significant findings confirmed that the pattern of the interaction was as expected; when faced with stress, those with high levels of cognitive vulnerability reported an increase in maladaptive behaviors. Consistent with hypotheses, level of depressive symptoms was not a consistent predictor of changes in specific health behaviors above and beyond the variance explained by cognitive vulnerability. Analyses also revealed an unpredicted finding - that increased life stress, regardless of one's level of

cognitive vulnerability and depressive symptoms, was the most consistent and robust predictor of increases in maladaptive health behaviors, including marijuana use, alcohol use ($p = .08$), increased number of sexual partners, lack of vigorous exercise, and lack of strength training. Increases in stress also predicted trouble falling asleep ($p = .07$), and decreases in self-reported health status.

DISCUSSION

These results confirm prior research as well as provide novel findings. Consistent with prior research, cross-sectional analyses confirmed the association between depression and physical health problems such as hypertension and mononucleosis. Depressive symptoms were more strongly associated with recent health history than any other factor in the study, including cognitive vulnerability and life stress. These findings provide additional evidence for the depression-health connection in college students and refute the hypothesis that this association is the result of negative cognitions rather than depression specifically. Rather, it remains possible that depression could have a negative physiological effect on individuals, increasing their risk for a variety of health-related problems.

The results of the prospective analyses provided partial support for our hypothesis that cognitive vulnerability would be a more potent predictor of health behaviors than depressive symptoms. Cognitive vulnerability, in combination with stress, predicted decreased consumption of fruits and vegetables and less help-seeking motivation, even after controlling for depressive symptoms (which was not a reliable predictor of any specific health behaviors). These results support the belief that cognitive processes might be a more important antecedent to the development of poor health behaviors than depressive symptoms.

An unexpected finding from the prospective component of the study was the predictive power of life stress. Life stress was the strongest predictor of changes in specific health behaviors, even after controlling for depressive symptoms and cognitive vulnerability. The main effect of life stress predicted an impressive number of health behaviors including marijuana use, alcohol use, increased number of sexual partners, lack of vigorous exercise, lack of strength training, and sleep problems. This powerful effect of stress on specific health behaviors was not predicted; however, it is possible to explain this finding given the existing literature. It is theorized that stress leads to health behaviors that might be emotionally pleasing (eg, eating unhealthy foods, increased smoking) but physically unhealthy. For example, preliminary work shows that stress can lead to unfavorable changes in health behaviors such as decreased exercise and increased substance use in individuals preparing for examinations[55] and dealing with high job demands and marital conflict.[56] That said, the negative effects of stress are typically exacerbated by how an individual interprets the stress (ie, whether they generate negative cognitions). Thus, future research is necessary to explain why stress led to poor health behaviors regardless of one's cognitive vulnerability level. It is possible that a longer follow-up period would have revealed the expected stress by cognitive vulnerability interaction as it would have allowed more time for cognitions to exert their effects. However, it is also possible that if a stressor is potent enough, changes in health behaviors may result regardless of one's interpretation of its cause or meaning. These

individuals may have changed their health behavior to cope with and recover from stress, and failure to successfully adapt in the aftermath of the stressor may lead to persistence of poor health behaviors and even the development of depressive symptoms.

Results of the current study have at least 3 important implications for research on depression and health. First, this study examined the unique effects of cognition, stress, and depressive symptoms on recent health history and health behaviors. Our results support the assertion that these factors do not overlap in their predictive power, but rather, might each be related to different health outcomes. This finding suggests the possible necessity of creating interventions for at-risk individuals that simultaneously target multiple factors including cognition, response to stress, and depression. Second, these findings underscore the importance of distinguishing between physical health problems and specific health behaviors. Our results indicate that the factors that are associated with health problems are different than those associated with health behaviors. Indeed, our study revealed a double dissociation in which depressive symptoms (but not stress) were associated with health problems, and stress (but not depression) was associated with health behaviors. Thus, it will be important for future research to offer careful consideration of the outcome variable when making conclusions about the depression-health connection. Third, the noteworthy effect of life stress on health behaviors has important implications for both theory and practice. Theories explaining the depression-health connection need to incorporate and account for the possibly large effect of stress. If these effects are corroborated, then mental health professionals should consider implementing stress management courses or other therapies that teach stress coping skills that improve health behaviors. Providing at-risk individuals with the skills to deal effectively with stress could pave the way for healthier behaviors (non-smoking, decreased drug and alcohol use) throughout life.

It is important to note limitations of this study. First, it used a relatively short prospective interval. Although the interval was long enough to capture changes in specific health behaviors, it was not long enough to predict changes in health problems/health status. It will be important for future work to examine these variables using long-term intervals (eg, multiple years) to predict changes in health status as well as more enduring changes in health behaviors. A second limitation was the use of a correlational design; an experimental design is needed to make causal statements about the role of cognitive vulnerability, stress, and depression on health. Similar caution is needed when making conclusions about the direction of the findings (eg, changes in stress might be the result rather than cause of changes in health behaviors). Third, the current study examined depressive symptoms, but not clinical diagnoses. Thus, we cannot make conclusions about clinically significant forms of depression. However, given research suggesting that depressive symptoms and depressive syndromes lie on a continuum,[57,58] we expect that future research will provide evidence that this pattern of results also extends to depressive disorders. Finally, although college students are an ideal population for testing hypotheses about health and depression because of the high prevalence of depression and importance of this time period for developing adult health behaviors, this sample had a relatively low rate of health problems. It is unclear whether more robust associations among depressive symptoms, cognitive vulnerability, life stress, and health outcomes would be found in an older population where health problems are more prevalent.

Conclusions

This study was the first to attempt to tease apart the effects of depressive symptoms, cognitive vulnerability, and life stress on recent health history and health behaviors. The results provided partial support for the hypothesis that cognitive vulnerability could account for the depression-health connection. Consistent with prior research, depressive symptoms (and not cognitive vulnerability) were associated with recent health history. However, cognitive vulnerability was a better predictor of changes in specific health behaviors than were depressive symptoms. The study also revealed an unexpected and important finding. Specifically, we found that life stress was the best predictor of changes in specific health behaviors. This important finding suggests that implementing stress-reduction interventions could reduce negative health behaviors and in turn, help shape the trajectory of patients' future physical health. We look forward to future research that focuses on the potential explanatory role of life stress in explaining the depression-health connection.

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Table 1

Means and Standard Deviations for Study Variables at Baseline

Variable	Mean	SD
Depressive Symptoms	5.62	5.29
Cognitive Vulnerability	3.81	.99
Stressful Life Events	2.71	3.08
Self-reported General Health	2.17	.73
Insomnia	2.24	1.57
Sunscreen Use	1.51	.51
Help-seeking	1.75	.43
Cigarette Use	1.33	.73
Alcohol Use	3.01	1.16
Marijuana Use	1.36	.63
Number of Sexual Partners	.25	.46
Fruit and Vegetable Servings	2.75	.71
Vigorous Exercise	3.66	2.08
Strength Training	2.59	1.88
Back Pain	1.11	.31
Diabetes	1.01	.08
Hypertension	1.01	.08
Cholesterol	1.03	.16
Irritable Bowel Syndrome	1.03	.16
Migraines	1.06	.24
Mononucleosis	1.04	.19
Sinus Problems	1.20	.40
Strep	1.13	.34
Weight	149.72	30.91

Note.

N = 154

Higher values indicate greater depressive symptoms, cognitive vulnerability, number of stressful life events, insomnia, sunscreen use, help-seeking behavior, cigarette use, alcohol use, marijuana use, number of sexual partners, fruit/vegetable servings, days exercising, days strength training, back pain, diagnosis of diabetes, diagnosis of hypertension, diagnosis of high cholesterol, diagnosis of irritable bowel syndrome, diagnosis of mononucleosis, sinus problems, occurrence of strep, and weight. In contrast, higher values indicate poorer self-reported general health.

Table 2

Cross-Sectional Component: Bivariate Correlations among Depressive Symptoms, Cognitive Vulnerability, Stressful Life Events, and Recent Health Problems and Behaviors

Variable	Depressive Sxs	Cognitive Vulnerability	Stressful Live Events	Cognitive X Stress
Self-reported Health	**.38**	**.19**	**.20**	**.23**
Insomnia	**.32**	.12	**.41**	**.42**
Sunscreen Use	−.06	−.07	−.08	−.08
Help-seeking	−.04	.01	−.07	−.06
Cigarette Use	.06	.03	−.02	−.02
Alcohol Use	**.20**	.06	**.18**	**.18**
Marijuana Use	.07	.03	−.01	−.01
Number of Sexual Partners	.02	−.09	**.16**	.13
Fruit and Vegetable Servings	−.11	.03	−.08	−.08
Vigorous Exercise	**−.19**	−.01	.10	.10
Strength Training	***−.13***	−.06	.12	.10
Back Pain	.07	.03	**.22**	**.20**
Diabetes	−.10	−.03	.03	.02
Hypertension	**.26**	.09	.03	.05
Cholesterol	−.03	.05	−.01	−.01
Irritable Bowel Syndrome	***.14***	.12	−.03	.01
Migraines	***.14***	.06	.08	.11
Mononucleosis	**.17**	.04	.01	.01
Sinus Problems	−.03	.02	.10	.10
Strep	.10	.09	**.18**	**.20**
Weight	.11	.02	**.16**	**.16**

Note.

N = 154

Correlations in bold are significant at the $p < .05$ level; correlations in bold and italics are significant at the $p < .10$ level.

Table 3

Prospective Component: Depressive Symptoms, Cognitive Vulnerability, and Stressful Life Events Predicting Prospective Changes in Health Behaviors

Variable	Depressive Sxs	Cognitive Vulnerability	Increase in Stress	Cognitive × Increase Stress
Self-reported Health	pr = .10, b = .01	pr = .04, b = .02	pr = .24, b = .02	pr = .06, b = .02
	t = 1.2, p = .24	t = .46, p = .65	t = .87, p = .39	t = .68, p = .50
Insomnia	pr = .01, b = .00	pr = .02, b = .03	***pr = .15, b = .13***	pr = .04, b = .03
	t = .13, p = .90	t = .26, p = .79	***t = 1.8, p = .07***	t = .52, p = .60
Sunscreen Use	pr = −.13, b = −.01	pr = .06, b = .03	pr = −.08, b = −.02	**pr = .17, b = .04**
	t = −1.6, p = .12	t = .72, p = .48	t = −.91, p = .36	**t = 2.0, p = .046**
Help-seeking	pr = −.09, b = −.01	pr = .04, b = .01	pr = .02, b = .00	**pr = −.20, b = −.04**
	t = −1.0, p = .31	t = .49, p = .63	t = .24, p = .81	**t = −2.4, p = .02**
Cigarette Use	pr = .07, b = .01	pr = −.06, b = −.03	pr = −.04, b = −.01	pr = .07, b = .02
	t = .85, p = .40	t = −.75, p = .46	t = −.47, p = .64	t = .86, p = .39
Alcohol Use	pr = −.03, b = −.01	pr = .03, b = .03	***pr = .15, b = .08***	pr = .01, b = .01
	t = −.38, p = .71	t = .32, p = .75	***t = 1.8, p = .08***	t = .16, p = .87
Marijuana Use	pr = .05, b = .01	**pr = −.19, b = −.09**	**pr = .26, b = .07**	pr = −.01, b = −.01
	t = .65, p = .52	**t = −2.4, p = .02**	**t = 3.3, p = .001**	t = −.24, p = .81
No. Sexual Partners	pr = −.09, b = −.01	pr = −.09, b = −.04	**pr = .21, b = .05**	pr = .02, b = .00
	t = −1.1, p = .25	t = −1.1, p = .29	**t = 2.6, p = .009**	t = .23, p = .82
Fruits and Vegetables	pr = .01, b = .00	pr = .09, b = .06	pr = −.07, b = −.02	**pr = −.16, b = −.06**
	t = .11, p = .92	t = 1.1, p = .28	t = −.78, p = .44	**t = −2.0, p = .049**
Vigorous Exercise	pr = .07, b = .02	pr = −.03, b = −.05	**pr = −.25, b = −.21**	pr = .00, b = .00
	t = .82, p = .42	t = −.37, p = .71	**t = −3.1, p = .002**	t = .01, p = .99
Strength Training	pr = .00, b = .00	pr = .01, b = .00	**pr = −.23, b = −.14**	pr = .08, b = .05
	t = −.03, p = .98	t = .07, p = .95	**t = −2.8, p = .006**	t = .96, p = .34
Weight	pr = −.07, b = −.01	pr = .09, b = .04	***pr = .16, b = .04***	pr = .13, b = .03
	t = −.83, p =.41	t = 1.0, p = .30	***t = 1.9, p = .06***	t = 1.5, p = .13

Note.

N = 154

Partial correlations (ie, effect sizes; pr), unstandardized beta values (b), t-values, and p-values from the regression analyses. Results in bold are significant at the $p < .05$ level; results in bold and italics are significant at the $p < .10$ level.