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Level and Instability of Day-to-Day Psychological Well-Being and Risk for Depression

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For 21 days, 123 undergraduates provided measures of their self-esteem, anxiety, causal uncertainty, perceived control over outcomes, and the three constructs comprising A. T. Beck's (1972) cognitive triad. Factor analyses of measures of the mean level and day-to-day instability of these constructs produced 2 factors, level of well-being and day-to-day instability of well-being. Participants also provided 4 measures of risk for depression over 2½ months. For participants who were not at risk for depression, level of day-to-day well-being was negatively related to risk for depression, and this effect was not moderated by day-to-day instability. In contrast, for participants who were classified as at-risk for depression, day-to-day instability of well-being moderated the strength of the negative relationship between level of well-being and risk for depression. The relationship between level of well-being and depression was stronger for participants who were more unstable.

Research on individual differences in personality has tended to focus on traits, defined more or less as relatively enduring individual differences that are assumed to have some consistent influence on behavior, thought, or feeling. Accordingly, trait theorists have tended to focus on the stability of personality characteristics and on the consistency with which such differences manifest themselves across situations. However, a line of research has recently emerged that has focused on transient changes in a characteristic that traditionally has been considered a trait, self-esteem (Kernis, 1993).

Within this newer framework, self-esteem is conceptualized in terms of two relatively independent dimensions. The first is the traditional trait-focused level of self-esteem, which has been the subject of considerable research. The second dimension is the instability of self-esteem across relatively short periods of time such as days. Researchers have found that an individual's self-esteem can fluctuate over time, and some individuals experience greater fluctuations than others. Moreover, these fluctuations have been linked to a variety of constructs such as proneness to anger and hostility, defensiveness, rejection of negative feedback, and depressive symptoms (Kernis, Cornell, Sun, Berry, & Harlow, 1993; Kernis, Grannemann, & Barclay, 1989; Roberts & Monroe, 1992).

Using this recent research as a springboard, the present study was intended in part to test the hypothesis that self-esteem instability is a single facet of a multifaceted construct that includes the instability of related measures of well-being and adjustment. For example, at the trait level, self-esteem is negatively related to depressive symptoms and anxiety, which are positively related to each other (Gotlib, 1984). Within this framework, trait self-esteem can be thought of as a single facet of a multifaceted construct. If this is so, the instability of self-esteem should be positively related to the instability of other constructs because the instability of self-esteem represents the instability of an underlying, multifaceted construct. For present purposes, this latent construct was operationalized as psychological well-being or adjustment, with an emphasis on the inclusion of theoretical constructs that have been linked to depression.

This present study was also intended to examine the relationships between risk for depression and the instability of personality characteristics that have been associated with depression at a trait level (the well-being construct). Some research has suggested that the instability of well-being may be a better predictor of risk for depression than overall level of well-being. Butler, Hokanson, and Flynn (1994) found that the self-esteem of currently depressed and previously depressed people (those at risk for future depressive episodes) was more unstable than the self-esteem of people who had not been depressed, whereas the trait level of self-esteem of the previously depressed and those who had never been depressed did not differ.

Other research has suggested an interactive model in which risk for depression is a joint function of level and instability of well-being. Kernis, Grannemann, and Mathis (1991) found that the negative relationship between level of self-esteem and depressive symptoms was stronger for individuals with stable self-esteem than for those with unstable self-esteem. Kernis et al. found no effect for instability per se.

Yet another perspective on the relationships between risk for depression and the level and instability of well-being was provided by Roberts and Monroe (1992). In a longitudinal study,

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they found that self-esteem instability was associated with increases in depressive symptoms following a stressor such as academic failure only for people who had few depressive symptoms at the beginning of the study. A different pattern occurred for people who had higher levels of depressive symptoms at the beginning of the study. For them, self-esteem instability was not associated with increases in depressive symptoms following a stressor. Rather, self-esteem instability was associated with increases in depressive symptoms in the absence of a stressor.

These previous studies suggest that the relationships between risk for depression and the level and instability of self-esteem are complex and interactive. The present study measured three constructs, level and instability of day-to-day well-being and risk for depression, and tested an interactive model that posited that the interactive effect of instability and level of well-being in predicting risk for depression would be stronger for people who were at risk for depression than for those who were not at risk.

The model tested in this study was based on research on *diathesis–stress* models of depression, which assume that risk for depression is a function of vulnerability and stress (Abramson, Alloy, & Metalsky, 1988). In the present context, level of day-to-day adjustment was assumed to be a measure of vulnerability to depression, and day-to-day instability of adjustment was assumed to be a measure of how much people's psychological states fluctuate from day to day. Such fluctuations can be considered to be a measure of stress because greater instability may indicate that people are having more difficulties coping and managing their emotions (stress). Alternatively, instability may represent adaptive responses to changes in environments, although even adaptive changes may be stressful when they are considerable, and this possibility was also considered in the present study.

Following previous research, individuals' risk for depression was hypothesized to vary as a function of their vulnerability (level of day-to-day adjustment) and stress (day-to-day instability). We expected that, overall, level of day-to-day well-being would be negatively related to risk for depression; greater vulnerability should be accompanied by greater risk. In contrast, we did not expect to find a general main effect for day-to-day instability. In diathesis–stress models, stress is posited to increase risk for depression only when combined with increased vulnerability. Moreover, relationships between stress and risk for depression may vary across levels of vulnerability and across levels of stress itself.

The interactive effects of vulnerability and stress in predicting risk for depression were expected to vary as a function of the relative level of risk being considered, a combination of a diathesis–stress model and a *discontinuity* approach to measuring depressive symptoms. *Discontinuity* approaches assume that the relationships between two constructs change at some critical level of one of the constructs. In contrast, *continuity* approaches assume that relationships are consistent (usually linear) across levels of the constructs. In the present case, relationships between day-to-day well-being and risk for depression were expected to change at a particular level of risk for depression, an at-risk cutpoint.

For people at risk for depression, degree of risk was expected to be a joint function of level and instability of well-being. Previous research (Butler et al., 1994) suggests that the daily fluctuations in well-being of people who are at risk for depression are greater than the fluctuations of those who are not at risk. Furthermore, daily fluctuations should affect those who are at risk more than those who are not because the stress itself (fluctuations) and its perceived impact are greater. By definition, people who are at risk for depression are more vulnerable to stress. Lower levels of day-to-day well-being (greater vulnerabilities) combined with higher fluctuations (greater stress) should produce the greatest risk for depression.

In contrast, those not at risk for depression are less vulnerable, and they experience less stress because they fluctuate less from day to day. Moreover, compared to their at-risk counterparts, they are likely to perceive less stress in the same situation. They are generally not vulnerable to depression, and the normal day-to-day stress they experience and its perceived impact do not increase their risk for depression. For those not at risk, risk for depression should not vary as a function of day-to-day instability (stress).

In conceptualizing relative risk for depression, this study employed the construct of a *cutpoint,* a symptom level that represents a qualitative change in the meaning or importance of depressive symptoms. Such relationships between symptom and risk are termed *discontinuous* because of the important change in the nature of the symptom–risk relationship at the cutpoint. For example, research suggests that the amount a score is above a certain point (originally 16) on the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) represents increasingly greater risk of experiencing a depressive episode, whereas the amount a score is below this point is unrelated to risk (Ensel, 1986). Researchers using the Beck Depression Inventory (BDI; Beck, 1967) have also used such cutpoints, although for both measures there is some disagreement about the exact score that should serve as a cutpoint.

Although many researchers have treated measures of depressive symptoms such as the CES-D and the BDI as continuous, there is some support for discontinuity models aside from validity studies of the measures themselves. Nezlek, Imbrie, and Shean (1994) found that depressive symptoms were not correlated with measures of affective reactions to social interactions for people below the CES-D at-risk cutpoint, whereas symptoms and affective reactions were strongly and negatively correlated for people above the cutpoint. The results of Roberts and Monroe (1992) also support a discontinuity approach because they found that relationships between depressive symptoms and other measures varied as a function of people's level of depressive symptoms. The hypothesis tested in the present study was a discontinuity hypotheses in that it was expected that the relationship between risk for depression and measures of day-to-day well-being would be stronger for people above an at-risk cutpoint than for people below it.

A wide variety of theories regarding the development and maintenance of depression have been proposed, and five constructs that have been linked to depression were used to operationalize the latent construct of well-being investigated in the present study: Beck's cognitive triad (Beck, 1972), control over the outcomes of one's behavior (Abramson, Seligman, & Teas-

dale, 1978; Deci & Ryan, 1985), the ability to detect cause and effect in the social world (Weary, Jordan, & Hill, 1985), anxiety (Greenberg, Vazquez, & Alloy, 1988), and self-esteem (Brown & Harris, 1978).

These five constructs were conceptualized as components of the diathesis described in several prominent cognitive theories of depression collectively known as *diathesis–stress* models (Abramson et al., 1988). In general, *diathesis–stress* models consider combinations of life stressors and vulnerability factors within individuals as causes of depression (Abramson et al., 1988), although specific vulnerability factors differ from model to model.

In his cognitive triad theory of depression, Beck (1972) suggested that individuals vulnerable to depression have a negative view of self, a negative view of the world, and a negative view of the future. Beck's theory asserts that negative life events and negative schemata interact to produce cognitive distortions, which in turn produce the cognitive triad that leads to depressive symptoms (Beck, Rush, Shaw, & Emery, 1979).

The hopelessness theory of depression (Abramson et al., 1978) is also considered to be a diathesis–stress model. A major tenet of this theory is that perceived lack of control over outcomes is associated with greater risk for depression. For present purposes, perceived control over behavioral outcomes was conceptualized in terms of Deci's (1980, 1992) self-determination theory. Specifically, the *impersonal orientation* documented by Deci and Ryan (1985) was used because this construct concerns people's perceptions of their abilities to initiate behaviors that consistently lead to desired outcomes. Moreover, individuals' impersonal orientations have been found to be correlated with reports of depressive symptoms (Deci & Ryan, 1985) and are similar to the central component of the hopelessness model of depression.

Depression has also been investigated using an approach that emphasizes how people process social information. Weary and her colleagues have investigated the role of causal uncertainty in depression (Weary et al., 1985). Causal uncertainty refers to people's perceived ability to predict or explain causal relationships in the social world. Specifically, scores on the Causal Uncertainty Scale, which measures this construct, have been found to be positively correlated with measures of depression (Weary & Edwards, 1994), and causal uncertainty was measured in the present study.

Another common finding in research on depression is the close link between anxiety and depression. Symptoms of anxiety are routinely associated with depression, and differential diagnosis can often be difficult (Greenberg et al., 1988). It was beyond the scope of the present study to address these issues; however, it is generally agreed that anxiety is an important correlate of depression, and anxiety was measured in this study.

Finally, level of self-esteem has been linked to depression by several researchers (Brown & Harris, 1978; Tennen & Herzberger, 1987). Feeling bad about one's self is a facet of many theories of depression (Beck, 1972; Rosenberg, 1965), and low self-esteem is a risk factor for depression. Moreover, the instability of self-esteem has been linked to depression (Butler et al., 1994; Kernis et al., 1991). Accordingly, people's self-esteem was measured in the present study.

In sum, five constructs that have been identified as vulnerability factors in the onset and maintenance of depression were the focus of this study, and these are referred to collectively as *well-being*. Each of these constructs was measured on a daily basis, providing measures of the day-to-day level and instability of well-being. It was hypothesized that these constructs represented a latent construct of well-being and that people's day-to-day instability on these constructs represented a latent construct of the instability of well-being. Moreover, it was expected that people's risk for depression would be related to the level and instability of daily well-being and that this relationship would vary as a function of whether people were above or below an at-risk cutpoint for a depressive episode.

Method

Participants

The 128 participants in the study were drawn from a pool of 700 introductory psychology students attending the College of William & Mary. All participants received credit in partial fulfillment of class requirements. To ensure that the sample contained a sufficient number of participants who were at risk for depression, people were invited to participate in the study on the basis of two measures of risk for depression, and those at risk for depression were slightly oversampled.

Seven weeks before the study began, all participants completed the BDI and the CES-D in a mass testing session held during classes. Approximately 25% of those who were invited to participate scored at or above at-risk cutpoints on both the BDI and the CES-D (scores of 12 and 17, respectively), whereas the remaining 75% were randomly sampled from those who scored below the cutpoints on both measures. Virtually all who were invited to participate in the study participated.

Procedure

At the beginning of the study, participants reported to a laboratory to receive instructions and a computer disk containing the data collection programs. They were told that they would be using a computer to complete a series of questionnaires every day for 3 weeks in addition to completing questionnaires on the 1st and last day of the study. Standard instructions for the measures (modified to refer to a daily frame of reference) were part of the program that presented the questions. Participants were told to run the programs toward the end of the day before going to sleep.

Data collection programs were written using the Micro Experimental Laboratory software package (Schneider, 1988). Participants were able to run these programs and provide data from any PC-based personal computer. Data were collected using three different programs that participants ran on particular days, and participants were given a written list of which programs to run each day. The first program was run on the 1st day of the study; it administered the BDI. The second program was run every day of the study; it administered the measures designed to assess daily levels of the five target constructs: self-esteem, causal uncertainty, anxiety, perceptions of control over outcomes of behavior, and the cognitive triad. The third program was run on the last day of the study; it administered the CES-D.

A member of the research team maintained regular contact with participants via electronic mail. Participants were told to contact the experimenters should any problems arise such as disk failure, computer viruses, and so forth. Problems of these types occurred rarely during the study. When they did occur, participants were given replacement disks within 48 hr and continued the study.

Daily self-esteem was measured with a modified version of the Rosenberg (1965) Self-Esteem Scale. The instructions for the scale and the individual items were reworded to refer to how participants felt about themselves that day. Using a 9-point scale ranging from *strongly disagree* (1) to *strongly agree* (9), participants indicated their agreement with items on the scale such as "Today, on the whole, I am satisfied with myself." Daily self-esteem was operationalized as the mean response across the 10 items for each day.

Causal uncertainty was measured using four questions based on items from the CUS. Items from the CUS were chosen on the basis of factor loadings from previous studies (Weary & Edwards, 1994) and appropriateness for daily assessment. Using a 6-point scale ranging from *strongly disagree* (1) to *strongly agree* (6), participants indicated their agreement with the statement "I did not understand why things happened the way they did" in reference to four topics: thinking back on my day today in terms of the positive interactions I had with others; thinking back on my day today in terms of the positive nonsocial events (e.g., schoolwork, sports, etc.) that occurred; thinking back on my day today in terms of the negative interactions I had with others, and thinking back on my day today in terms of the negative nonsocial events (e.g., schoolwork, sports, etc.) that occurred. I did not understand why things happened the way they did. Daily causal uncertainty was operationalized as the mean response across the four items for each day.

Anxiety was assessed with three items from the Profile of Mood States (Lorr & McNair, 1971) that have been used previously to assess daily anxiety (Bolger, 1990). Participants used a 9-point scale ranging from *strongly disagree* (1) to *strongly agree* (9) to respond to the following three statements: "I felt on edge today," "I felt uneasy today," and "I felt nervous today." Daily anxiety was operationalized as the mean response across the three items for each day.

Feelings of control over the outcomes of one's behavior were assessed with two questions based on Deci and Ryan's (1985) construct of impersonal causality orientation. *Impersonal orientation* refers to beliefs people have about their ability to regulate their own behaviors in ways that lead to desired outcomes. Participants used a 7-point scale ranging from *not at all* (1) to *very much so* (7) (with higher scores representing greater perceived control) to answer the following two questions: "Thinking back on your day today in terms of your relationships with others and the social events that occurred, to what extent were you able to control the outcomes of these events?" and "Thinking back on your day today in terms of nonsocial areas of performance (e.g., schoolwork, sports, fitness, etc.), to what extent were you able to control the outcomes of these events?" Daily control was operationalized as the mean response across the two items for each day.

Other cognitive components of depression were assessed with three items representing the essential elements (the cognitive triad) of Beck's (1972) theory of depression: negative view of self, negative view of life in general, and negative view of the future. These items are referred to as the cognitive triad. Participants used 7-point bipolar scales (with higher numbers indicating a more positive outlook) to answer the following three questions: (a) "Overall, how positively did you feel about yourself today?" (b) "Thinking of your life in general, how well did things go today?" and (c) "How optimistic are you about how your life (in general) will be tomorrow?" Daily triad was operationalized as the mean response across the three items for each day.

At the end of the study, participants answered a series of questions about their participation. Their responses suggested that participation in the study did not change their daily routine meaningfully. Most (53%) reported spending 5 min or less per day running the program, and 99% reported spending 10 min or less per day. Using a 5-point scale (1 = *very difficult*, 5 = *very easy*), participants reported that it was relatively easy to run the program (M = 4.6). Finally, using a 5-point scale (1 = *not at all*, 5 = *very much*), participants reported that participating in the study did not make them feel or think differently about themselves (M = 2.1), their relationships with other people (M = 1.8), or their schoolwork or other areas of performance (M = 1.7).

Of the 128 participants who began the study, 123 provided usable data on the daily measures. Two participants' data were unusable due to disk failures, 2 participants failed to follow instructions, and 1 participant lost the disk on the last day of the study. The data describing these 123 participants are the focus of the analyses in this article. These 123 participants completed the daily measures on an average of 19.6 days; 48% of the participants provided daily measures for all 21 days, 24% provided data for 20 days, and 24% provided data for 16–19 days. Based on previous research that used an index of instability from eight measurements taken over a 4-day period (Kernis et al., 1993), all participants' data were included in the analyses.

Results

Risk for Depression

Over a 2½-month period, participants completed four measures of depression. They completed the BDI and the CES-D during a mass-testing session held at the beginning of the semester during which the study was conducted. Seven weeks later, at the beginning of the study, they completed the BDI again, and 3 weeks after that, at the end of the study, they completed the CES-D again. These four measures were used to classify participants as being depressed or not depressed and to create a continuous measure of risk for depression.

Participants who scored above the cutpoints of 12 on the BDI and 17 on the CES-D on at least three out of the four depression scores were classified as depressed. This criterion was adopted to ensure that only participants who reported high levels of depressive symptoms over an extended period of time were classified as depressed. This procedure produced subsamples of 33 participants classified as depressed and 90 classified as nondepressed.[1]

The four depression measures were conceptualized as indicators of a single latent construct of risk for depression; this conceptualization was verified by a confirmatory factor analysis (EQS; Bentler, 1989) that produced a comparative fit index of .99 (Bentler, 1988). This conceptualization was also supported by the results of a maximum-likelihood factor analysis of the four measures that produced only one factor with an eigenvalue greater than 1.0. These analyses provided strong support for the existence of a single latent factor.

A continuous measure of risk for depression was created based on a maximum-likelihood factor analysis of these four

[1] Of the 123 participants who provided daily measures, 106 provided scores on all four of the depression scales and 17 provided scores on three of the scales. There was sufficient information in the scores of the 17 participants who provided only three scores to classify them unambiguously as depressed or nondepressed; 12 were classified as nondepressed, and 5 were classified as depressed. For purposes of this discussion, those who scored at or above the cutpoints are referred to as *depressed,* and those who scored below the cutpoints are referred to as *nondepressed;* similarly, the terms *depressed group* and *nondepressed group* are used. However, these terms are used only to simplify the discussion; their use is not meant to imply that participants who scored above the cutpoints had been diagnosed as clinically depressed.

Table 1
Measures of Risk for Depression

Measure	Overall		Depressed		Nondepressed		Factor coefficient
	M	*SD*	*M*	*SD*	*M*	*SD*	
BDI, Time 1	7.7	7.4	16.8	7.3	4.5	4.0	.98
CES-D, Time 1	18.1	10.5	31.0	7.6	13.7	7.3	.82
BDI, Time 2	8.5	8.2	18.5	8.7	5.0	4.2	.80
CES-D, Time 2	14.4	10.4	26.6	11.0	10.3	6.0	.72
Risk factor score	0.0	1.0	1.44	0.85	−0.46	0.52	

Note. BDI = Beck Depression Inventory; CES-D = Center for Epidemiological Studies Depression Scale.

measures. This factor, Risk, had a reliability coefficient of .97. Risk factor scores were estimated for 17 participants who had a missing score on one of the depression measures so that these participants could be included in the analyses; these Risk factor scores were estimated using a procedure that predicted the factor score using a regression analysis in which missing scores were predicted from nonmissing scores.

The means of the four depression measures, the factor loadings from the maximum-likelihood factor analysis, and the means for the Risk factor are shown in Table 1. As expected, participants who were classified as at risk for depression reported more symptoms on all four depression measures and had higher Risk factor scores than those who were not classified as at risk (all $ps < .001$).

Daily Measures

For each day of the study, a daily score for each of the five constructs was computed by averaging responses to the items of the corresponding scale. Mean *level* scores were operationalized as the mean of these daily scores across the days of the study. *Instability* scores were operationalized as the standard deviation of these daily scores across the days of the study. The means and standard deviations of the level and instability scores for each of the five daily measures are presented in Table 2.

One of the hypotheses concerned the existence of two general factors, level and instability. The results of a variety of analyses supported this hypothesis. First, an exploratory maximum-likelihood factor analysis of the five mean levels and five instability measures produced only two factors with eigenvalues greater than 1.0, suggesting a model with a maximum of two factors. Moreover, the goodness of fit of this two-factor model was significantly better than the goodness of fit produced by a maximum-likelihood factor analysis in which a one-factor model was fitted to these same 10 measures, $\chi^2_{\text{diff}}(9) = 149.9$, $p < .001$.

The specific hypothesized model consisting of general level and instability factors was supported by a confirmatory factor analysis (EQS; Bentler, 1989) that examined the fit of a two-factor model in which all five mean level scores were hypothesized to load on one factor and all five instability scores were hypothesized to load on another. This analysis produced a comparative fit index of .88 (Bentler, 1988). Finally, the validity of the two-factor model was supported by the results of a series of factor analyses in which only four of the five level and instability measures were included. Each of these analyses produced two factors, one consisting of mean level scores and the other consisting of instability scores, suggesting that the two-factor model did not depend on the covariance associated with a specific daily measure.

Previous research by Kernis et al. (1991) found that level and stability of self-esteem were correlated ($r = -.33$), and a confirmatory factor analysis found that the two general factors found in the present study were also correlated. A confirmatory factor analysis of a model that allowed the two factors to be correlated provided a better fit of the data than a model that constrained the factors to be orthogonal $\chi^2_{\text{diff}}(1) = 21.1$, $p < .01$. The results of this analysis, coupled with findings from previous research, suggested that a model that allowed the two factors to be correlated was appropriate.

To produce factor scores to represent the level and instability latent constructs of daily adjustment, participants' five level scores and five instability scores were subjected to a maximum-likelihood factor analysis followed by an oblique rotation (direct

Table 2
Means and Standard Deviations of Level and Instability Scores on Daily Measures

Variable	Overall sample		Depressed		Non-depressed	
	M	*SD*	*M*	*SD*	*M*	*SD*
	Level[a]					
Self-esteem	7.2	1.1	6.0	1.0	7.7	0.9
Cognitive triad	5.1	0.9	4.2	0.8	5.5	0.6
Anxiety	3.7	1.6	5.2	1.2	3.1	1.4
Control	4.7	0.9	4.1	0.7	5.0	0.8
Causal uncertainty	2.5	0.8	3.0	0.6	2.3	0.8
	Instability[b]					
Self-esteem	0.8	0.4	1.0	0.5	0.7	0.4
Cognitive triad	0.9	0.4	1.1	0.4	0.8	0.3
Anxiety	1.5	0.6	1.5	0.6	1.5	0.6
Control	0.9	0.3	1.0	0.3	0.9	0.3
Causal uncertainty	0.6	0.3	0.7	0.3	0.5	0.3

[a] Mean of scores across days. [b] Mean standard deviation of scores across days.

Table 3
Factor Analysis of Daily Measures

Measure	Factor 1 (Level)	Factor 2 (Instability)
Factor loadings		
Cognitive triad level	.94	.06
Self-esteem level	.92	.00
Causal uncertainty level	−.71	−.04
Control level	.70	−.06
Anxiety level	−.59	.10
Cognitive triad instability	−.18	.86
Self-esteem instability	−.23	.66
Causal uncertainty instability	.02	.44
Control instability	−.06	.57
Anxiety instability	.13	.51
Factor scores		
Nondepressed		
M	0.37	−0.17
SD	0.74	0.78
Depressed		
M	−1.01	0.45
SD	0.78	1.19

quartimin). The correlation between the Level and Instability factors was −.34, and the reliabilities of the factors were .93 and .89, respectively. Higher scores on Level indicated better daily adjustment, and higher scores on Instability indicated more variability in these measures of daily adjustment. The results of the factor analysis and the means for the Level and Instability factors are presented in Table 3. Consistent with the proposed diathesis–stress conceptualization in which level represented vulnerability and instability represented stress, participants who were classified as at risk had poorer daily adjustment (greater vulnerability) and greater instability (greater stress) than participants who were not classified as at risk, $Fs(1, 121) = 83.2$ and 11.2, respectively, $ps < .01$.

Relationships Between Risk for Depression and Daily Measures

Relationships between risk for depression and the daily measures were examined using multiple regression. The interaction between Level and Instability was represented by a term created by multiplying participants' Level and Instability factor scores.

Table 4
Relationship Between Risk for Depression and Daily Measures for Entire Sample

Variable	β	*SE* β	*t*	*p*
Intercept	.000			
Level	−.792	.070	11.3	<.01
Instability	.021	.076	0.3	*ns*
Level × Instability	−.198	.063	3.2	<.01

Note. $n = 123$. Model $R^2 = .58$, $F(3, 119) = 54.8$, $p < .001$.

Table 5
Mean Predicted Risk for Depression as a Function of Level and Instability for Entire Sample

Level	Instability: Stable	Instability: Unstable
Low	0.55	0.95
High	−0.62	−0.94

Note. Higher scores indicate greater risk for depression.

Risk for depression was the dependent variable, and Level, Instability, and the interaction term were entered simultaneously into the analysis as independent variables. The results of this analysis for the full sample are presented in Table 4.

These results partially agree with the results of previous research that used only self-esteem level and stability to predict depressive symptoms (Kernis et al., 1991). Similar to previous findings, level of daily adjustment was inversely related to risk for depression ($\beta = -.79$), and instability was not directly related to risk for depression. Also similar to previous research, the Level × Instability interaction term was significant, although the specific interaction found in the present study differed from that found by Kernis et al.

To interpret the Level × Instability interaction, predicted Risk for depression scores were generated for participants who were 1 *SD* above and below the mean on the Level and Instability factors. These predicted scores indicate that the Level × Instability interaction occurred primarily because the effect for Level was smaller for more stable participants (a difference of 1.17 between low and high adjustment) than it was for more unstable participants (a difference of 1.89). These predicted scores are shown in Table 5.

To test the hypothesis that the relationship between Risk for depression and Level and Instability differed for those above and below the at-risk cutpoint for depression, multiple regression by groups analyses were conducted. These analyses compared the two groups that were created based on at-risk cutpoints (the 33 participants classified as depressed and the 90 classified as nondepressed). In confirmation of one of the primary hypotheses of the study, the regression equations describing these two groups were significantly different, $F(4, 115) = 25.4$, $p < .001$. Moreover, the groups also differed in terms of the variance in risk for depression accounted for by the daily measures. In the depressed group, the daily measures accounted for 47% of the variance in risk, whereas in the nondepressed group, the corresponding amount was 26%. A summary of the analyses for each group are presented in Table 6.[2]

[2] The standard regression by groups analysis includes a test of the similarity of the intercepts across groups. The two groups compared in this study were known to differ on the dependent measure (risk for depression), and so the intercepts in the two equations would be expected to differ. To eliminate the contribution of this difference to the sums of squares comparing the two equations, zero-intercept equations were compared. This entailed zero-centering each variable within each subgroup. The two sets of coefficients produced by this analysis were

Table 6
Relationship Between Risk for Depression and Daily Measures for Depressed and Nondepressed Subsamples

Variable	β	$SE\ \beta$	t	p
	Depressed[a]			
Intercept	.885			
Level	−.459	.151	3.0	<.01
Instability	−.257	.174	1.5	*ns*
Level × Instability	−.362	.125	2.9	<.01
	Nondepressed[b]			
Intercept	−.324			
Level	−.300	.074	4.0	<.01
Instability	−.063	.070	0.9	*ns*
Level × Instability	.144	.083	1.8	.08

Note. Model $R^2 = .47$, $F(3, 29) = 8.5$, $p < .001$ for depressed subsample. Model $R^2 = .26$, $F(3, 86) = 9.9$, $p < .001$ for nondepressed subsample.
[a] $n = 33$. [b] $n = 90$.

Table 7
Mean Predicted Risk for Depression as a Function of Level and Instability for Depressed and Nondepressed Subsample

	Instability	
Level	Stable	Unstable
	Depressed	
Low	1.42	2.34
High	1.12	0.71
	Nondepressed	
Low	−0.11	−0.29
High	−0.66	−0.60

Note. Higher scores indicate greater risk for depression.

For both the depressed and nondepressed groups, there was no main effect for Instability, and Level scores were negatively related to Risk for depression (βs = −.459 and −.300, respectively). For the nondepressed group, the Level × Instability interaction term was not significant, $t(86) = 1.8$, $p = .08$, whereas it was significant for the depressed group, $t(29) = 2.9$, $p < .01$. Follow-up tests of the equality of the coefficients showed no significant differences between the two groups for the Level and Instability coefficients (Fs < 1) and a significant difference for the interaction term, $F(1, 117) = 12.2$, $p < .001$. These results suggest that Instability moderated the relationship between Level and Risk for depression in the depressed group but did not (or did so only marginally) in the nondepressed group.

To interpret these analyses, scores 1 *SD* above and below the mean were used to generate predicted scores of the Risk for depression score separately for each group. These predicted scores indicated that the interaction between Level and Instability in the depressed group was similar to that found in the full sample analysis. The difference in Risk for depression between those high and low in Level of well-being was smaller for those who were stable (0.30) than it was for those who were unstable (1.63). These predicted scores are presented in Table 7.[3]

Discussion

The results of this study confirmed our primary expectations and hypotheses. First, the factor analyses suggested that the day-to-day mean levels of different measures of well-being constituted a general factor of level of well-being and that the day-to-day instability of these measures constituted a general factor of instability. The better adjusted people were on one of the five constructs, the better adjusted they were on the others, and the more unstable they were on one of the constructs, the more unstable they were on the others. Second, there was a negative relationship between daily level of well-being and risk for depression that varied as a function of instability, and this interaction varied as a function of people's relative risk for depression in a way that supported a discontinuity approach to understanding depressive symptomatology.

To date, researchers have focused on the instability of self-esteem, and the present study is among the first to measure day-to-day levels of multiple psychological states. Not surprisingly, the results suggest that day-to-day mean levels of psychological states that are related to each other at the trait level covary. Trait and state measures of the same construct are usually positively correlated, and so the correlations among a set of mean state measures should be similar to the correlations among the trait measures of the same constructs.

More interesting is the suggestion of these results that the day-to-day instability of psychological states (including self-esteem) that are related to each other at the trait level also covary. Assuming that measures of the instability of different psychological states covary has important implications for the-

the same as those found in the original analysis, and they were also significantly different from each other, $F(3, 117) = 5.1$, $p < .005$. The coefficients in the equations describing each group were different independent of differences in the intercepts.

[3] As is shown in Table 1, the standard deviation of risk for depression was greater for the depressed group than for the nondepressed group. This being the case, and despite the fact that the nondepressed group was approximately three times the size of the depressed group, the failure to find significant relationships in the nondepressed group may have been due to the lesser variability of risk for depression in this group. One way to address this issue was to eliminate the difference between groups in the variability of risk for depression and redo the analyses. Excluding the 2 participants in the depressed group with the highest risk for depression scores produced similar standard deviations of risk for depression for the two groups, 0.52 for the nondepressed group and 0.54 for the depressed. Results of regression analyses that excluded these 2 participants were very similar to those presented in this article, indicating that differences between the two groups in the variability of risk for depression cannot account for differences in the regression equations of the two groups.

ory and research. In terms of research on the instability of specific constructs, the present results suggest that it is important to consider the possibility that the instability of a specific construct is a single indicator of a more general instability construct that than the possibility that it is merely a construct in and of itself.

The present results suggest that researchers need to be cautious when they assume that a measure of the instability of a specific construct represents only the instability of that construct per se. The relationship of an outcome to the instability of a specific construct such as self-esteem may or may not be different than the relationship between that outcome and the instability of another construct. The present results suggest that such divergent validity cannot be assumed; it must be demonstrated. Explanations that hinge on the instability of a specific construct such as self-esteem will be stronger if they are accompanied by a demonstration that the outcome in question has a different relationship with the instability of a construct other than self-esteem.

Although in the present study the factors of Instability and Level of well-being were correlated, the correlation was not strong enough ($r = -.34$) to suggest that these factors were measuring a common construct. These present results suggest that daily fluctuations in state measures are related to trait levels but are also a unique construct. Tellegen's (1988) discussion of "temporal variation" (p. 640) suggested that viewing the instability of a particular construct as a moderator variable may improve the prediction of behavior. Our findings support this contention, particularly in the prediction of risk for depression.

In the present study, instability moderated the relationship between level of daily well-being and risk for depression. For the entire sample, there was a main effect for Level of daily adjustment and an interaction of Level and Instability in the prediction of risk for depression. Daily well-being level was negatively related to risk for depression, and this effect was stronger for those who were more unstable. However, this interaction must be evaluated in light of the significant and hypothesized differences between the depressed and nondepressed groups in the prediction of risk for depression. In this regard, it is important to note that the subsample analyses indicated that the interaction found in the full sample analysis was due primarily to relationships in the depressed subsample.

When participants were divided into those who were at risk for depression and those who were not, the Level × Instability interaction found in the analyses of the full sample reached standard significance levels only in the depressed subsample. For participants who were depressed, the interaction followed the same pattern as the interaction found in the full sample analysis. The negative relationship between level of daily well-being and risk for depression was stronger for those who were more unstable. This interaction can also be described by noting that for people in the at-risk group who were relatively more poorly adjusted, instability was positively related to risk for depression, whereas for those who were relatively better adjusted, instability was negatively related to risk.

Although for the nondepressed subsample the Level × Instability interaction did not reach standard significance levels ($p = .08$), it merits some discussion. The pattern of means presented in Table 7 suggests that for those who were relatively poorly adjusted, instability was negatively related to risk, whereas there was practically no relationship between instability and risk for those with better daily adjustment within this subsample. It should be noted that a negative relationship between instability and risk for depression was found for both poorly adjusted participants who were not depressed and better adjusted participants who were depressed.

The results of the present study can be explained in part by a diathesis–stress model in which Level of daily adjustment is assumed to measure vulnerability and Instability of daily adjustment is assumed to measure stress. The negative relationship between risk and daily well-being found in all analyses is consistent with such a model; lower well-being (greater vulnerability) was associated with greater risk for depression. The fact that participants who were depressed were more unstable (experienced more stress) than participants who were not depressed is also consistent with such a model. Finally, the greatest risk for depression was found for participants who combined the lowest level of adjustment and the highest instability—that is, for low-Level, high-Instability participants in the depressed subsample. The predicted Risk for depression of these participants was 2.34 (see Table 7). In contrast, the least risk for depression was found for participants with the lowest vulnerability, high-Level participants in the nondepressed group (predicted scores of −0.60 and −0.66). Moreover, the vulnerability of these participants was low enough that their risk for depression did not vary as a function of stress (instability).

Although a diathesis–stress model may explain many of the present findings, some of the results are inconsistent with such a model. Although there are no simple effects tests for interactions in regression analyses, inspection of the means in Table 7 suggests that greater instability was associated with lowered risk for depression for participants who had moderate levels of adjustment (high-Level participants who were depressed and low-Level participants who were not depressed). Such a relationship is not consistent with a model in which instability is a measure of stress. To the contrary, these results suggest that instability can represent some form of positive process or coping mechanism. For people with moderate levels of adjustment, instability may represent normal adaptation and reactions to changes in their environments, whereas for the very poorly adjusted, such as the low-Level participants in this study who were depressed, instability may represent poor coping or stress.

The fact that the relationships among Level, Instability, and Risk for depression differed between the at-risk groups supports a discontinuity model of depressive symptoms. There were qualitative differences between those who scored above and below the at-risk cutpoints on the measures of depression collected in the study. Such changes suggest that at some point along the continuum of depressive symptoms there is a qualitative shift or change in the meaning of increases in symptoms. More research is needed to examine such differences. At the least, researchers who use scales such as the BDI and the CES-D should examine their data with cutpoints in mind. We agree wholeheartedly with the conclusion of Roberts and Monroe (1992) that "Regardless of the interpretation, this study again demonstrates the importance of attending to the initial level of depression. . . . Those who were already mildly depressed showed quite

different results than those who were initially asymptomatic" (p. 810).

There are several limitations to the present study, some of which are relevant to the diathesis–stress models on which the study relied. First, the study is correlational, and the data collected cannot be used to determine whether level and instability of day-to-day adjustment influence or are influenced by risk for depression (or both). Second, some of these results suggest that instability may not reflect stress but may reflect positive responses to the environment. Just as the meaning of depressive symptoms may change at some critical point, the meaning of instability may vary as a function of level of adjustment. For the poorly adjusted, instability may reflect a failure to retain a necessary consistency of psychological states across time, whereas for the better adjusted, instability may reflect a lack of rigidity. Further research is needed to examine the causal relationships among these constructs and how their interaction varies as a function of different levels of adjustment and instability.

Another limitation of this study may have been the samples studied. The samples were not large, and only replication can address the reliability of the coefficients produced in the regression equations. Small changes in regression coefficients could change some of the results, particularly some of the smaller effects for instability that were found, such as the effect for low-Level participants who were not depressed. Moreover, although risk for depression was assessed using four different measures of depression taken over 2½ months (an improvement over many previous studies of nonclinical samples that have used one or two measures), participants who were classified as at risk for depression may not have been at the same risk as people who have been diagnosed as clinically depressed. The relationships examined in the present study should be examined in larger samples that include those who have been diagnosed as clinically depressed.

The specific constructs measured in the study may be another limitation. They were chosen because of their identification as vulnerability factors for depression, although they do not represent all of the vulnerability factors that have been identified. For example, the quality of participants' social relationships was not measured explicitly. The present study also did not address the possibility that the instability of other personality traits is related to outcomes other than depression. A different operationalization of well-being (or an entirely different type of outcome) combined with a different set of day-to-day measures may have produced different results. Although the present study provides evidence for a general factor of temporal instability, testing the scope of this general factor of instability is needed.

The present study suggests that the relationships between daily adjustment and risk for depression are complex. For some people, risk for depression may be a simple inverse function of their mean level of daily adjustment, whereas for others, risk for depression may be a joint function of level and instability of daily adjustment. The complexity of the present findings calls for replication. Nonetheless, the present results suggest that understanding the onset and maintenance of depression should include consideration of the day-to-day instability of psychological states.

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