Affect- and Self-Based Models of Relationships Between Daily Events and Daily Well-Being

John B. Nezlek
Rebecca M. Plesko
College of William & Mary

The present study examined affect- and self-based explanatory models of relationships between daily events and daily well-being. Twice a week for up to 10 weeks, participants described the events that occurred each day and provided measures of their daily affect, self-esteem, and depressogenic thinking. Participants also provided trait-level measures of affect, depression, and self-esteem. Measures of daily well-being representing each model covaried jointly and independently with daily negative and positive events. Positive events buffered the effects of negative events on daily self-esteem and daily depressogenic thinking, whereas there was no buffering effect for daily affect. More depressed people were more reactive to positive events, and those higher in trait PA were less reactive to negative events. Buffering effects for self-esteem were more pronounced for those with lower trait self-esteem, and buffering effects for daily depressogenic adjustment were more pronounced for those with higher trait negative affect. The results suggest that affect- and self-based models provide complementary perspectives on relationships between psychological well-being and daily events.

Keywords: *daily event; self-esteem variability; multilevel modeling*

Throughout the past few decades, there has been a tremendous increase in studies of the relationships between daily events and daily well-being and of individual differences in these within-person relationships. In terms of how daily well-being has been operationalized, these studies have tended to focus on either daily variability in mood or daily variability in states concerning different aspects of the self such as self-esteem. Moreover, studies of daily mood and events have emphasized how relationships between daily events and well-being vary as a function of individual differences in neuroticism and extraversion, whereas studies of daily self-esteem and events have emphasized the moderating roles of depression.

Despite the similar focus of these two types of studies on relationships between daily events and daily well-being and the possible overlap in the constructs they examine (at both the state and trait levels), these two approaches have not been integrated either conceptually or empirically. The present study was intended to provide a basis for such an integration by examining relationships between daily events and daily well-being and the trait-level moderation of such relationships using state and trait measures reflecting both of these approaches. For present purposes, studies concerning daily variability in affect will be referred to as affect-based studies, and studies concerning daily variability in self-esteem and other self-relevant states will be referred to as self-based studies, a distinction discussed in more detail below.

In the present study, participants (twice a week) described the events that occurred to them during a day. Similar to previous affect-based studies, participants also provided measures of their mood each of these days, and similar to previous self-based studies, they also provided measures of their daily self-esteem and a related measure of state depressogenic thinking. Participants also provided trait-level measures of their mood, self-esteem, and depressive symptoms. These data allowed us to examine within-person relationships and trait-level moderation as conceptualized by these affect- and self-based approaches.

Authors' Note: The data in this article come from a larger study that also was described in Nezlek and Plesko (2001). Correspondence regarding this article should be sent to John B. Nezlek, College of William & Mary, Department of Psychology, P.O. Box 8795, Williamsburg, VA 23187-8795; e-mail: john.nezlek@wm.edu.

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Previous Research Using Affect-Based Models

The majority of "daily event" studies have concerned changes in daily affect, and much of this research has concerned relationships between various types of negative events and daily affect (e.g., Affleck, Tennen, Urrows, & Higgins, 1994; Bolger, DeLongis, Kessler, & Schilling, 1989; Bolger & Schilling, 1991; Marco & Suls, 1993; Suls, Martin, & David, 1998; van Eck, Nicolson, & Berkhof, 1998). It should be noted, however, that some affect-based studies (e.g., David, Green, Martin, & Suls, 1997; Gable, Reis, & Elliot, 2000; Stone, 1981; Watson, 1988) have studied positive and negative events. These studies have consistently found that on days when people experience more negative events they experience greater negative affect (e.g., greater anxiety) than on days when they experience fewer negative events. Correspondingly, studies of positive events have consistently found that positive affect (or positive activated mood) is greater on days when people experience more positive events than on days when they experience fewer positive events.

Affect-based studies have examined individual differences in the within-person relationships between daily events and daily affect primarily in terms of neuroticism or extraversion. These studies have relied either explicitly (e.g., Bolger & Schilling, 1991) or implicitly on Eysenck's model of personality (e.g., Eysenck & Eysenck, 1985). This model suggests that more neurotic people (or those with higher trait negative affectivity) will react more strongly (particularly in terms of anxiety) to negative events than less neurotic people and that more extraverted people will react more strongly to positive events than less extraverted people.

Although some of this research has found that greater neuroticism (e.g., Bolger & Schilling, 1991; Marco & Suls, 1993) or greater behavioral inhibition within Gray's (1987) BIS-BAS model (e.g., Gable et al., 2000) is associated with stronger covariation between negative daily events and daily mood, some studies have not found such moderating effects (e.g., Affleck et al., 1994; David et al., 1997). Moreover, with a few exceptions (e.g., Gable et al., 2000), affect-based studies have not found trait-level moderation of within-person relationships between positive events and mood.

Previous Research Using Self-Based Models

The relatively fewer studies of daily events that have relied on self-based models have operationalized daily well-being in terms of self-esteem or aspects of daily well-being related to depression (e.g., Butler, Hokanson, & Flynn, 1994; Nezlek & Gable, 2001). (It should be noted that although there is an extensive literature on the variability of state self-esteem [e.g., Kernis, 1993], this research concerns the instability per se of self-esteem, not the covariation between self-esteem and events.) Similar to the results of affect-based studies, these studies have found that daily well-being is positively related to the number of positive events that occur each day and negatively related to the number of negative events that occur (Butler et al., 1994; Nezlek & Gable, 2001).

In terms of trait-level moderators, self-based studies have examined the moderating role of depression. These results suggest that people who report more depressive symptoms react more strongly to both positive and negative events than people who report fewer depressive symptoms (e.g., Butler et al., 1994; Nezlek & Gable, 2001). Self-based studies have relied on theories emphasizing how individual differences in the strength of people's self-concepts are responsible for individual differences in reactivity to events. Such explanations are consistent with Rogers's (1961) theory of the self, particularly his beliefs about conditions of self-worth. In explaining individual differences in well-being, Rogers emphasized how contingent an individual's self-worth is on environmental events or conditions. Rogers believed that the self-worth of people with lower levels of well-being is more contingent (less unconditional in Rogers's terminology) on environmental feedback such as positive or negative daily events than the self-worth of people with greater levels of well-being.

Distinguishing and Integrating the Two Models

Despite differences between the two models in the core constructs on which they focus, various scholars have argued that the constructs examined in self-based studies can be subsumed by the constructs examined in affect-based studies. For example, at the trait level, some have argued that depression and anxiety should not be considered as distinct (e.g., Feldman, 1993). Clark and Watson (1991) proposed that depression represents a combination of high negative affect (NA) and low positive affect (PA) and that measures of depression can be subsumed by measures of affect. Both of these perspectives question the divergent validity of measures of depression. Yet others have argued that the focus of self-based studies, self-esteem and depression, are highly correlated and may not possess divergent validity (Tennen & Herzberger, 1987).

Despite these arguments, at this point in time, we thought it would be more informative to investigate more specific types of distress (and well-being) rather than general factors at both the trait and state levels. This decision was based on three factors. First, some previous research on trait-level measures (e.g., Burns & Eidelson, 1998) has found divergent validity for measures of

depression and anxiety. Second, the state-level covariation among these constructs has not received much (if any) attention. Covariances at the state and trait levels are mathematically independent (e.g., Nezlek, 2001) and may reflect different psychological processes (e.g., Tennen, Affleck, Armeli, & Carney, 2000), and one cannot assume that state-level relationships between constructs will parallel trait-level relationships. Third, as described below, depression has been found to moderate relationships between daily well-being and daily positive events, whereas NA, PA, neuroticism, or extraversion have not been found to moderate such relationships. Therefore, our consideration of the distinctiveness of the two models at both the trait and state (day) levels relied on studies of trait-level relationships with the recognition that such research may provide a good starting point for understanding state-level relationships but cannot provide definitive predictions regarding state-level relationships.

Previous research on daily events has consistently found that daily well-being as defined within the self- and affect-based models covaries with both positive and negative daily events. People experience greater well-being (e.g., increased PA and greater self-esteem) on days when more positive events occur, and their well-being is lower (e.g., increased NA and lower self-esteem) on days when more negative events occur, and we expected to find the same relationships in this study. Moreover, we expected that daily well-being as defined within the two models would share some covariance with daily events (because the constructs themselves would covary) but also would covary independently with events (because the constructs, although related, are not synonymous).

With one exception (David et al., 1997), previous studies of reactivity to daily events have examined only the additive effects of positive and negative events on daily well-being. More specifically, studies have not examined the possibility that positive events might ameliorate the effects of negative events, a phenomenon frequently referred to as the "buffering effect". Although David et al. (1997) did not find such a buffering effect, other research suggests that such effects may exist. For example, Cohen and Hoberman (1983) found that positive life events buffered the effects of negative events on well-being. People who had experienced a high number of negative events and positive events reported fewer depressive and physical symptoms than people who had experienced a high number of negative events and a low number of positive events. Consistent with this, we expected that daily positive events would buffer the effect of daily negative events on daily well-being.

The other focus of this study was on individual differences in within-person relationships between daily well-being and daily events (i.e., reactivity to daily events). Previous research suggested that lower trait well-being would be associated with greater reactivity to negative daily events: higher NA or neuroticism within the affect model (e.g., Bolger & Schilling, 1991; Suls et al., 1998) and more depressive symptoms within the self model (Butler et al., 1994; Nezlek & Gable, 2001). Moreover, increased depressive symptoms also have been found to be associated with greater reactivity to positive events (Butler et al., 1994; Nezlek & Gable, 2001). In contrast, with few exceptions (e.g., Gable et al., 2000), research relying on affect-based models has not found any trait moderation of reactivity to positive events.

Although some have argued that depression (or reports of dysphoria) is not readily distinguishable from general negative affectivity (e.g., Feldman, 1993), we felt that it was premature to assume that depression and NA would not possess divergent validity as moderators of within-person relationships between daily well-being and daily events. Although researchers have found evidence for a common, second-order negative affectivity factor, such a *g* factor does not preclude meaningful divergent validity among the first-order *s* factors comprising such a *g* factor. Accordingly, we examined the moderating roles of trait-level measures from both the affect- and self-based models with the expectation that depression and NA would moderate relationships between negative events and well-being, whereas depression would moderate relationships between positive events and well-being and NA would not. Moreover, we also examined the moderating role of Clark and Watson's proposed affectively based description of depression. This was done by creating a variable representing the interaction of PA and NA.

METHOD

Participants

Participants were 112 introductory psychology students who received credit in partial fulfillment of class requirements. To ensure variability in trait-level well-being, participants with elevated scores on a pretest of the Center for Epidemiological Studies Depression Scale (CESD) (Radloff, 1977) were slightly oversampled.

Measures

Twice a week, participants provided measures of their daily mood, self-esteem, depressogenic thinking, and the events that occurred that day. Most previous research has collected data every day, raising the possibility that event-state relationships found in previous studies somehow hinged on the collection of data every day. The present twice-weekly schedule was meant to address concerns about how the results of daily event studies might be affected by data collection protocols.

Daily affect was measured with the state version of the PANAS (Watson, Clark, & Tellegen, 1988). The PANAS was chosen because of its widespread use in studies of daily affect. Daily self-esteem was measured with Items 3, 6, 7, and 10 of the Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965), with response scales reworded to refer to how participants felt that day. These items were selected on the basis of their appropriateness for daily administration and a factor analysis of a sample of 641 individuals who were similar to the participants in this study (data described in Nezlek & Zebrowski, 2001). Daily depressogenic thinking (referred to as the triad measure) was measured with three items based on Beck's Cognitive Triad (Beck, 1967): negative view of self, "Overall, how positively did you feel about yourself today?"; negative view of life in general, "Thinking of your life in general, how well did things go today?"; and negative view of the future, "How optimistic are you about how your life (in general) will be tomorrow?" These questions have been used successfully in previous research (Nezlek & Gable, 2001). All daily questions were answered using 7-point scales (with higher numbers indicating a more positive outlook except for NA). Daily scores for each scale were operationalized as means of the items.

Daily events were measured using a subset of items from the Daily Events Survey (DES) (Butler et al., 1994). Twenty-two of the 40 events from the DES were measured, 12 positive and 10 negative, with equal numbers of social and achievement events. In addition, combinations of positive-negative and social-achievement events that were not listed were measured. For example, other positive social events were measured using the item, "Had other type of pleasant event (not listed above) with friends, family, or date." Each day, participants rated each event using the following scale: 0 = *did not occur*, 1 = *occurred and not important*, 2 = *occurred and somewhat important*, 3 = *occurred and pretty important*, 4 = *occurred and extremely important*.[1] Much of the research on daily events has used a daily recording schedule; however, the twice-weekly schedule we used did not seem to influence reports of events. The present distributions of event scores were very similar to those from a previous study (Nezlek & Gable, 2001) that used the same set of events with a comparable sample and a daily schedule.

For each day, ratings of positive events were averaged to create a positive event score, and ratings of negative events were averaged to create a negative event score. Positive and negative frequency scores, the number of events occurring each day, also were created. Analyses using composite scores were presented because there was less heterogeneity of variance for composite scores than for frequency counts and because composite scores incorporate differences in the importance of events, whereas frequency counts assume all events are equally important. Nevertheless, when frequency counts were used, the results were similar to the results presented in this article. The present study also concerned the buffering (interactive) effects of positive and negative events, and this required a term representing the interaction of positive and negative events. Following the advice of Aiken and West (1991), daily event scores were centered around each participant's mean score, and for each day, these scores were then cross-multiplied to form an interaction term.

At the end of the study, using 1 to 5 scales, participants completed the Rosenberg Self-Esteem Scale and a trait version of the PANAS and they completed the CESD. All of these measures were standardized prior to analysis.

Procedure

At the beginning of the study, participants came to a laboratory and received instructions and a computer disk containing the data collection programs. They were told that they would be using a computer to answer a series of questions twice a week for the next 10 weeks (excluding a week for spring break in the middle) and to complete questionnaires on the last day of the study. Data collection programs were written using the Micro-Analytic Experimental Laboratory software package (Schneider, 1988), and participants were able to run these programs using any IBM-compatible personal computer.

Instructions for the measures were included in the programs that participants ran on the days described on a written list given to them. One program was run twice a week and collected state measures and reports of daily events. Participants were told to run the program twice a week (on Wednesdays and Sundays or the day after if they forgot) at night just before going to sleep. Another program was run on the last day of the study and administered the trait PANAS, the CESD, the RSE, and the study evaluation questions.

The research team maintained regular contact with participants via e-mail. After the first 5 weeks, participants turned in their disks and received new ones. Participants were told to contact the experimenter should any problems arise such as disk failure, computer viruses, and so forth. When problems occurred, participants were given replacement disks within 48 hours and continued the study. At the end of the study, participants answered questions about their participation. Their responses suggested that participating in the study had not changed their daily routine meaningfully. Most participants (92%) reported spending 15 min or less per day running the program and reported that the study was not disruptive to their daily life, a mean of 3.2 (SD = .76)

using a 5-point scale where 1 = *very disruptive* and 5 = *not at all disruptive.*

The programs recorded the date and time participants provided their responses. This allowed us to determine when participants had entered their data and if they had entered multiple days of data simultaneously. All the data provided by three participants were eliminated because they had entered most of their data at one sitting. Twelve days of data provided by another four participants (3 days each) also were eliminated because the data were not entered on separate days. To be included in the analyses, participants had to provide at least 6 days of data. The above-mentioned problems, combined with mechanical problems such as computer viruses or disk failures, and the theft of data from one of the authors' cars, left 103 participants who provided at least six daily measures. These participants provided a total of 1,330 days of data (an average of 12.9 days per participant, *SD* = 2.8), and 81% of participants provided at least 10 daily measures.

RESULTS

Overview of Analyses

The data were analyzed with a series of multilevel random coefficient models using the program HLM (Version 4.04) (Bryk, Raudenbush, & Congdon, 1998). The analyses examined within-person relationships between events and mood, between events and daily self-esteem and the triad measure, and the shared relationships among these constructs. The analyses also examined the buffering effects of positive events on the influence of negative events. A second set of analyses examined the moderating effects of between-person individual differences on these within-person relationships. Did within-person relationships between events and states vary as a function of between-person individual differences?

In these analyses, days were analyzed as nested within people. Within-person relationships were modeled at what is referred to as Level 1 in multilevel analysis, and individual differences in these within-person relationships were modeled at what is referred to as Level 2. Multilevel random coefficient modeling was used instead of some type of ordinary least squares analysis (e.g., within-person correlations) because multilevel random coefficient modeling provides more accurate parameter estimates and tests of significance than comparable OLS techniques. See Nezlek (2001) for a description of multilevel random coefficient analyses of daily event studies.

Descriptive Statistics and Reliability and Validity of Daily Measures

To provide a context for understanding the present results, descriptive statistics for the daily measures are presented in Table 1. These statistics were provided by what is called an unconditional model of each measure. Unconditional refers to the fact that no terms other than intercepts are included at any level of the model. The Level 1 and Level 2 equations were as follows:

$$\text{Level 1 (within-person): } y_{ij} = \beta_{0j} + r_{ij}$$

$$\text{Level 2 (between-person): } \beta_{0j} = \gamma_{00} + u_{0j}.$$

In this Level 1 model, y_{ij} is a daily measure of either mood, self-esteem, or depressogenic thinking, for person j on day i, β_{0j} is a random coefficient representing the mean of y for person j (across the i days for which each person provided data), r_{ij} represents the error associated with each measure, and the variance of r_{ij} constitutes the within-person residual (or error) variance. In multilevel modeling, the coefficients from one level of analysis are passed on to the next. In this Level 2 model, γ_{00} represents the grand mean of the person-level means (β_{0j}s) from the within-person model, u_{0j} represents the error of β_{0j}, and the variance of u_{0j} constitutes the Level 2 residual (error) variance.

The reliability of coefficients, defined as the ratio of the true to total variance of an effect, is calculated automatically by HLM, and as shown in Table 1, all of the daily measures were reliable. The validity of the daily measures was determined by examining relationships between the trait and mean daily measure of the same construct.[2] For example, the within-person mean for self-esteem (i.e., the mean of a person's daily self-esteem, β_{0j}) was modeled as a function of trait self-esteem as measured by the RSE:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{RSE}) + u_{0j}.$$

The maximum-likelihood procedures used by HLM provide separate estimates of fixed parameters (significance tests of coefficients such as the RSE) and random parameters (error variances). The fixed effect parts of these analyses found that the coefficient between each individual daily measure and the corresponding between-person measure was significant (all *p*s < .001), and these coefficients are presented in Table 1. Interpreting these coefficients is relatively straightforward. The γ_{01} coefficient represents the change in β_{0j} (the mean daily score) associated with a 1.0 change in a trait measure. For example, the γ_{01}coefficient for the RSE was 1.18, and so a 1.0 increase in trait self-esteem (corresponding to 1.0 *SD* increase because trait-level measures were standardized) corresponded to a 1.18 increase in mean daily self-esteem.

Validity coefficients for the daily measures were estimated by determining the random variance in a mean

TABLE 1: Summary Statistics

	Daily Measures						*Trait-Level Measures*		
	Mean	*Between-Person Variance*	*Within-Person Variance*	γ_{01}	*Reliability*	*Validity*	*Mean*	SD	*Reliability*
Self-esteem	5.19	1.65	.47	1.18	.98	.92	37.9	9.7	.96
Depression	5.09	.66	.89	–.55	.90	.69	20.7	10.6	.88
Positive affect	3.92	.60	.75	.58	.91	.74	31.6	8.4	.93
Negative affect	2.49	.80	.71	.76	.93	.86	19.5	8.7	.94
Positive events	1.12	.28	.23		.94				
Negative events	.54	.12	.16		.90				

daily measure accounted for by the corresponding trait-level measure. For example, for daily self-esteem, the residual variance of β_{0j} (u_{0j}) from the first analysis in which trait self-esteem was not included at the person level was 1.65, and the residual variance from the second analysis in which trait self-esteem was included was .25, a reduction of 85%. The validity coefficient (a correlation) was defined as the square root of this percentage, and validity coefficients are presented in Table 1. In addition, descriptive statistics for the trait-level measures are presented in this table.

Within-Person Covariation Between Daily Events and Daily Measures

The next series of analyses examined within-person relationships between daily events and daily mood, self-esteem, and depressogenic thinking. The basic within-person model was as follows:

$$y_{ij} = \beta_{0j} + \beta_{1j}\text{PosEvent} + \beta_{2j}\text{NegEvent} + \beta_{3j}\text{NegPos} + r_{ij}$$

in which y_{ij} is a score for person j on day i, β_{0j} is a random coefficient representing the intercept for person j, β_{1j}PosEvent is a random coefficient (referred to as a slope to distinguish it from an intercept) for positive events, β_{2j}NegEvent is a random coefficient (slope) for negative events, β_{3j}NegPos is a random coefficient representing the interaction of negative and positive events, and r_{ij} represents error. Separate analyses were done for PA, NA, self-esteem, and the triad measure.[3] To eliminate the influence on parameter estimates of individual differences in event scores, event scores were group-mean centered. Thus, an individual's coefficients described relationships between deviations from that individual's mean event score and deviations from his or her mean mood, self-esteem, or triad score.

To determine if within-person relationships between states and events were significant, event slopes were analyzed at the person level:

$$\text{Intercept:} \quad \beta_{0j} = \gamma_{00} + u_{0j}$$

$$\text{Positive events:} \quad \beta_{1j} = \gamma_{10} + u_{1j}$$

$$\text{Negative events:} \quad \beta_{2j} = \gamma_{20} + u_{2j}$$

$$\text{Interaction:} \quad \beta_{3j} = \gamma_{30} + u_{3j}$$

In this model, γ_{00} represents the mean intercept and γ_{10}, γ_{20}, and γ_{30} represent the mean positive, negative, and interaction event slopes, respectively. A summary of the results of these analyses is presented in Table 2.

As expected, all four daily measures covaried with positive and negative events. The γ_{10} and γ_{20} coefficients were significantly different from 0 in all four analyses. These coefficients can be interpreted as mean within-person unstandardized regression coefficients. For example, in the analysis of daily self-esteem, the mean positive event slope (γ_{10}) was .29. This meant that, on average, on days when positive event scores were 1.0 points above a person's mean positive event score, that person's daily self-esteem was .29 above his or her mean daily self-esteem. The mean negative event slope (γ_{20}) was –.79. This meant that, on average, on days when negative event scores were 1.0 points above a person's mean negative event score, that person's daily self-esteem was .79 below his or her mean daily self-esteem.

As indicated by the tests of the γ_{30} coefficients, the interaction between positive and negative events was not significant in the analyses of daily PA ($p = .95$) and NA ($p = .54$), whereas this interaction was significant in the analyses of the self-esteem and triad measures ($ps < .05$). To interpret these interactions, self-esteem and triad scores were estimated for days that were 1 *SD* above and below the mean for positive and negative events. The *SD* for positive events was .48, and it was .40 for negative events. Predicted values are presented in Table 3.

For daily self-esteem and the depressogenic triad measure, positive events buffered the effects of negative events. For self-esteem, the average effect for positive

TABLE 2: Within-Person Relationships Between Events and Daily Measures

Measure	*Intercept*	*Positive*	*Negative*	*Interaction*
Positive affect	3.92	.79****	–.34****	.03
Negative affect	3.73	–.26****	.86****	–.10
Self-esteem	5.14	.29****	–.51****	.21**
Cognitive triad	5.10	.75****	–.81****	.25**

**$p < .05$. ****$p < .005$.

TABLE 3: Predicted Scores Illustrating the Buffering Effects of Daily Positive Events on the Impact of Daily Negative Events on Daily Self-Esteem and Triad Measure

Positive events Negative events	Low High	High High	Low Low	High Low	Buffering Effect
Measure					
Self-esteem	4.77	5.12	5.24	5.44	.15
Triad measure	4.39	5.18	5.11	5.72	.18

events (the difference between days that were +1 *SD* and –1 *SD* for positive events) was .35 when negative event scores were high (+1 *SD*), whereas the positive event effect was .20 on days when negative scores were low (–1 *SD*). For the triad measure, the corresponding figures were .79 and .61.

Daily Mood, Self-Esteem, and Depressogenic Thinking Analyzed Simultaneously

Another hypothesis concerned the extent to which daily mood shared its covariance with daily events with the self-esteem and triad measures.[4] That is, did mood covary with events above and beyond the covariation between events and self-esteem and depressogenic thinking, and did esteem and depressogenic thinking covary with events above and beyond the covariation between events and mood? Such relationships were examined with variants of the within-person models described above. For the analyses of the daily self-esteem and triad measures, daily PA and NA were entered as group mean-centered predictors into a model that included positive and negative events and the interaction term. For the analyses of daily mood, daily self-esteem and the triad measure were entered as group mean-centered variables with the two event measures, but the event interaction term was not included. The results of these analyses are summarized in Table 4.

These analyses suggested that daily mood and self-esteem and the triad measures covaried both together and independently with daily events. For the self-esteem and triad measures, joint covariation with events was indicated by the fact that positive and negative event

TABLE 4: Within-Person Relationships Between Daily Events and Daily Measures Controlling for Other Daily Measures

Outcome Measure	*Other Predictors*		*Event Slopes*		
	Self-Esteem	*Triad*	*Positive*	*Negative*	*Interaction*
Positive affect	.14***	.37***	.44***	.02	
Negative affect	–.22***	–.28***	.00	.47***	
	PA	*NA*	*Positive*	*Negative*	*Interaction*
Self-esteem	0.16***	–0.23***	0.09**	–0.22***	0.16**
Triad	0.37***	–0.36***	0.35***	–0.35***	0.19**

**$p < .05$. ***$p < .01$.

slopes for these two measures were smaller (by approximately 60%) when mood was included as a predictor than they were in the analyses without mood (the slopes presented in Table 2). For example, the negative events slope in the analysis of self-esteem was –.51 in the original analysis, whereas it was –.22 in the analysis controlling for daily mood. That is, some of the variation the esteem and triad measures shared with events was variation mood shared with events. Independent covariation of esteem and depressogenic thinking with events was suggested by the fact that positive and negative event slopes for the self-esteem and triad measures remained significant when mood was included as a predictor. The esteem and triad measures covaried with events after controlling for the covariation between mood and events. It is important to note that the interaction slopes were virtually unchanged between the two analyses.

A similar, but not identical, pattern was found when self-esteem and daily depressogenic thinking were included with events as predictors of mood. The joint covariation with events of mood and self-esteem and the triad measure was indicated by the fact that positive and negative event slopes were smaller (by approximately 40%) when esteem and the triad measure were included as predictors of mood than they were in the original analyses without these predictors (the slopes presented in Table 2). Moreover, the triad measure mediated relationships between mood and opposite-valenced events. When the triad measure was included as a predictor of daily PA, the negative event slope was not significant ($p = .9$), and when the triad measure was included as a predictor of daily NA, the positive event slope was not significant ($p = .9$). The independent covariation of mood and the esteem and triad measures was suggested by the fact that slopes between mood and similarly valenced (e.g., PA and positive events) events remained significant when self-esteem and depressogenic thinking were included as predictors.

Trait-Level Moderators of Within-Person Relationships

Given the within-person covariation described above, analyses of trait-level moderators of within-person relationships between daily mood and events relied on within-person models that included positive and negative events but did not include self-esteem and the triad measure. Analyses of trait moderators of relationships between daily events and daily self-esteem and the triad measure relied on within-person models that included positive and negative events and their interaction but did not include mood.[5] For each daily measure, the moderating effect of each trait-level measure (PA, NA, CESD, and self-esteem) was examined both alone and in combination with each other trait-level measure. A term representing the interaction of trait PA and NA also was included in these analyses. These results are discussed in a separate section. This round-robin approach provided a basis for determining which trait-level measure was the most reliable moderator of event slopes.

The basic Level 2 model that examined these relationships was as follows:

$$\text{Intercept:} \quad \beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Trait}) + u_{0j}$$

$$\text{Positive events:} \quad \beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Trait}) + u_{1j}$$

$$\text{Negative events:} \quad \beta_{2j} = \gamma_{20} + \gamma_{21}(\text{Trait}) + u_{2j}$$

$$\text{Interaction:} \quad \beta_{3j} = \gamma_{30} + \gamma_{31}(\text{Trait}) + u_{3j}\,.$$

Relationships between event slopes and between-person individual differences (labeled Trait) were tested by the significance of the γ_{11}, γ_{21}, and γ_{31} coefficients. In the initial analyses, only one between-person variable was included. In the round-robin follow-up analyses, a second between-person variable was included, producing another set of Level 2 coefficients (γ_{12}, γ_{22}, and γ_{32}).

For daily mood, trait-level measures moderated only positive event slopes. For daily PA, people with lower trait PA, and higher CESD scores, were more reactive to positive events than people with higher trait PA and lower CESD scores. Similarly, for daily NA (for which the mean positive event slope was negative), lower trait PA and higher trait NA and CESD scores were associated with greater reactivity to positive events. The round-robin analyses clearly indicated that CESD was the most reliable moderator of positive event slopes for daily PA. When pairs of traits were included as moderators of the positive event slope for daily PA, coefficients for the CESD remained significant, whereas coefficients for other traits were not significant. A similar set of analyses found that trait NA was the most reliable moderator of positive event slopes for daily NA.

TABLE 5: Traits as Moderators of Within-Person Relationships Between Daily Events and Daily Affect

	Daily PA			*Daily NA*		
Trait	*Intercept*	*Positive*	*Negative*	*Intercept*	*Positive*	*Negative*
Positive affect	.58**	.15*	.00	.35**	.11*	.06
Negative affect	.18*	.05	.08	.75**	.16**	.05
CESD	.37**	.16*	.06	.61**	.15**	.08
Self-esteem	.36**	.13*	.11	.49**	.09[a]	.01

NOTE: CESD = Center for Epidemiological Studies Depression Scale.
[a] $p < .06$. * $p < .05$. ** $p < .01$.

The results of these analyses are summarized in Table 5. These coefficients can be interpreted like standardized regression coefficients because trait-level variables were standardized prior to analysis. For example, the coefficient for the CESD presented in Table 5 was .16. This means that for every 1.0 unit change in CESD scores (a 1 *SD* change), positive event slopes changed .16. The mean positive event slope for PA was .79 (Table 2), so the predicted positive event slope for a person 1 *SD* above the mean on the CESD was .95 (.79 + .16), whereas it was .63 for a person 1 *SD* below the mean.

For the daily self-esteem and triad measures, trait-level measures moderated all three event slopes, although the trait moderation of negative event slopes was somewhat limited. For self-esteem, all trait-level measures (except NA) moderated the positive event slope, and for the triad measure, all trait-level measures moderated the positive event slope. In both cases, poorer trait-level well-being (higher scores on NA and the CESD and lower scores on PA and self-esteem) was associated with greater reactivity to positive events. The round-robin analyses clearly indicated that the CESD was the most reliable moderator of positive event slopes for both daily self-esteem and the triad measure. Negative event slopes for the daily self-esteem and triad measures were moderated only by trait PA.[6] In each case, higher PA was associated with lessened reactivity to negative events (a less negative slope). The results of these analyses are summarized in Table 6.

For both daily self-esteem and the triad measure, the size of the buffering effect of positive events on the impact of negative events (the event interaction slope) was moderated by various trait-level measures. For daily self-esteem, the CESD and trait self-esteem moderated this buffering effect, and the round-robin analyses found that trait self-esteem was the most reliable moderator. For the daily triad measure, the CESD and trait NA moderated this buffering effect (although the trait self-esteem moderating effect approached, but did not reach, conventional levels of significance, $p = .06$), and

TABLE 6: Traits as Moderators of Within-Person Relationships Between Daily Events and Daily Self-Esteem and Triad

	Daily Self-Esteem				*Daily Triad*			
Trait	*Intercept*	*Positive*	*Negative*	*Interaction*	*Intercept*	*Positive*	*Negative*	*Interaction*
Positive affect	.72***	.13***	.18**	.21	.49***	–.16**	–.16	–.13
Negative affect	.80***	.08	.09	.13	–.48***	.16***	.08	.33***
CESD	–.93***	.20***	–.01	.16**	–.54***	.23***	.01	.24**
Self-esteem	1.17***	–.20***	–.05	–.26**	.53***	–.20***	.01	–.24

NOTE: CESD = Center for Epidemiological Studies Depression Scale.
**$p < .05$. ***$p < .01$.

the round-robin analyses found that trait NA was the most reliable moderator of this effect.

To examine the nature of these moderating effects, within-person equations (consisting of an intercept and the three event slopes) were estimated for people at the mean on a trait-level measure, 1 *SD* above the mean, and 1 *SD* below the mean. Similar to the procedure used previously to interpret the buffering effect without trait-level moderation, self-esteem and triad scores for days 1 *SD* above and below the mean for both positive and negative events were estimated. Although the specific results varied somewhat as a function of the combination of daily measure and trait moderator being analyzed, across all combinations, poorer trait-level well-being (e.g., lower self-esteem, higher CESD scores, and higher NA) was associated with a more pronounced buffering effect. As before, the buffering effect was operationalized as the difference between the effect for positive events when negative events were high compared to the effect for positive events when negative event scores were low.

For example, when daily self-esteem and trait self-esteem scores were analyzed together, the buffering effect for people 1 *SD* below the mean on trait self-esteem was .36 (.62 vs. .26), whereas for people at the mean, the buffering effect was .12, and it was –.09 for people 1 *SD* above the mean. In terms of within-day standard deviations, the buffering effect for people 1 *SD* below the mean on trait self-esteem was slightly more than .5 *SD*. Predicted values from this analysis and from the analysis of the buffering effect of trait NA on the daily depressogenic triad measure are presented in Table 7.

Depression as a Combination of PA and NA

Clark and Watson (1991) proposed that depression can be understood as a combination of high NA and low PA. The explanatory power of this conceptualization was examined by calculating a term representing the interaction of trait PA and trait NA and examining how this interaction moderated within-person relationships between daily well-being and daily events. Across all four analyses (daily PA, NA, self-esteem, and depressogenic thinking), this interaction term moderated only the slope between positive events and daily depressogenic thinking ($p < .05$). Consistent with Clark and Watson's supposition, predicted slopes for participants +/– 1 *SD* on NA and PA showed that participants who were 1 *SD* below the mean for NA and 1 *SD* above the mean for PA had lower positive event slopes than any other combination.

Of interest, when CESD scores also were entered as a predictor, this interaction term remained significant, and the CESD was also a significant moderator, as it was in the original analyses. This pattern suggests that although the combination of NA and PA had some predictive power, low PA and high NA did not subsume a standard measure of depression.

Artifacts and Threats to Validity

In studies in which participants provide varying amounts of data over extended periods of time, it is important to know if effects include artifacts such as fatigue or relationships between parameters and the amount of data participants contribute. To examine temporal trends in the data, the analyses described above were repeated with a measure of days since the study began included at Level 1 (the within-person level). These analyses found only one significant relationship between this measure and the four outcome measures. Daily PA declined over time ($\gamma_{10} = -.005$, $t = 3.6$, $p < .01$). Nevertheless, the results of these follow-up analyses were very similar to the results of the original analyses. For example, in the original analyses, the slope between PA and positive events was .79, and it was .76 in the follow-up analyses. The corresponding figures for negative events were –.34 and –.37.

Participants provided varying amounts of data, leaving open the possibility that such differences influenced the overall results. Accordingly, the previous analyses were repeated with the number of days a person contributed data included at Level 2 (the between-person level). Across all four outcome measures, amount of contributed data was significantly related to only one coefficient, the slope between daily NA and negative events ($\gamma_{21} = .09$, $t = 3.3$, $p < .01$). The NA–negative event relationship was stronger for participants who contributed

TABLE 7: Predicted Values Illustrating How Traits Moderated the Buffering Effect of Daily Positive Events on the Impact of Daily Negative Events on Daily Self-Esteem and Triad Measure

Positive Events		Low	High	Low	High	Buffering
Negative events		High	High	Low	Low	Effect
Trait measure	*Daily measure*					
Low RSE (–1 *SD*)	Self-esteem	3.59	4.21	4.19	4.45	.36
Mean RSE		4.78	5.12	5.24	5.46	.12
High RSE (+1 *SD*)		5.95	6.03	6.28	6.45	–.09
High NA (+1 *SD*)	Triad	3.82	4.88	4.56	5.26	.36
Mean NA		4.40	5.18	5.10	5.76	.12
Low NA (–1 *SD*)		4.98	5.50	5.62	6.26	–.12

NOTE: RSE = Rosenberg Self-Esteem Scale, NA = negative affect.

more data than it was for those who contributed less data. Nevertheless, the results of analyses of trait-level moderators including data contributed at the person level were very similar to the results of the original analyses. Recall that in the original analyses, none of the trait-level measures moderated slopes between daily NA and negative events, and this was also the case in the follow-up analyses.

DISCUSSION

As expected, daily psychological well-being, operationalized in terms of both the affect (PA and NA) and self models (self-esteem and depression-related cognitions), was higher on days when more positive events occurred and was lower on days when more negative events occurred. Moreover, although daily affect measures and measures from the self model covaried with each other and jointly covaried with daily events, these two sets of measures covaried with events independently in psychologically meaningful ways. More specifically, self-esteem and depressogenic thinking (the triad measure) covaried with both positive and negative events after controlling for the covariation between events and NA and PA.

This independent covariation suggests that although self-esteem and depressogenic thinking have affective components, it appears that more cognitively focused states covary with daily events above and beyond the covariation between events and affect. Such covariation has been found before. For example, Nezlek and Gable (2001) found that two cognitively focused states, perceptions of causal uncertainty (Weary & Edwards, 1994) and perceived control over the environment (Deci & Ryan, 1985), as well as self-esteem and depressogenic thinking (the same measures used in this study), covaried with positive and negative events. In a similar vein, Nezlek (2002) found that daily self-awareness (the state analog of trait self-consciousness) covaried with daily events above and beyond the covariation between events and daily anxiety.

The independent covariation with events of daily measures from the affect and self models provides further validation of the importance of the results of previous studies of the covariation between events and self-esteem (e.g., Butler et al., 1994) by suggesting that such covariation is not simply a manifestation of the covariation between affect and events. It appears that changes in state self-esteem and depressogenic thinking reflect aspects of daily experience that are psychologically distinct from changes in affect.

The most important difference between the affect and self models in relationship between daily events and daily measures was the existence of a buffering effect for the daily self-esteem and triad measures and the lack of any such effect for daily affect. For the self-esteem and depressogenic triad measures, positive events minimized the negative effects of negative events. This difference did not appear to have been due to differences among measures in sensitivity to events per se because event slopes for affect and other measures were of similar magnitudes. Moreover, this pattern of relationships is consistent with previous research. The lack of a buffering effect for daily affect replicates the null results of David et al. (1997) in a study of daily events and affect among adult men, and the existence of a buffering effect for measures from the self model is consistent with the results of Cohen and Hoberman (1983), who found a buffering effect for positive events when they measured well-being in terms of depressive symptoms.

Such a difference naturally raises questions. Taking these results at face value, it is possible that buffering effects do not exist for affective reactions, whereas they do exist for more explicitly self-evaluative or cognitively focused outcomes. The PANAS measured how people felt, whereas the self-esteem and triad measures concerned people's judgments about their self-worth and their futures. Although such judgments have affective

components, they are not purely affective in nature. The changes in self-evaluations or optimism associated with negative events may be broader and different in focus than an affective response, and this difference in focus may make such changes more susceptible to being counteracted by positive events than changes in affect are. On days when more negative events occur, positive events may provide some sort of balance, leading perhaps to increased optimism, and a sort of "Life isn't all bad" reaction may occur. Such reactions may be accompanied by smaller reductions in self-evaluations than on days when negative events occur in the absence of positive events.

It is also possible that differences in buffering effects were due to other differences in the breadth of the constructs measured by the PANAS and the daily self-esteem and depressogenic triad measure. By design, the PANAS measures two very specific aspects of affect, positive and negative activation. Although the PANAS has been a valuable tool (particularly in studies of daily affect), as discussed by Feldman Barrett and Russell (1998) and others, it does not measure the full affective circumplex because it does not measure pleasant-deactivation and unpleasant-deactivation. If buffering effects involve these aspects of the circumplex, then the PANAS is not likely to capture such effects. For example, pleasant-deactivation may buffer the effects of unpleasant-activation. The relaxation that accompanies finishing a task may offset the agitation that accompanies failure. Or, correspondingly, pleasant activation may offset the effects of unpleasant deactivation. The enthusiasm of meeting new people may overcome the boredom of isolation. In affective terms, daily self-esteem and the depressogenic triad may have measured constructs involving more of the affective circumplex that were more sensitive to buffering effects than the constructs measured by the PANAS.

The second focus of this study was the trait moderation of within-person relationships between events and psychological states, and the present results supported three conclusions. First, there was only one significant moderating relationship for negative event slopes: Trait PA moderated the negative event slope for daily self-esteem. Negative event slopes were not moderated by NA or depression, the two trait-level measures that could be considered measures of negative affectivity. Such a lack is consistent with the results of some previous studies (e.g., Affleck et al., 1994; David et al., 1997), although not others (e.g., Bolger & Schilling, 1991; Gable et al., 2000; Nezlek & Gable, 2001; Suls et al., 1998). These inconsistent findings suggest that understanding trait moderation of reactions to negative events requires future study.

The second conclusion regarding trait moderation of event slopes is that the CESD moderated positive event slopes most reliably. The daily psychological mood, self-esteem, and depressogenic thinking of more depressed people were more labile, in terms of positive events, than the daily states of the less depressed. More depressed people reacted more strongly (more positively) to positive events than less depressed people, a replication of Nezlek and Gable (2001). As discussed by Butler et al. (1994), such a relationship is consistent with various conceptualizations of depression. Generally speaking, as suggested by Rogers, more depressed people are more dependent on feedback from their environments. More depressed persons' increased sensitivity to positive events may be due to the fact that positive events are more meaningful for them. Although the analyses controlled for individual differences in positive event scores, for more depressed people, positive events may have provided an important antidote for their general sense of dysphoria. They may be more uncertain about themselves, and their abilities and may be more sensitive to positive feedback.

The third conclusion regarding trait moderation of event slopes is that the buffering effect of positive events on the impact of negative events was greater for people with lower trait well-being. For daily self-esteem, trait self-esteem was the most reliable moderator. For those low in trait self-esteem, negative events (failure, rejection, etc.) unaccompanied by positive events appear to be particularly influential on their immediate (daily) self-esteem. A low level of trait esteem may put people at risk for being influenced by negative events in the absence of positive events. For daily depressogenic thinking (a measure with an important emphasis on optimism and the future), NA was the most reliable moderator. For anxious people, negative events, in the absence of positive events, appear to be particularly influential on their views of their futures.

The findings regarding trait moderation suggest that it is meaningful to distinguish among different types of trait-level well-being or distress. The fact that CESD was the most reliable moderator of positive event slopes suggests that there is something unique about depressogenic distress compared to other types of distress at least in terms of reactivity to positive events. Although depression and other measures of distress are related and may reflect some sort of general factor, this does not preclude the existence of meaningful differences among types of distress. In factor analytic terms, the predisposition to experience negative affect may be a *g* factor, and measures of specific distress such as anxiety and depression may be *s* factors. There may be times when a *g* factor provides the most parsimonious explanation for a phenomenon, whereas there may be other times when more specific factors need to be considered (e.g., the moderation of the positive event slopes in the

present study). Rather than presume de facto that a general factor provides the best explanation for a phenomenon, researchers might benefit by comparing the explanatory power of different *s* factors.

These results also can be considered within a diathesis-stress framework. They suggest that understanding relationships among diathesis, stress, and psychological well-being may require differentiating different types of diatheses (e.g., depression vs. anxiety), different types of outcomes (e.g., mood and self-esteem), and potentially, different types of life stress. In this regard, we agree with Monroe and Simons (1991), who noted,

> We suggest that the essence of the diathesis-stress model is its implications for interactive analysis. This is in contrast to the complementary tendency to think in extensive terms and comprehensive theories. Interaction implies a more restrained focus, an in-depth probing of associations between components of the model, often multidimensional and transpiring over time. In contrast, comprehensive implies a broad view of possible correlates, often sweeping and possessing functionally interchangeable components, that can combine in nonspecific ways. (p. 422)

Although we found that different trait-level variables moderated different within-person relationships between daily states and events, conclusions regarding such specificity need to be drawn cautiously. The trait-level measures collected in the present study were correlated (and measured conceptually related constructs), and the specific pattern of moderating relationships reflected the covariances among these measures in this sample. Clearly, the present findings need to be replicated before firm conclusions can be drawn about the relative strength of such moderating relationships.

Moreover, the specific trait-level measures chosen for study limit the generalizability of the present results. For example, in previous research relying on an affective model (e.g., David et al., 1997), the potential moderating effects of extraversion have been examined under the assumption that extraversion predicts positive affectivity. In the present study, extraversion was not measured, and despite the possible overlap between positive affectivity and extraversion (e.g., Watson & Clark, 1992), future research needs to examine extraversion specifically. The nature of the sample and the self-report nature of the measures also limit the generalizability of these results. For example, although the mean CESD score was 20.7, suggesting that a fair number of participants were genuinely distressed (Radloff, 1977), as discussed by Nezlek, Imbrie, Sullivan, and Blevins (1991), collegian's reports of symptoms on the CESD may overestimate distress. Clearly, more research is needed that uses techniques other than self-report to measure distress.

Similar to many studies of daily events, we have assumed that events lead to changes in internal states; however, it is also possible that people's internal states influence the events they experience. Such causal relationships have been examined by comparing lagged relationships between measures taken on adjacent days. In support of causal sequence from events to states, Bolger and Zuckerman (1995) found that distress experienced on a particular day was related to the conflict experienced on a previous day. Similarly, Gable et al. (2000) and Nezlek and Gable (2001) found that events occurring on a preceding day predicted present day affect, whereas prior day affect did not predict present day events. Unfortunately, we could not conduct such analyses because the length of time between adjacent recording days ($M = 4.6$, $SD = 2.9$) was too long for lagged effects to appear (Marco & Suls, 1993).

Nevertheless, the present study is the first to demonstrate that daily positive events can buffer the effects of daily negative events. Moreover, the present results suggest that daily fluctuations in constructs such as self-esteem and depressogenic thinking represent distinct phenomena from daily fluctuations in mood that may be sensitive to different aspects of daily experience and therefore merit attention in and of themselves.

NOTES

1. The present study used only a subset of the Daily Events Survey (DES) items because it was felt that some of the items on the DES occurred too infrequently to qualify as a daily event. It appears that no frequent items were eliminated because the mean positive and negative events recorded per day in this study (5.06 and 2.32, respectively) are similar to the numbers reported by Butler et al. (1994) using the full scale version.

2. The Center for Epidemiological Studies Depression Scale (CESD) was used as the trait analog for the measure of daily depressogenic thinking.

3. In the initial analyses of day-level relationships, all day-level slopes were modeled as random coefficients; however, random variance components that were not statistically reliable were fixed. For example, the event interaction term was fixed in all analyses. For a description of the statistical tests used to make such decisions and of fixed and random slopes in daily event studies, see Nezlek (2001). Details about the specific slopes that were fixed in each analysis are available from the first author.

4. As expected, all four day-level measures covaried with each other ($ps < .01$). Day-level correlations were estimated using a variance comparison procedure similar to that used to estimate validity coefficients. The estimated day-level correlations between NA and PA was –.40. All other day-level correlations were between .50 and .60 in magnitude.

5. Although the event interaction term was not significant in the within-person analyses of mood, trait-level moderators of this effect were considered because it is possible to have a nonsignificant Level 1 coefficient that varies as a function of a Level 2 variable. None were found, and in the interest of parsimony, the term was deleted from day-level models of affect. It could be argued that PA and NA should be included in the within-person models of self-esteem and the triad measure and that esteem and the triad measure should be included in the within-person models of PA and NA. Such analyses were conducted, and the results were similar to those presented here.

6. Although the moderating effect of PA on the positive event slope for self-esteem did not reach conventional levels of significance when this slope was modeled solely as a function of PA ($p < .07$), with any of the other trait measures included it did (all ps $< .01$). Moreover, the PA coefficients from these analyses were very similar to the coefficient from the PA-only analysis (.16). These results suggested some form of mild suppression effect of NA on the PA moderation of this slope.

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