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Dynamic Approaches to Emotions and Stress in Everyday Life: Bolger and Zuckerman Reloaded with Positive as Well as Negative Affects

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Abstract

A decade ago, Bolger and Zuckerman (1995) incorporated personality into the study of daily life events and psychological distress. Their approach put an entirely new cast on research and theorizing in this area. In their work, they focused on the predominantly negative personality trait of neuroticism. We extend their work to include theory and measurement of positive events and indicators of well-being in this paper. Integrating these research strands offers the possibility of a comprehensive yet highly sensitive and dynamic approach to the study of emotions, stress and health in everyday life.

In their study of emotional reactions to everyday events, Bolger and Zuckerman (1995) provided a sophisticated template to guide the examination of the interaction between personality and ideographic accounts of everyday life stress. They identified three fundamental ways that personality could influence stress processes including individual differences in exposure to stressful events, reactivity to those events, and coping effectiveness. In their illustration, they examined whether persons high in neuroticism would vary in exposure, reactivity, and effectiveness in coping with daily interpersonal conflicts. Not only were the findings interesting (showing differential exposure and reactivity to interpersonal stressors as well as coping effectiveness), they provided a way of thinking about stress-diathesis models in daily life and methods for examining such models. We (Affleck, Tennen, & Apter, 2001; Smith & Zautra, 2003; Tennen, Affleck, Armeli, & Carney, 2000; Zautra & Smith, 2001) along with others (e.g., Gable, Reis, & Elliot, 2000) have relied on this model in studying how person-situation influences on health and well-being play out in daily life.

As insightful as this model is, we believe that it provides an incomplete picture of the events of daily life and their influence on health and well-being. Through their focus on stress processes exclusively, Bolger and Zuckerman neglected the positive in daily events, affect and psychological well-being. Our research program on the dynamics of emotional life offers advances in theory and methods that extend Bolger and Zuckerman's Person X Situation framework by including positive dimensions of daily experience and their relationship to stress. In this article, we explain the reasoning behind our approach to the study of personality and stress in everyday life. We argue that we should incorporate, simultaneously, both negative and positive dimensions of personality and events as well as negative and positive dimensions of psychological well-being. As a complement to Bolger and Zuckerman's (1995) examination of neuroticism as a central personality feature governing adaptation to stress, we offer the study of extraversion as one among many “positive” features of personality (such as hope and optimism, Affleck, Tennen, & Apter, 2001) that influence psychological well-being. We begin

this work by tracing the methodological and conceptual developments that led us to what we view as a more comprehensive and dynamic approach to daily adaptation including the study of positive events and their effects on mental health. Though we present our own framework here, from the outset we wish to link progress in our thinking to the foundation established by Bolger and Zuckerman (1995) for testing models of how personality differences are revealed within processes of daily life.

Why Study Positive Events?

Before adding positive event/well-being relationships to Bolger and Zuckerman's approach, along with it all the attendant complexities in measurement and methods, we need to ask whether it is worth the trouble. There is considerable evidence that people (and psychological researchers) are more attentive to negative events and their potential consequences than to positive events (Cacioppo, Bernston, & Gardner, 1994). There are some very good reasons for this, not the least of which is the essential priority of mounting adaptive responses to threat. Does the assessment of everyday positive events side-by-side with stressors add substantively to our understanding of person-environment transactions in everyday life?

Zautra (2003) reviewed the evidence across a range of studies and found little support for belief that positive events would lower psychological distress. Although these events promote greater positive emotion, they are typically uncorrelated with scales that assess anxiety and depressive symptoms (Zautra & Reich, 1983). Even when the positive events arise from a beneficial reinterpretation of a negative experience, the evidence of benefit in reducing negative affective states is meager (Zautra, 2003, pp. 71−76). However, positive states do appear to promote physiological adaptation, leading to better health outcomes. Cohen, Doyle, Turner, Alper, and Skoner (2003) recently demonstrated that susceptibility to a cold virus was greater among individuals who reported fewer positive emotions, whereas cold susceptibility was unrelated to their levels of negative emotions. Moskowitz (2003) studied HIV-positive men and found that only the positive affect was associated with longer survival times. Tugade, Fredrickson, and Feldman-Barrett (2004) likewise showed that individuals with greater positive emotion demonstrated faster blood pressure recovery following stress, an important factor in cardiovascular health.

The underlying rationale for these studies of the positive is that they add information about the person's life not found in assessments of negative events and negative affect. Some of the first solid evidence in support of this idea came from an analysis of a national survey of happiness. Bradburn (1969) discovered that scale items assessing positive aspects of daily life such as “pleased at having accomplished something” did not show an inverse correlation with negative aspects tapped with items such as “lonely and depressed.” The two dimensions of well-being were not opposites. In fact, they were not correlated at all. This finding was remarkable since the prevailing view was that well-being is a unidimensional, bipolar construct; individuals who report high levels of negative feelings also should report low levels of positive feelings.

Our own research program was strongly influenced by these findings. At the time Bradburn published his analysis, investigators had just begun to study life change events as stressors, and they charted the effects of life events on health and psychological distress. By adding more positive events to the lists of life changes assessed and measuring positive along with negative aspects of subjective well-being, we found considerable support for within-domain as opposed to cross-domain relationships (Zautra & Simons, 1979; Zautra & Reich, 1982; Block & Zautra, 1981). Positive events were correlated only with positive affects, and negative events primarily with negative emotional states. However, negative events also were correlated with decreased positive feelings. This two-factor model of well-being (Zautra & Reich, 1983; Reich & Zautra, 1981) encouraged us to attend to the measurement of positive and negative events (Zautra,

Guarnaccia, & Dohrenwend, 1986; Zautra, Guarnaccia, Reich & Dohrenwend, 1988) to further test this model. Along the way, we examined the influence of cognitive and personality features on affective ratings and perceptions of personal control over events (Reich & Zautra, 1984; Wright, Zautra, & Braver, 1985).

Over several years, and after some interesting forays into related domains (see for example Block & Zautra, 1981; Reich & Zautra, 1988), we created an inventory from which investigators could probe the occurrence of everyday desirable and undesirable life events (Zautra, Guarnaccia, Reich, & Dohrenwend, & Reich, 1986; Zautra, Affleck, & Tennen, 1996; Zautra, Reich, & Schultz, 2000). We have used portions of this instrument to examine everyday life experiences among healthy elders, individuals with chronic pain or asthma, and regular drinkers drawn from the community (Affleck, Tennen, & Apter, 2001; Armeli, Carney, Tennen, Affleck, & O'Neil, 2000; Armeli, et al., 2003; Carney, Armeli, Tennen, Affleck & O'Niel, 2000).

Integrating the Bolger and Zuckerman Approach with Our Two-Factor Approach

The assessment of everyday events that are positive as well as those that are stressful provided a more complete representation of the person-in-situ. When discussing individual differences in the occurrence of events Bolger and Zuckerman introduced the term, stress exposure. The term “exposure” does not capture the processes that underlie the production of positive experiences however. These events typically involve the person as an active agent rather than a passive recipient (Reich & Zautra, 1981, 1984). Although people may be responsible for the stressful events they experience, they rarely intentionally produce them. Positive events, by contrast, are often sought after, and are perceived as under one's control, even when they are not (Wright, Zautra, & Braver, 1985). We suggest that a more appropriate characterization of these positive experiences is that of “engagement in” rather than “exposure to.”

Bolger and Zuckerman's (1995) concept of “reactivity” implies an organism provoked by an external agent. For positive events, we prefer the term “responsiveness” which suggests that the person is involved in acquiring benefit from these experiences. These differences in the fundamental character of positive and negative events have implications for the study of events that have not been fully appreciated. Because many positive events are welcomed rather than avoided, they are likely to occur at a much higher frequency than negative events (and they do, as we shall report), and their distributional properties should be different as a consequence (a point we illustrate with data from one of our diary studies).

We think there is also an important affective distinction between negative and positive events. Whereas negative events are nearly always undesirable, positive events may *vary* widely in their desirability. For example, consider the event, “received a gift from a friend.” The gift may or may not have been valuable, and any message about the relationship implied by the gift may or may not have been welcome (Zautra & Reich, 1980). We would expect, therefore, that positive events, though occurring at a greater frequency, would show a weaker relationship to affective states than negative events, regardless of the influence of personality. A corollary to this point is that personal ratings of the enjoyment of positive events are likely to account for much of the relationship between positive events on affective states. In contrast, a person's ratings of the “stressfulness” of negative events may not fully account for the emotional correlates of negative events. Negative events signify undesirable changes in the person's life that may have affective consequences, even if the person does not report the experience as stressful.

Finally, "coping effectiveness", which Bolger and Zuckerman (1995) use to characterize individual differences in adaptive responses to negative events, is not as useful when characterizing differences between persons in their adaptations to positive events. Though undesirable experiences may arise along with positive changes and require coping, in general, people do not construe much need to cope with positive events per se, or with the positive affects engendered by those events. We believe it is more valuable to ask how personal capacities and social ties sustain positive affective responses to events. Sustainability may depend on how well the person is able to integrate these experiences within existing schemas, and view them as the consequences of meeting challenges that advance personal goals (Brim, 1992; Goodhart & Zautra, 1984). Social ties can enhance well-being through sharing of positive experiences, a process Langston (1994) has referred to as "capitalization". Gable, Reis, Impetti, and Asher (2004) have shown that sharing amplifies the effects of these events on well-being, particularly when others respond with enthusiasm and happiness to the good news (Gable et al., 2004).

Cross-Domain Effects: The Dynamic Model of Affect (DMA)

As we pursued our two factor investigations of events and well being, it became obvious to us that we were working within a restrictive framework of how daily life unfolds. Our interpretations of the effects of positive and negative events were based on a static model of "if-then" relations. In essence, we were asking the following question: If person A experienced *X* negative events and person B encountered *X + 2* negative events, what was B's incremental rise in negative affect or reduction in positive affect? The underlying analytic approach, even when employing correlation/regression statistics on longitudinal data, was a between-person set of comparisons. To understand the dynamics of change in events and affects, data needed to be collected and analyzed to examine within-person relationships.

New developments in analytic methods, particularly since the development and general acceptance of multilevel modeling (e.g. Affleck, Zautra, Tennen, & Armeli, 1999) are particularly useful for analyzing responses within persons, across time. In this approach, which characterizes the analytic strategy of most of the work described in this Special Issue, we can measure the same variables over time with multiple indicators. For example, we can now examine how different facets of well-being change over time as a function of different events changing over time. We can still, of course, test for traditional between-person differences, but now we can investigate how these individual differences moderate within-person relationships, providing a truly dynamic and more integrative approach that brings investigators much closer in real time to observing people's lives as they unfold.

The problem we faced and then could solve with within-person methods was the asymmetry apparent in the two-factor model. Whereas positive events increased only positive affects, stressful events increased negative and decreased positive affects. When we started to take a more dynamic approach by examining the possibility of change in relationships among affective states within the person, we discovered a reason for the asymmetrical effects of negative events: Negative events not only provoked negative affects, but they also created a stressful context for registering and responding to affective information regarding those events. The stress effects we observed led us to develop what we now call a *Dynamic Model of Affect* (*DMA*; Zautra, Potter, & Reich, 1996; Zautra, Smith, Affleck, & Tennen, 2001; Reich, Zautra, & Davis, 2003).

This model of events and affects builds on work examining the contextual determinants of information processing (e.g., Linville, 1985; 1987; Paulhus & Lim, 1994; Ursin & Olff, 1993). Like cognition, the experience of emotion always occurs in an environmental context. In safe and predictable situations, we are able to process information from multiple sources,

including emotional inputs, in order to develop an adaptive response. We acquire information arising not only from negatively valenced aspects of a situation, but also from its positively valenced features. Positive and negative affective registers provide little overlapping information here. In times of low stress, then, we would expect positive and negative affects to be relatively uncorrelated.

Stressful events generate uncertainty, and the need to process information efficiently takes precedence over any advantages that accrue from more nuanced evaluation of stimuli. Our attention narrows and our judgments become more simplified and rapid, allowing us to quickly adopt behaviors that are necessary to adjust to the threatening situation. In such contexts, we preferentially process negative information at the expense of positive. According to the DMA, during times of stress, PA and NA collapse toward a simpler bipolar dimension, manifested by a higher inverse relationship.

When we measure positive and negative affects along with changes in the information demands of the environment through daily event accounts, we can inquire about these cross-domain relationships (Reich & Zautra, 1988). One of the implications of the DMA is that on days when stressful events occur, positive affect is more likely to diminish negative affect. Another implication, less obvious from the model, is that positive events should relax information demands, and thus lead to greater affective complexity. This broadening of awareness would be manifested in a lower correlation between positive and negative affective states on days with many positive events.

Thus, our inquiry into the positive of event-affect relations required a confluence of theoretical and methodological advances, including attention to a separable domain of positive events, affects and personality features, recognition of fundamental differences in the nature of within-person versus between-person associations, and Bolger and Zuckerman's (1995) invitation to examine personality influences on everyday processes of adaptation. We now have appropriate methodology and statistical techniques to model these relationships. In the remainder of this article, we illustrate from a study in progress how we can investigate important questions about positive events and well-being within a dynamic conceptual and methodological framework.

Testing the Model

We start with descriptive analyses of daily events. What do we observe in reports of positive events that are similar or different from negative events? How frequent and how correlated with each other are positive and negative events? We then proceed to examine how these events are related to psychological distress and well-being. Once we include the assessment of positive events, we expand our view of well-being to embrace measures that gauge the presence versus absence of positive affects as well as the more standard measures of negative affects (Watson, Wiese, Vaidya, & Tellegen, 1999; Zautra, 2003). This, in turn, leads to the examination of cross-domain effects and tests of the DMA predictions regarding how negative events and positive events influence affective experience. These core issues require attention in both the nomothetic world of between-subject analysis and the idiographic world of within-subject inquiry.

The data to address these questions comes from an ongoing diary study of 93 men and women with rheumatoid arthritis (RA). Participants were between the ages of 23 and 86 (M = 54.3, SD = 13.3). In this study we made use of data from brief (10−15 minute) questionnaire diaries filled out nightly for 30 days. In total, participants provided 2713 of 2790 possible person-days of diary data (97% complete).

The diaries included measures of positive and negative interpersonal events drawn from the Inventory of Small Life Events (ISLE) for older adults (Zautra, Guarnaccia, & Dohrenwend,

1986). These measures assessed daily positive experiences and daily exposure to stressors. We asked participants to provide frequency counts of the occurrence of 44 events in all (26 positive, such as “played a sport, game, or cards with friends,” and 18 negative, such as “criticized by friend/acquaintance”) gathered from the four domains of the ISLE: (1) friends and acquaintances; (2) spouse or live-in partner; (3) family members; and (4) co-workers. In order to examine these scores at the between- and within-person levels independently, we transformed the daily positive event (PE) and negative event (NE) scores into mean scores and person-centered daily change scores, constructed by subtracting each person's mean from her/his daily scores across all daily observations. This method of forming change or deviation scores was used for all within-person variables in this paper.

To estimate reactivity and responsiveness to events, we also assessed perceptions of stress and positive benefit from these daily events. For each of the four interpersonal domains, we asked participants to rate on 1−4 scales both the daily stressfulness, and their daily level of enjoyment, of each domain. The scores were averaged across the four domains yielding a daily index of perceived relationship stress and a parallel daily index of relationship joy. The stress ratings follow assessment procedures we have employed in a number of prior studies (e.g. Zautra & Smith, 2001). The enjoyment ratings on the other hand are a new addition to our assessment procedures (see Davis, Zautra, & Smith, 2004). Our methods link enjoyment and perceived stress to everyday events within each domain. In so doing we obtain ratings of daily stress and enjoyment that are focused more on responses to actual events and less on internal mood states.

Participants also completed the *Positive and Negative Affect Schedule* (Watson & Clark, 1999) each day. They indicated the extent to which they had experienced each of 10 positive affects and negative affects during that day on a 5-point scale. The affective states probed by the items on these scales are relatively high in arousal level, leading the authors of the measures to suggest that the scale names be changed to “positive and negative activation”. We continue to use the original names, with the caveat that the affective states we assess here do not include low arousal positive affects such as “calm”, and low arousal negative affects like “fatigued”.

Finally, we used the Revised NEO Personality Inventory (NEO-PI-R: Costa and McCrea, 1992) to assess neuroticism (N) in keeping with Bolger and Zuckerman, and added extraversion (E) because it is known to correlate with positive affective states, and yet be fairly independent of scores on N. Other personality features could have also been selected to assess individual differences in propensity to experience positive emotions but none have been studied as thoroughly as has E (e.g., Canli, 2004).

Descriptive Characteristics of Positive and Negative Daily Events

A simple graph of the distribution of PE and NE scores reveals several remarkable differences in how these two kinds of events are reported. Figure 1 displays the distributions of the 2713 person-days of daily positive and negative events. PEs occurred much more frequently and showed greater variability than NEs. NE scores, in contrast, were skewed toward zero, with an average less than 1, and a peaked (leptokurtotic) score distribution.

The variance in these event scores has a between-person component, i.e. the differences between persons in their mean levels, and a within-person component, i.e., the differences within persons in the dispersion of the scores. Table 1 provides descriptive analyses for data parsed at the between-person level using mean daily scores and at the within-person level using person-centered daily scores. As can be seen in Table 1, the distributions of the within-person (person-centered) event scores parallel those found with the mean scores, including greater variability and approximation to normality in PE, but not in NE.

Relations Between Positive and Negative Event Experiences

We next examined the relationships between positive and negative events both between-persons and within-persons using multilevel modeling procedures. Before doing so, we identified outlying individuals and outlying days so that we could check for their influence on the relationships under study. Following Tukey (1977), outliers were designated as scores that fell outside 1.5 boxwidths from the 25th and 75th percentiles. The distributions of mean PA and mean positive events contained no outlying individuals. However, five of the 93 subjects (5.4%) were identified as outliers because of their unusually high levels of NA and seven (7.5%) were identified as outliers because of their unusually high numbers of negative daily events. Also, 9.2% of the days were identified as outliers, because they were characterized by uncommonly high NA (relative to the person's mean level) whereas only 1.5% of the days were outliers because of their uncommonly low level of PA. Owing to the more compressed range and negative skew of negative daily events, 6.3% of the days were identified as outliers because of the relatively high number of negative events reported on those days, compared with the 0.37% of the days that had relatively low numbers of positive events.

At the within-person level there was no association between positive and negative events, either before excluding outlying days, $b = -.033$, $F(1, 2617) = .35$, $p > .25$ or after doing so, $b = -.017$, $F(1, 2435) = .04$, $p > .25$. And at the between-person level, there was a positive association between positive and negative events, $b = .943$, $F(1,91) = 14.51$, $p < .001$, but this association was not statistically significant after individuals with outlying mean negative event scores were omitted from the analyses, $b = -.163$, $F(1, 84) = .46$, $p > .25$. Thus, the measurement of positive events introduces a wholly independent assessment of daily life that is afforded us through the assessment of negative events. Findings like this provide a clear indication of the need for daily event studies to include PEs.

Relations Between Positive Events/PositiveAffect and Negative Events/ Negative Affect

The next question we addressed was whether PEs showed distinctive patterns of correlation with affective states when compared with NEs. Here we expected to find that PEs related primarily to PA and NEs related primarily to NA but also associated with lower PA (cf. Zautra & Reich, 1983). Two sets of multilevel analyses examined how positive and negative events were related to PA and NA at both the between- and within-person levels of analysis. These findings are presented in Table 2.

The between-person results replicated our prior findings. Participants who experienced more PEs reported higher PA, but not lower NA. Participants who reported more NEs, however, showed lower PA as well as higher NA. These findings remained significant after excluding individuals with outlying mean scores. The within-person analyses revealed deviations from this pattern. On days of elevated NEs, NA rose as expected, and on days of elevated PEs, PA rose. However, daily PA was unaffected by an increase in that day's negative events, and daily NA declined when participants reported more PEs than usual. In our prior work with only one assessment of participants we could not distinguish the effects of events within the person over time from effects between persons. These data suggest an important difference in the meaning of assessments of people *who* have many versus few negative experiences and assessments of times *when* they have many versus few negative events. People who tend to have more stressful lives also tend to have lower PA, as well as more NA. In contrast, days when many negative experiences occur do not bring lower PA, *per se*. Processes other than the mere accumulation of events must be involved to diminish positive states for people with high levels of chronic stress from negative events. Changes in the structure of the relationship between events and affect over time may underlie these processes.

Influences of Events on the Relationship between Positive and Negative Affect

Although the measures were clearly assessing different emotive states at both the between- and within-person levels, PA was significantly and inversely correlated with NA, and remained so whether outliers were included or excluded in the analyses. The overlap between measures of PA and NA registered as 7.8% shared variance between-subjects, reflecting a correlation of .28, and as 6.4% shared variance within-persons, reflecting a correlation of .25. We examined whether this relationship between PA and NA was stable across days, or if it varied as a function of the stressful NEs, as predicted by the DMA.

The DMA predicts that stressful conditions act to "shrink" affective space, resulting in more simplified affective experiencing and manifested by a stronger inverse correlation between PA and NA on days of with more NEs than usual. A multilevel model examined NA on a given day as a function of that day's person-centered PA score, that day's person-centered NE score, and the PA X NE interaction. That day's person-centered PE score was entered as a covariate. A significant effect for the interaction term ($b = -.023$, F (1, 2591) = 5.78, $p < .05$) supported the hypothesis. As portrayed in Figure 2, the relation between PA and NA was more strongly negative on days with relatively more negative events[1]. In contrast to the partial collapse of affective complexity under stressful conditions, the experience of PEs should broaden the capacity for information processing, resulting in greater affective differentiation (Fredrickson, 2003). A comparable multilevel model examined the effect of that day's positive events on the relation between that day's PA and NA, *i.e.*, the PA X PE interaction. That day's person-centered NE score was entered as a covariate. The interaction term was significant ($b = .013$, F (1,2591) = 4.49, $p < .05$) and consistent with prediction. Panel 2 in Figure 2 shows that the relation between PA and NA was closer to zero on days with relatively more PEs. Thus individuals experienced greater affective complexity on days with more PEs, a pattern that highlights the potential of positive affective experiences to broaden peoples' emotional, cognitive, and/or behavioral repertoires. Expanding our focus beyond consideration of NA and stressful events to include study of the role of positive engagements provides a fuller and more accurate rendering of how our daily lives shape our affective experiences. These influences would not have been detected without the study of within-person processes.

What began as an attempt to explain a relatively straightforward asymmetry in the effects of positive versus negative events has led us to uncover complex changes in the nature of affective experiencing as a function of life events. Life events appear to have two kinds of influences on our emotions. They heighten the level of positive and negative affects that we experience, but they also can change the nature of the experience itself. These two effects are the source of the asymmetry we observe. Negative events increase NA but also reduce affective complexity, which leads us to observe lower PA along with increases in NA. Positive events increase PA and also appear to broaden our affective experience, which would lead us to observe little or no correlation between PE and NA.

[1]The size of correlative relationships may be attenuated when scores on the variables of interest do not vary. To address this possible explanation of our findings we computed the internal consistency reliability for NA during days when a stressful event occurred and compared it to the alpha reliability obtained for NA on days when no stressful event occurred. Since alpha provides an unbiased estimate of the average inter-item correlation for the scale, we reasoned that significant differences in alpha on stressful versus non-stressful days would be evidence for such attenuation. On days with no negative events, the alpha reliability for NA was .73. On days with one or more negative events the alpha was .78. For positive affect, alpha was .86 on stressful and non-stressful days. It is unlikely that these small variations in inter-item correlation could account for the significant increase in PA-NA relationship on stressful days.

Individual Variability in Affective Responses

What evidence is there for individual (between-person) differences in the affective response to positive and negative events? Examination of the variance-covariance parameter estimates in these random effects analyses indicates whether there are significant individual differences in the within-person relations (i.e., level 1 slopes) between interpersonal events and positive and negative affect. Significant individual differences were found for the relation between negative events and negative affect (adjusting for positive events and positive affect), covariance parameter estimate = .004, $Z = 3.44$, $p < .001$, and for the relation between positive events and positive affect (adjusting for negative events and negative affect), covariance parameter estimate = .001, $Z = 2.17$, $p < .05$). We also identified similar individual differences in the relationships between positive events and relationship enjoyment (adjusting for negative events and relationship stress), covariance parameter estimate = .001, Z = 2.64, p < .001, and between negative events and perceived relationship stress (adjusting for positive events and relationship enjoyment), covariance parameter estimate = .010, Z = 3.39, p < .001). , These findings argue that a search for personality differences in relationships between events and affective outcomes benefits from assessments of event appraisals as well as affective consequences of events. .

Such individual differences were found not to be significant for the cross-domain relations between positive events and negative affect or between negative events and positive affect. Relationships between relationship stress and positive affect and relationship enjoyment and negative affect also showed little variability between persons. Apparently the influence of personality does not extend to cross-domain effects: *i.e.*, the influence of positive experience on negative affects, and that of negative experiences on positive affects. Once again, the data reveal how important it is to analyze positive affective processes in parallel with negative affective processes rather than attempt to treat them as bipolar opposites and subtracting scores in one domain from scores in the other.

Neuroticism and Extraversion

Bolger and Zuckerman's (1995) formulation gathers strength from its capacity to address how personality—measured at the between-person level—influences relationships among variables measured within-person over time. Bolger and Zuckerman (1995) relied on neuroticism (N) as the key personality feature, and they demonstrated that individuals who reported higher levels of N also showed differences in their exposure to stressful events and in their reactivity to those stressors.

To determine whether similar cross-level interactions capture personality's influence on positive affects we turned to extraversion (E), which is generally thought to be associated with greater sensitivity to social reinforcement (Eysenck, 1981) and has been associated with individual differences in positive emotionality (Lucas & Baird, 2004).

Neuroticism and extraversion were inversely but modestly correlated, $r\ (91) = -.32$, $p < .01$. Clearly, they are distinct personality features. In a first set of analyses, N and E were examined as predictors of the level 1 intercepts (equivalent to the means of the daily variables) in models treating positive and negative interpersonal events, perceived relationship stress and enjoyment, and positive and negative affect as dependent variables. The results appear in Table 3. N predicted lower PA after controlling for the persons' average levels of NA, and E predicted higher PA after controlling for average levels of NA. Only N predicted higher NA. E, but not N, predicted more positive events (controlling for one's mean number of negative events). N, but not E, predicted more negative events (controlling for one's mean number of positive events). Thus, with the exception of N's influence on PA, these personality measures had influences only within their own domains. E was related to PE, relationship enjoyment

appraisals, and PA, but not NE, relationship stress appraisals and NA. N was associated with negative events, relationship stress appraisals and NA, but not with PE or relationship enjoyment.

A third set of analyses determined whether N and E moderated the within-person relations between a given day's PEs and PA (adjusting for that day's NE and NA) and between a given day's NEs and NA (adjusting for that day's PEs and PA). Extraversion did not moderate the within-person relation between a day's PE and PA, but N moderated the within-person relation between a day's NE and NA, $b = .04$, $F\ (1,2591) = 11.00$, $p < .001$. As portrayed in Figure 3 and consistent with Bolger and Zuckerman's model of stress reactivity, as a person's level of N increased, so did that individual's tendency to experience negative affect on days with more negative events.

At this point we might have concluded that personality differences do not influence responsiveness to positive events. Neither N nor E showed significant influence on the within-person relationship between deviations in daily positive events and positive affect. However, as we alluded to earlier, positive events do not parallel negative events in all respects. Whether an event carries positive valence may depend on the person to a greater extent than whether a negative event carries a negative valence. Logically then, the influence of personality should be found in the appraisal of the events. To pursue this question, we next examined the role of E on the relationship between positive relationship events occurring within the domains of family, friends, spouse/partner and work, and the participants' daily ratings of relationship enjoyment in those domains. In parallel, we examined the role of N in the relationship between negative interpersonal events and ratings of relationship stress across social domains. Now the situation is reversed. N did not influence the relationships between events and affective appraisals of stressfulness ($b = -.006$, $F\ (1,2591) = .08$; $p > .30$), but extraversion did ($b = -.020$, $F\ (1,2591) = 5.50$, $p < .05$).

The findings for E are shown in Figure 4. They do not show the expected pattern. Whereas N increased the NE-NA relationship, E did not increase the relationship between PA and enjoyment. Instead, E appears to identify people with high levels of relationship enjoyment each day almost regardless of their number of positive experiences. There is only a modest upward slope linking PA increases with higher PE for the extraverts. The slope for more introverted participants is the steep one. In essence Figure 4 shows that only when introverts report a relatively high number of positive events than usual does their enjoyment of relationships approach the level of extraverts.

Summary and Conclusions

Our approach in this article has been to investigate the usefulness of adding another affective dimension to the study of the relationship between events and psychological adaptation advocated 10 years ago by Bolger and Zuckerman. This dimension focuses on the positive within events, appraisals of events, and affect as they unfold day-to-day. Accompanying the daily measurement of these positive affective processes are personality processes that also accent the positive, and in this article we settled on extraversion as a representative trait within this broad domain.

Adding a dimension to an already complex framework of within- and between-person relationships is not a direction that one should advocate without ample supportive evidence. Our own studies beginning in the 1980s suggest that a great deal of information about psychological well-being could be gained from more research and conceptualization about positive aspects of daily life. We have been able to adapt innovative technologies (daily diary procedures) and advanced data-analytic techniques (multilevel modeling). These advances in

methods have sharpened our thinking as well, enabling us to move from static to more dynamic approaches.

With this as a backdrop, we reported new findings that are rather unambiguous in their implications. Daily processes of positive events, appraisals and affects constitute a unique dimension of everyday life. The positive assessments do not replace or reduce the salience of daily stress and distress, but neither does information about negative events and affective consequences provide us with information about the positive domain. Positive events show distinct patterns of occurrence and distinct relationships with affective states. Further, individual differences in neuroticism do not account for the influence of extraversion on daily events and their outcomes, and extraversion levels do not account for the influence of neuroticism on daily processes. These positive and negative transactions bring different mixes of states and traits to the table, and different mechanisms appear to underlie each.

The simplest difference is in the sheer frequency of positive versus negative events. Participants reported five to six times as many positive events as negative events. Our investigation of personality characteristics shows unique influences on positive as opposed to negative affective processes as well. Further, events that are positive appear to influence the structure of our affective states in ways opposite that of the effects of negative events.

The evidence does not, however, support a shift of attention from the negative affective realms in favor of the positive. The most interesting models appear to be those that make predictions regarding how people integrate experiences in both domains in ways that further adaptation. The DMA is built upon this dynamic integration process, and multilevel modeling was able to investigate its utility. The results presented here support the DMA and encourage further attention to the role of affective complexity. As predicted, positive and negative affect were less differentiated on stressful days, and more differentiated on days characterized by many positive events. These findings suggest a degree of fluidity in the breadth and depth of affective experiences.

In our applied research, we have focused on the role of positive emotions in reducing the negative affective consequences of episodes of chronic pain. If there were any condition that would seem to demand attention to the negative it would be high levels of musculoskeletal pain. Yet it is when these exacerbations of pain are the greatest that the influence of positive experience appears most valuable to emotion regulation (Zautra, Johnson, & Davis, in press). Stressful conditions like these suggest there may be important clinical and even preventative applications for dynamic models of affect regulation.

People differ in affective complexity (Kang & Shaver, 2004; Lane & Schwartz, 1987; Terracciano, McCrae, Hagemann, & Costa, 2003), and some investigators have begun to examine possible adaptational advantages afforded those with more highly differentiated affect systems (e.g., Ong & Bergeman, 2004). The development of measures to capture individual differences in the complexity of affective awareness is a promising field of inquiry in itself, and may be furthered by attention to physiological concomitants such as heart rate variability (Thayer & Lane, 2000) and neural activation differences in areas of the brain such as the anterior cingulate and the right anterior insula (Craig, 2004).

One point that should not be overlooked here is the importance of detailed assessment of daily events and responses to those events. Had we taken a shortcut in assessment of daily life and relied solely on appraisals of events, or ignored the subjective appraisals in favor of the more objective reports of events, we would not have uncovered personality differences in response to positive events. Indeed, further attention to cognitive-affective responses to events is likely to reveal what is involved in recovery following a “bad” day as well as the processes that sustain positive emotion following a “good” day.

The findings for extraversion and neuroticism were a study in contrasts. Each personality attribute predicted differences between participants in levels within their respective domains: Neuroticism linked to the negative affective domain primarily, and extraversion to the positive. How these personality features predicted the strength of the association between events and affective states followed dynamics that were unique to each affective domain. Neuroticism appeared to magnify the impact of events as expected from Bolger and Zuckerman's stress vulnerability model. Extraversion, on the other hand, appeared to identify people with greater trait-level positive affect, rather than people with an increased sensitivity to positive events. Our interpretation of the interaction graphed in Figure 4, when coupled with the main effect for extraversion, was that introverts needed to be more engaged in positive events to catch up to the levels of positive daily emotion reported by extraverts. There also appeared to be a ceiling on PA in these daily reports. No such ceiling was observed in the reports of NA, which were substantially lower on average than PA. These findings may reflect fundamental differences in emotional regulation strategies for positive versus negative emotion. Our minds may encourage relatively high levels of PA throughout the day up to a certain homeostatic set point. On the other hand, our minds may actively suppress NA except in response to negative events that focus our attention on needs to respond effectively to events that threaten to disrupt stable patterns of adaptation. This rise in NA following stress is amplified for those higher in neuroticism.

Our aim in this article was to provide a glimpse of the inner workings of affective dynamics as they unfold over time. Attention to fundamental differences between positive and negative domains leads to complex and exciting developments in our understanding of stability and change in everyday life. Our initial findings regarding extraversion should encourage testing other trait measures in the positive affective domain to more fully examine the dynamics underlying personality influences of positive states. The influence of stressful events on affect compression, and the apparent greater affective differentiation afforded us by positive experiences support a dynamic approach to the study of daily life. Although our early work encompassed the full range of everyday events, we, like Bolger and Zuckerman (1995), only examined interpersonal events in the daily studies reported here. Whether other types of events are related to affective states in similar ways awaits additional study. Our recent examination of daily pain and financial stress suggest that these are fruitful areas for future inquiry (Skinner, Zautra, & Reich, in press; Zautra, Johnson, & Davis, 2005). It is a rich subject matter, and we feel certain that our model of these processes represents only one of many useful ways of understanding the affective dynamics that underlie everyday experience.

One area in which we are developing our models further is in characterizing individual differences in social complexity in everyday life transactions and their ramifications for adaptation to stress (Davis, Zautra, & Smith, 2004). Another area of interest is the relationship between affective complexity and physiological responses to stress. Since it is now possible to examine covariation between physiological indicators and measures of stress and mood with close-in-time observations within the same person, we may begin to identify substrates of adaptive response in the body as well as the mind (cf. Kamarck et al., this issue). The mind-body connection contained therein may provide definitive physical evidence of the “resilient” response and how it is persevered through positive experience. We believe that progress is likely to advance most rapidly when Bolger and Zuckerman's (1995) model is reloaded with measures of the positive in events, affect and personality.

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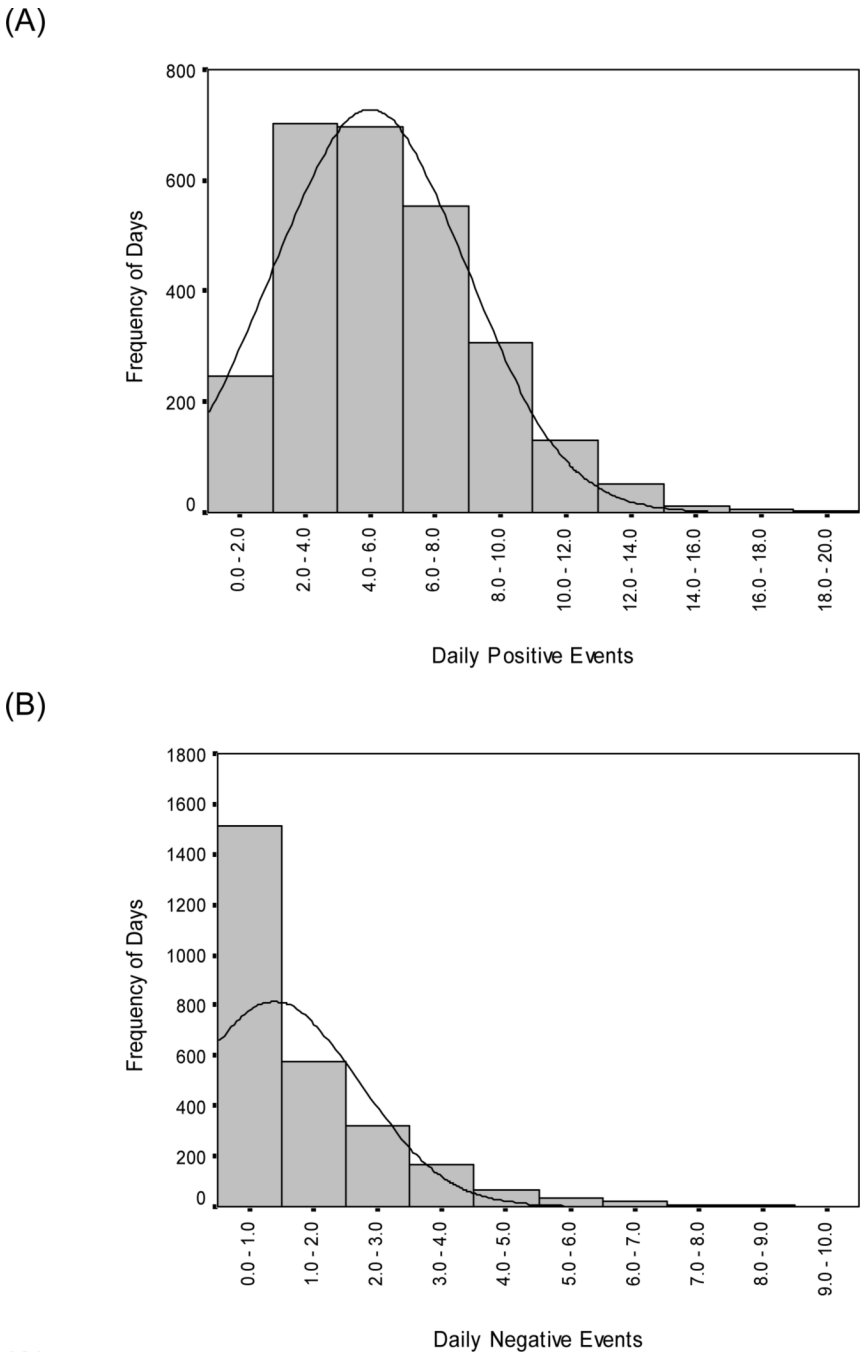

Figure 1.
Distributions of Daily Positive Event and Negative Event Scores

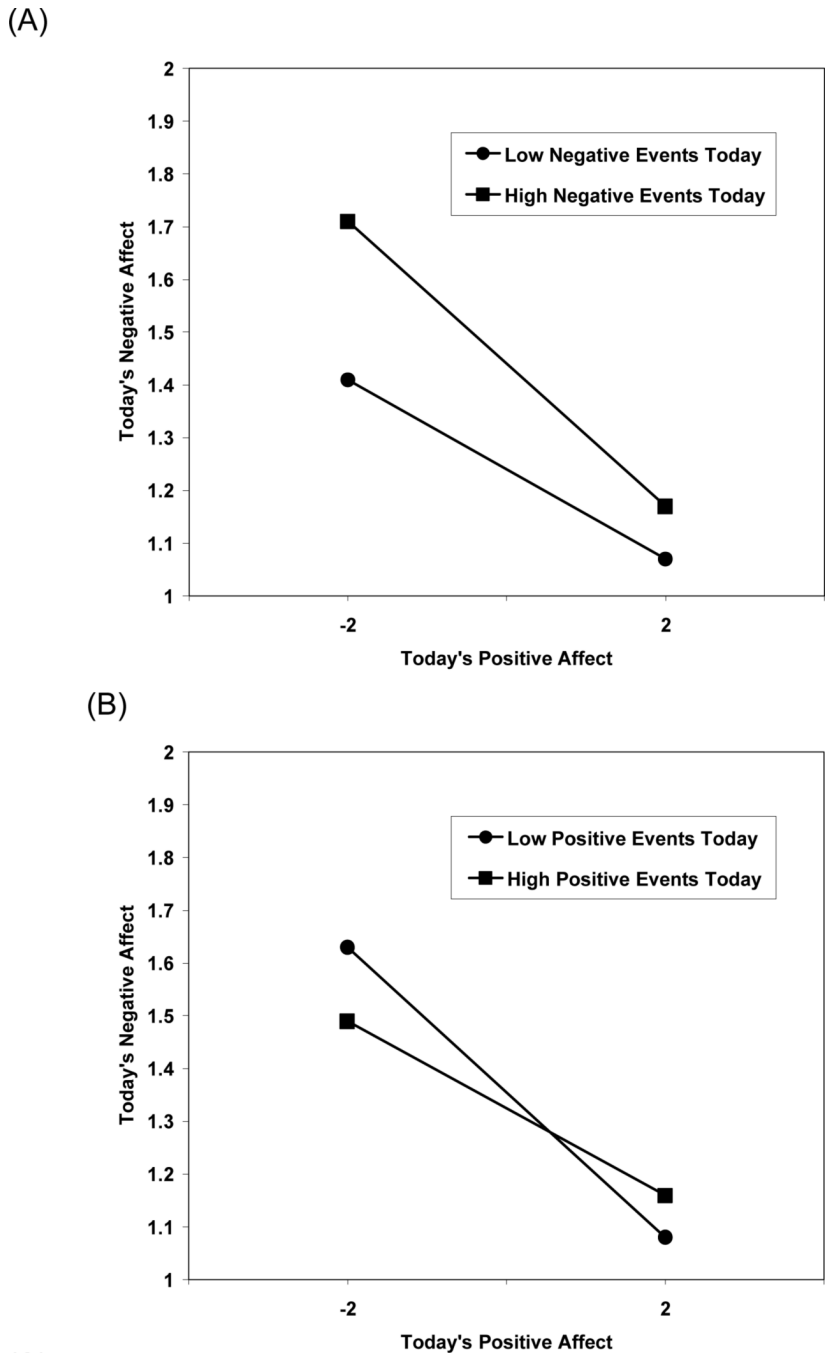

Figure 2.
Within-person relations between person-centered positive affect and negative affect on days with high (+1 s.d.) and low (−1 s.d.) number of person-centered negative events (A) and with high and low number of person-centered positive events (B)

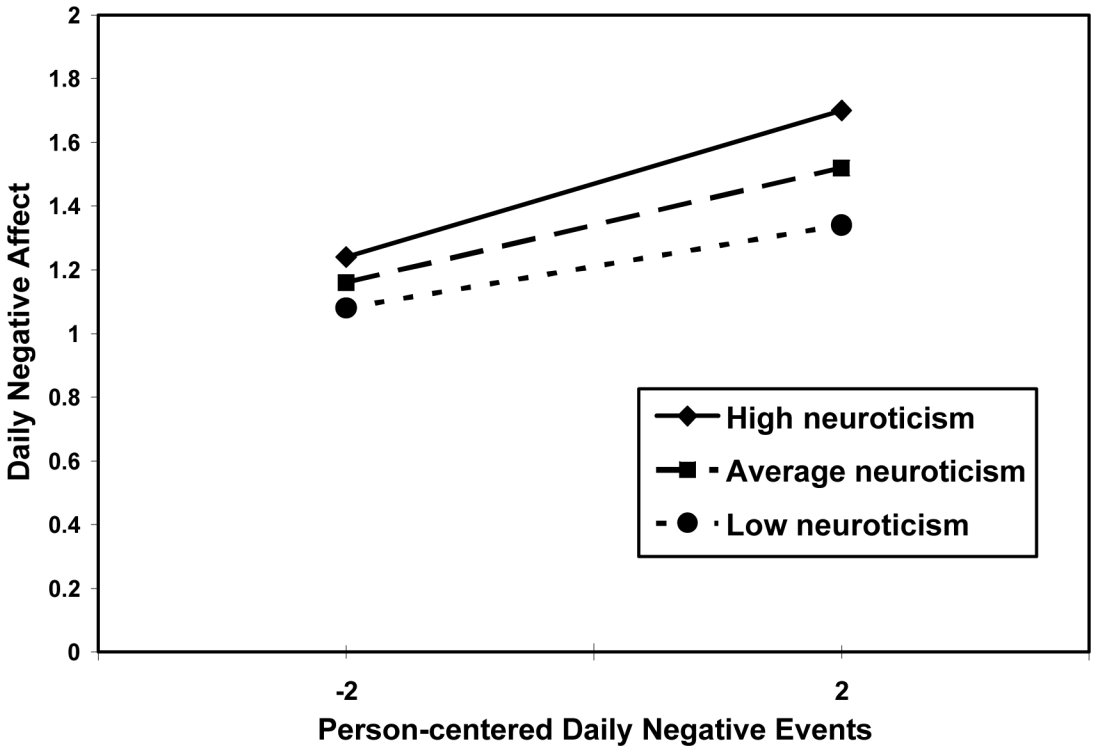

Figure 3.
Within-Person Relations between Daily Negative Events and Daily Negative Affect for Individuals at High (+1 s.d.), Average (mean), and Low (−1 s.d.) levels of Neuroticism

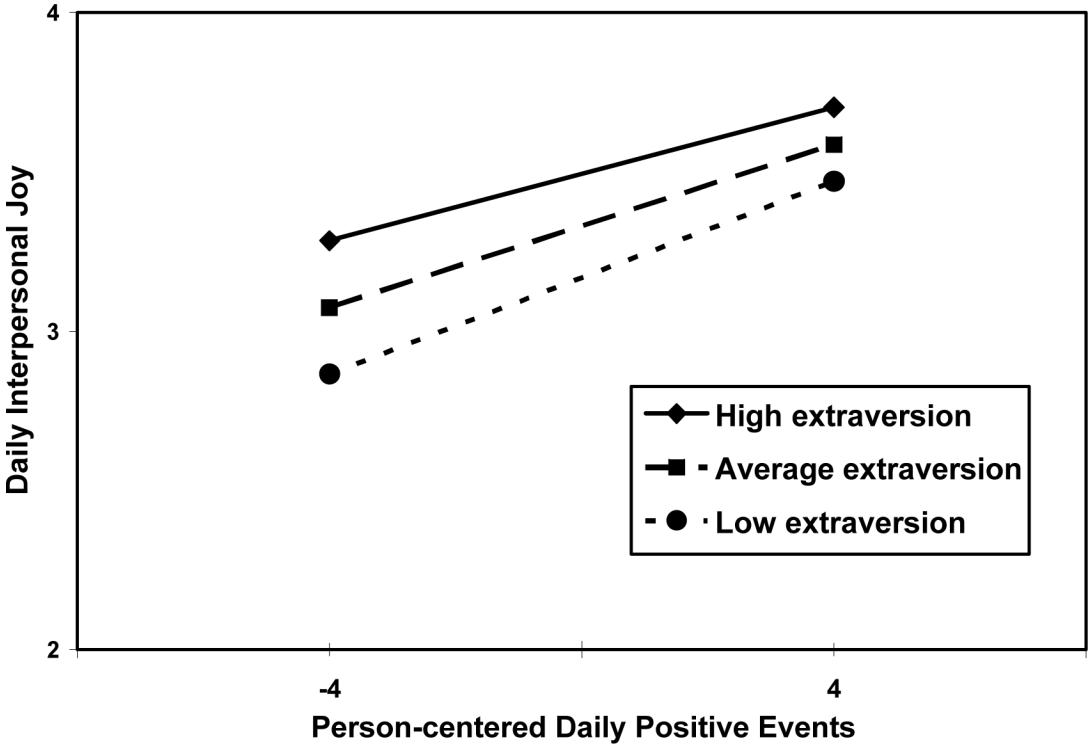

Figure 4.
Within-Person Relations between Daily Positive Events and Daily Enjoyment Appraisals for Individuals at High (+1 s.d.), Average (mean), and Low (−1 s.d.) levels of Extraversion

Table 1

Distributional Characteristics of 30-Day Averages and Person-Centered Daily Changes in Positive and Negative Events

	Average Daily Event Scores (N = 93 Persons)		Change in Daily Event Scores (N = 2713 Person-Days)	
	Positive	Negative	Positive	Negative
Mean	5.000	.887	.000	.000
Median	4.800	.706	−.133	−.200
S.D.	1.984	.783	2.216	1.076
Skewness	.143	1.440	.642	1.363
Kurtosis	−.030	1.678	1.571	4.220

Table 2

Multivariate Multilevel Random Coefficient Analyses of Between-Person and Within Person Relations of Negative and Positive Events with Negative and Positive Affect

	Negative Affect[a]		Positive Affect[b]	
	B	**F**	**b**	**F**
Negative Events				
Between-Person	.097	17.57**	−.307	11.09**
Within-Person	.094	106.16***	−.001	.02
Positive Events				
Between-Person	−.019	1.04	.140	14.79**
Within-Person	−.006	3.93*	.065	118.96***

Note: N = 93 for between-person analyses and N = 2713 person-days for within-person analyses

*** p < .001

** p < .01

* p < .05

[a] Adjusting for Positive Affect

[b] Adjusting for Negative Affect

Table 3

Relations of Neuroticism and Extraversion with Daily Affects, Events, and Appraisals Intercepts

Intercept	Neuroticism b	Neuroticism F	Extraversion b	Extraversion F
Affects				
Positive Affect[a]	−.337	9.01**	.266	4.67*
Negative Affect[b]	.163	7.83**	−.091	1.89
Events				
Positive Events[c]	−.387	1.65	.905	7.64**
Negative Events[d]	.285	5.10*	−.259	3.68
Appraisals				
Relationship Joy[e]	−.025	.17	.199	8.95**
Relationship Stress[f]	.101	4.82*	−.053	.85

[a] Adjusting for Negative Affect

[b] Adjusting for Positive Affect

[c] Adjusting for Negative Events

[d] Adjusting for Positive Events

[e] Adjusting for Relationship Stress

[f] Adjusting for Relationship Joy

* $p < .05$

** $p < .01$

Table 4

Moderating Effects of Neuroticism on the Within-Person Relations between Negative Events and Stress Appraisals, Stress Appraisals and Negative Affect, and Negative Events and Negative Affect

Within-Person Relation	b	F
Negative Events and Stress Appraisals[a]	−.006	.08
Stress Appraisals and Negative Affect[b]	.086	5.59*
Negative Events and Negative Affect[c]	.041	11.00**

* p < .05

** p < .01

[a] Adjusting for Positive Events and Enjoyment Appraisals

[b] Adjusting for Enjoyment Appraisals and Positive Affect

[c] Adjusting for Positive Events and Positive Affect

Table 5

Moderating Effects of Extraversion on the Within-Person Relations between Positive Events, Enjoyment Appraisals, and Positive Affect

Within-Person Relation	b	F
Positive Events and Relationship Joy[a]	−.020	5.50*
Relationship Joy and Positive Affect[b]	.022	.23
Positive Events and Positive Affect[c]	.006	.38

* $p < .05$

[a] Adjusting for Negative Events and Perceived Relationship Stress

[b] Adjusting for Relationship Stress and Negative Affect

[c] Adjusting for Negative Events and Negative Affect