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Personality moderates the interaction between positive and negative daily events predicting negative affect and stress

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ABSTRACT

A 30-day diary study examined personality moderators (neuroticism and extraversion) of the interaction between positive and negative daily events predicting daily negative affect and night-time stress. Multilevel analyses revealed positive daily events buffered the effect of negative daily events on negative affect for individuals low in neuroticism and individuals high in extraversion, but not for individuals high in neuroticism or individuals low in extraversion. Positive daily events also buffered the effect of negative daily events on that night's stress, but only for participants low in neuroticism. As such, this research linked today's events to tonight's stressfulness. This study advances our understanding of how neuroticism and extraversion influence within-person associations between positive and negative events predicting negative affect and stress.

1. Introduction

Previous research indicates that positive and negative daily events influence negative daily mood (e.g., Bolger, Delongis, Kessler, & Schilling, 1989; Clark & Watson, 1988; Stone, 1987). As an extension of this research, more recent studies have examined the interaction of positive and negative daily events predicting negative affect (David, Green, Martin, & Suls, 1997; Nezlek & Allen, 2006; Nezlek & Plesko, 2003). Most research that has explored this interaction predicting negative affect, however, has provided mixed evidence of a "buffering effect" (i.e., positive events mitigate the impact of negative events on negative affect).

Individual difference variables appear to influence within-person relations between events and moods (Bolger & Schilling, 1991; David et al., 1997; Gable, Reis, & Elliot, 2000; Nezlek & Allen, 2006; Nezlek & Plesko, 2003). Therefore, the buffering effect of positive events may only be evident for some people. The primary goal of the current study was to determine whether neuroticism and extraversion moderated the buffering effect of positive events on the relation between negative events and negative affect. In addition, longitudinal findings suggest that positive events may buffer the effect of negative events on distress (Reich & Zautra, 1981; Shahar & Priel, 2002). The current research extends this past research by exploring personality moderators of the buffering effect of a day's positive events on the relation between that day's negative events and stress experienced that night.

1.1. The interaction of positive and negative events: buffering

Research on positive events buffering the effect of negative events on affect has provided mixed results. Though some evidence suggests that positive events buffer the effect of negative events on negative affect (Nezlek & Allen, 2006), other research has failed to support this buffering effect (David et al., 1997; Nezlek & Plesko, 2003). Nezlek and Allen (2006) reported that positive events buffered the effect of negative events on high activation negative affect (e.g., guilty, afraid) and low activation positive affect (e.g., calm, relaxed). On the other hand, David et al. (1997) in a cross-sectional study and Nezlek and Plesko (2003) in a diary study failed to find evidence of the buffering effect. For example, David and colleagues (1997) reported a non-significant interaction between desirable and undesirable events predicting negative affect (see Nezlek & Plesko, 2003 for similar findings predicting daily affect). However, positive events have been shown to buffer the effect of negative events on other psychological outcomes, such as depressive symptoms (Cohen & Hoberman, 1983; Cohen, McGowan, Fooskas, & Rose, 1984; Nezlek & Allen, 2006; Nezlek & Plesko, 2003), evaluations of daily self-worth (Nezlek & Plesko, 2003) and distress (Reich & Zautra, 1981; Shahar & Priel, 2002).

Few studies have examined the trait-level moderation of the within-person interaction between positive and negative daily events predicting negative affect. Though Nezlek and Plesko (2003) tested for trait-level moderators of the daily events interaction, they did not find any such moderation when predicting negative affect. On the other hand, Nezlek and Allen (2006) found that depression and family support moderated the interaction between

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daily events predicting low activation positive affect (i.e. calm, satisfied and relaxed) and daily mood (i.e. difference between mean negative affect and mean positive affect), respectively. These researchers also reported that neuroticism and extraversion did not moderate the interaction between positive and negative events predicting affect. However, trait-level moderation (i.e., trait negative affect, self-esteem, and depression) of the interaction between positive and negative events has been found for outcomes such as daily self-esteem and depression (Nezlek & Plesko, 2003).

1.2. Neuroticism: moderation of the buffering effect

As a Big Five personality factor, Neuroticism characterizes individual differences in the predisposition to experience negative affect (e.g., Watson & Clark, 1984; McCrae & John, 1992; Costa & McCrae, 1980). People high in neuroticism (compared to those low in neuroticism) are more reactive to negative affect manipulations in the laboratory and negative events in everyday life (Bolger & Schilling, 1991; Larson & Ketelaar, 1991). Marco and Suls (1993) as well as Bolger and Schilling (1991) reported that neuroticism is indicative of a heightened sensitivity to stressful events and, subsequently, more negative affect and distress in both between- and within-subject analyses (c.f. David et al., 1997). Such findings suggest that neuroticism is an important contributor to daily negative affect and stress through its interaction with negative events.

Neuroticism may moderate the interaction between positive and negative events when predicting daily negative affect and night-time stress. Individuals high in neuroticism experience a heightened sensitivity to negative events due to poor coping skills (Gunthert, Cohen, & Armeli, 1999; Suls & Martin, 2005; Watson & Hubbard, 1996), ineffective emotion regulation (Kokkonen & Pulkkinen, 2001a) and negative schemas (Robinson, Ode, Moeller, & Goetz, 2006), which may preclude these individuals from reaping the benefits of positive events in the face of many negative events. Moreover, for individuals high in neuroticism, negative mood has been shown to increase evaluation speed (Tamir & Robinson, 2004) and enhance performance on cognitively demanding tasks (Tamir, 2005). Therefore, individuals high in neuroticism may be motivated to maintain negative affect in order to obtain these performance effects. Neuroticism is also negatively associated with the savoring of positive events (Bryant, 2003; Wood, Heimpel, & Michela, 2003), making individuals high in neuroticism even less disposed to the possible buffering effects of positive events. Based on these findings, the buffering effect of positive events may only be present among individuals low in neuroticism.

1.3. Extraversion: moderation of the buffering effect

Extraversion, another Big Five personality factor, is more closely related to positive affectivity (e.g., Costa & McCrae, 1980; McCrae & John, 1992; Zelenski & Larsen, 1999). Although little research has explored the interaction of extraversion and negative events predicting affect, one study which has explored the interaction has failed to find evidence for this effect (Zautra, Affleck, Tennen, Reich, & Davis, 2005). In addition, Lucas and Diener (2001) reported that participants high and low in extraversion did not differ in their ratings of how they would feel after experiencing a set of hypothetical unpleasant events, suggesting that negative events may not evoke differential responses based on level of extraversion. Studies reporting the interaction between extraversion and positive events suggest that extraverts are more sensitive to reward cues, therefore making them more susceptible to the positive affect associated with such cues (Lucas, Diener, Grobb, Suh, & Shao, 2000; Zelenski & Larsen, 1999). Individuals high in extraversion are more reactive to positive affect inductions in the laboratory (Larson & Ketelaar, 1991) and they rate both pleasant social and non-social situations more positively than their low extraversion counterparts (Lucas & Diener, 2001). On the other hand, some research contends that extraverts are not necessarily more reactive to positive events, but that they experience a greater trait level of positive affect (David et al., 1997; Lucas & Baird, 2004; Zautra et al., 2005).

Extraversion may moderate the interaction between positive and negative events predicting negative affect and night-time stress. Because some research reveals that extraverts are more sensitive to positive affect stimuli (Larson & Ketelaar, 1991; Lucas et al., 2000; Zelenski & Larsen, 1999) and positive events (Lucas & Diener, 2001), and more likely to savor positive events (Bryant, 2003; Wood et al., 2003), they may experience a buffering effect of positive events on the impact of negative events on negative affect and night-time stress. Therefore, the buffering effect of positive events may only be present among individuals high in extraversion.

1.4. Current study

The goal of the current study was to evaluate whether neuroticism and extraversion moderate the interaction between daily positive and negative events predicting daily negative affect and night-time stress. This research extends earlier findings, but is distinct from past research in several ways. The current research was concerned with participants' subjective experience of daily events as positive or negative. As such, participants' were asked to report the desirability (vs. undesirability) of events that had occurred each day, allowing participant ratings to determine whether an event was experienced as positive or negative. Therefore, though previous research has focused on more objective events (e.g., Nezlek & Allen, 2006; Nezlek & Plesko, 2003), the current research focuses on people's subjective interpretation of daily events.

Additionally, the current research expands past findings by exploring the day to day relations between positive and negative daily events predicting stress. Using a daily diary design, we are able to evaluate the within-person contingencies between daytime events and night-time stress, and personality moderators of this relationship. To our knowledge, this is the first study to explore trait-level (i.e. neuroticism and extraversion) moderation of the buffering effect of daily positive events on night-time stress (as reported the following day). Finally, because depression is related to both negative affect and stress, and has some conceptual overlap with neuroticism, all of our analyses control trait-level depression.

1.5. Summary of the hypotheses

Hypothesis 1. We hypothesized a three-way interaction between neuroticism, positive events, and negative events predicting both negative affect and night-time stress. We predicted that for individuals high in neuroticism, daily positive events would not buffer the effect of daily negative events on negative affect or night-time stress (i.e. the slope between negative events and negative affect (night-time stress) will not differ based on the amount of positive events experienced that day by participants high in neuroticism). Conversely, for individuals low in neuroticism, daily positive events would buffer the effect of daily negative events on negative affect and night-time stress (i.e. the slope between negative events and negative affect (night-time stress) will be weaker on days participants low in neuroticism experience more (vs. fewer) positive events).

Hypothesis 2. We hypothesized a three-way interaction between extraversion, positive events, and negative events predicting both negative affect and night-time stress. We predicted that for individuals high in extraversion, daily positive events would buffer the effect of daily negative events on negative affect and night-time stress (i.e. the slope between negative events and negative affect

(night-time stress) will be weaker on days participants high in extraversion experience more (vs. fewer) positive events). Conversely, for individuals low in extraversion, daily positive events would not buffer the effect of daily negative events on negative affect or night-time stress (i.e. the slope between negative events and negative affect (night-time stress) will not differ based on the amount of positive events experienced that day by participants low in extraversion).

2. Method

2.1. Participants

Participants were 575 undergraduate students from the University of Connecticut taking part in a 30-day diary study. We excluded data from five participants who did not complete the background survey and 65 participants who did not complete at least fifteen of the daily surveys. The final sample of 505 students (265 female, 240 male) completed an average of 25.15 days (SD = 3.88) of the 30-day diary study. Participants completed the diary study on 12,702 days of the potential 15,150 (505 participants × 30 days) reporting days (84%).[1] The sample was largely composed of White or European American participants (n = 432). The racial break down included African Americans (n = 15), Latinos (n = 13), Asian or Pacific Islander (n = 30), and other (n = 15). The mean age of participants was 18.79 years (SD = 1.14). Participants received partial course credit and monetary compensation for participating. In addition, participants who completed 25 days or more of the daily surveys were entered into a lottery to receive a monetary prize.

2.2. Overview of procedure

Students were recruited to take part in a web-based Study of College Student Daily Life. At the beginning of the study, participants filled out an online survey consisting of several background measures including measures of neuroticism and extraversion. Then, every day for 30 days, they logged onto a secure (password protected) website to access the daily diary portion of the study to record previous night's stressfulness, today's negative and positive events, and their current positive and negative affect. Participants were allowed access to the diary survey each day between the hours of 2:30 pm and 7:00 pm. Because this study was part of a larger study on college student drinking, these times were selected so that students were completing the surveys between the end of their classes and before their evening's social activities (i.e. drinking). Participants were unable to log onto the website at other times unless they received a special password from the researchers that allowed them access from noon until 9:00 pm. on a specific day.

2.3. Background measures

2.3.1. Neuroticism

Costa and McCrae's (1992) 12-item Neuroticism subscale of the 60-item NEO Five-Factor Inventory was used to assess individual differences in the predisposition to experience negative emotions (e.g., "I often feel tense and jittery", "Sometimes I feel completely worthless"). Participants responded using a Likert 7-point scale (1 = strongly disagree, 7 = strongly agree). Items were reverse scored where necessary (α = .86).

2.3.2. Extraversion

Costa and McCrae's (1992) 12-item Extraversion subscale of the 60-item Five-Factor Inventory was used to assess individual differences in positive affectivity (e.g., "I like to have a lot of people around me", "I am a cheerful, high spirited person"). Participants responded using a Likert 7-point scale (1 = strongly disagree, 7 = strongly agree). Items were reverse scored where necessary (α = .80).

2.3.3. Depression

The short form of the Beck Depression Inventory (Beck, Rial, & Rickets, 1974) was used to assess trait depression, which has some conceptual overlap with neuroticism. Participants were asked to respond to 13-items (e.g., "sad") on a 4-point scale (e.g., 1 = I do not feel sad, 4 = I feel so sad or unhappy that I just can't stand it) (α = .83).

2.4. Repeated diary measures

2.4.1. Daily events

Each day participants completed a daily event checklist containing events that occur frequently in the lives of college students (adapted from Gable et al., 2000; Nezlek & Plesko, 2001). The events were in the domains of school, social, and health (e.g., "made progress toward school assignment/task that has a deadline", "had a disagreement or conflict with friend, boyfriend/girlfriend, or family", and "tried to improve diet/ate healthy"). Participants were instructed to check any events that had occurred and then to rate how desirable or undesirable the event was on a 7-point scale (1 = extremely undesirable, 7 = extremely desirable). Negative events were those events rated as 1, 2, or 3 and positive events were those events rated as 5, 6, or 7. Positive events were then recoded so that slightly desirable was rated as 1 and extremely desirable was rated as 3. We computed positive and negative events by separately summing the ratings for each event for each day and then we averaged the items.

2.4.2. Mood

Nine negative emotions (e.g., angry, sad, bored, dejected, jittery, nervous, ashamed, guilty, hostile) and six positive emotions (e.g., happy, enthusiastic, cheerful, relaxed, excited, content) were selected from Larsen and Diener's (1992) mood circumflex and Watson, Clark, and Tellegen's Positive and Negative Affect Schedule (1998) . Participants rated the extent that they felt each emotion at that moment on a 5-point scale (1 = not at all, 5 = extremely). Composites of daily negative mood (day 3 α = .85; day 15 α = .78; day27 α = .86) and daily positive mood (day 3 α = .88; day 15 α = .91; day27 α = .92) were computed separately.

2.4.3. Night-time stress

Each day, participants' reported the previous night's overall level of stress (e.g., "Please rate last night's overall stressfulness") on a 5-point scale (1 = not at all stressful, 5 = extremely stressful).

3. Results

3.1. Descriptive statistics

Table 1 shows the descriptive statistics and correlations for the between-person and the aggregate (mean across 30 days) daily variables. Trait neuroticism was inversely related to trait extraversion and positively related to trait depression. Neuroticism was positively related to average levels of negative daily events, negative daily affect, and nightly stress, and negatively related to average levels of positive daily events and positive daily affect. Extraversion was positively related to average levels of negative daily events, positive daily events, and positive daily affect, but inversely related to average levels of negative daily affect, nightly stress and depression. Depression was positively related to average levels of negative daily events, positive daily events, negative daily affect, and night-time stress, but inversely related positive daily

[1] Participants who we included in our analyses did not differ significantly from students we did not include in our analyses in neuroticism or extraversion.

Table 1
Descriptive statistics and correlations for the between-person and the aggregate daily variables.

Variable	M	SD	1	2	3	4	5	6	7	8
1. Trait neuroticism	3.58	1.01	–							
2. Trait extraversion	4.93	.77	−.46**	–						
3. Trait depression	.36	.33	.59**	−.34**	–					
4. Daily negative events	5.50	7.03	.19**	.06**	.19**	–				
5. Daily positive events	6.94	6.51	.02*	.18**	.04**	.25**	–			
6. Daily negative affect	1.37	.49	.18**	−.08**	.27**	.17**	−.02*	–		
7. Daily positive affect	2.58	.92	−.27**	.32**	−.24**	−.15**	.20**	−.21**	–	
8. Night-time stress	2.82	1.72	.19**	−.09**	.18**	.16**	.06*	−.27**	.22**	–

Note: $N = 575$.
* $p < .05$.
** $p < .01$.

affect. Participants who reported more negative events on average also reported more positive events. In addition, participants who reported more negative daily events also reported more negative affect and night-time stress, but reported less positive affect. Similarly, participants who reported more positive daily events also reported more positive daily affect, but less negative daily affect and nightly stress. There was a negative relation between both negative daily affect and positive daily affect, and night stress and positive daily affect. Finally, there was a positive relation between night-time stress and negative daily affect.

3.2. Multilevel regression analyses

Our data contains two levels of analysis with repeated measurements of daily events, daily affect, and night-time stress nested within participants. Thus, we conducted multilevel regression analyses to test our hypotheses using PROC MIXED within SAS v9.1.3 (SAS Institute, 2002). This approach allows for the simultaneous estimation of both within- and between-person effects and allows for unbalanced data (Kenny, Kashy, & Bolger, 1998; Nezlek, 2001). We examined the within-person intercept and slope coefficients of the interaction between positive and negative daily events predicting daily affect (Level 1). We then predicted variability in the within-person intercepts and slopes from the Level 2 predictor (e.g., neuroticism or extraversion). For example, our hypothesis that the within-person interaction between positive and negative daily events (Level 1 variables) predicting daily affect will vary across levels of neuroticism (a Level 2 variable) proposes a cross level, three-way interaction.

Do positive events buffer the effect of negative events on negative affect differentially for people with high and low neuroticism? To answer this research question, we explored a cross-level, three-way interaction between negative events (Level 1 predictor), positive events (Level 1 predictor) and neuroticism (Level 2 predictor) predicting daily negative affect. Daily negative affect was predicted from the following person-level equation:

$$\text{Daily negative affect}_{ij} = \gamma_{00} + \gamma_{10}(\text{positive affect}) + \gamma_{20}(\text{positive events}) + \gamma_{30}(\text{negative events}) + \gamma_{01}(\text{trait neuroticism}) + \gamma_{02}(\text{trait extraversion}) + \gamma_{03}(\text{trait depression}) + \gamma_{40}(\text{positive events} \times \text{negative events}) + \gamma_{21}(\text{positive events} \times \text{neuroticism}) + \gamma_{31}(\text{negative events} \times \text{neuroticism}) + \gamma_{41}(\text{positive events} \times \text{negative events} \times \text{neuroticism}) + u_{0j} + u_{1j} + u_{2j} + r_{ij}.$$

where Daily Negative Affect$_{ij}$ refers to participant *j*'s daily negative affect on day *i*, γ_{00} refers to that participant's average negative affect across the 30 assessments (adjusted for other predictors in the model). The term γ_{10} represents the effect of daily positive affect on daily negative affect, therefore allowing us to control for the possible influence of positive affect. Whenever entering affect (and all other Level 1 variables) into the equation as a covariate, the affect score was person centered by centering the variable around each participant's average affect rating across the 30 assessments. The terms γ_{20} and γ_{30} represent the effects of positive daily events and negative daily events on negative daily affect, respectively. To eliminate the effects of individual differences in the reporting of events, daily level negative and positive events scores were also person centered by centering the variables around each participant's average event rating across the 30 assessments. Therefore a participant's coefficients for daily events reflect increases or decreases from his or her average daily event levels. The term γ_{01} represents the effects of trait neuroticism, the person-level variable, on person *j*'s average level of negative affect. The term γ_{02} represents the effect of extraversion on daily negative affect and the term γ_{03} represents the effect of depression on daily negative affect, allowing us to control for the influence of trait extraversion and trait depression on negative affect. Neuroticism, extraversion and depression scores were grand-mean centered by subtracting the respective sample means. The term γ_{40} represents the coefficient for the within-person interaction between positive daily events and negative daily events, while the terms γ_{21} and γ_{31} refers to coefficients for the interactions between positive events and neuroticism and negative events and neuroticism, respectively. The coefficient for the three-way interaction between Daily Positive Events × Daily Negative Events × Neuroticism is represented by the term γ_{41}. All interaction terms were calculated by group (or person) mean centering the predictors in advance and multiplying them together.

Because of our repeated measurements design, observations that are closer in time to one another may be more highly correlated than observations that are farther apart in time, possibly resulting in autocorrelated residuals (West & Hepworth, 1991). Therefore, for all analyses we specified an AR(1) error structure, in which correlations among the residuals exponentially decline over time.

3.3. Neuroticism, positive and negative daily events predicting negative affect

Do positive events buffer the effect of negative events on negative affect differentially for individuals high and low in neuroticism? As shown in Table 2, the multilevel regression analysis revealed significant main effects for negative events, depression[2] and neuroticism. In addition, there was a significant Positive Events × Negative Events[3] within-person interaction and a Neuroticism × Negative Events cross-level interaction when predicting negative affect. Moreover, there was a significant Neuroticism × Positive Events × Negative Events interaction.[4] We determined the nature of

[2] Because depression has some conceptual overlap with neuroticism, and it was significantly related to both daily negative affect and night-time stress, it was entered as a covariate. The pattern of results reported remains the same if Depression is dropped from the model.

[3] This interaction term was also significant in a reduced model including only positive events, negative events and their interaction.

[4] Gender did not moderate any of the effects that are reported.

Table 2
Multilevel regression results for neuroticism, positive and negative daily events predicting negative affect.

Dependent variable	Negative affect	
	B	SE
Intercept	1.36**	.017
Positive affect	−.157**	.005
Depression	.14*	.056
Extraversion	.016	.021
Positive events	−.001	.001
Negative events	.008**	.001
Neuroticism	.066**	.019
Positive events × Negative events	−.0003*	.0001
Positive events × Neuroticism	.0007	.001
Negative events × Neuroticism	.004**	.001
Positive events × Negative events × Neuroticism	.0004**	.0001

Note: $N = 575$.
* $p < .05$.
** $p < .01$.

Table 3
Multilevel regression results for neuroticism, positive and negative daily events predicting night-time stress.

Dependent variable	Night-time stress	
	b	SE
Intercept	2.947**	.057
Depression	.396*	.168
Extraversion	.01	.063
Positive events	.031	.002
Negative events	.018**	.005
Neuroticism	.228**	.056
Positive events × Negative events	−.001	.001
Positive events × Neuroticism	−.002	.004
Negative events × Neuroticism	.002	.005
Positive events × Negative events × Neuroticism	.001†	.0007

Note: $N = 575$.
† $p < .10$.
* $p < .05$.
** $p < .01$.

the three-way interaction by using the procedures outlined by Aiken and West (1991). Specifically, two variables were calculated to represent participant's one standard deviation above (i.e., high neuroticism) and one standard deviation below (i.e., low neuroticism) the mean on neuroticism. Then, two additional analyses were run in which the newly computed high and low neuroticism variables were separately entered into the equation replacing the original neuroticism variable.

The simple slopes analyses for participants high in neuroticism revealed a significant main effect for negative events ($b = .012$, $p < .01$) and a non-significant main effect for positive events ($b = -.001$, $p = .57$) predicting negative affect. In addition, the Positive Events × Negative Events within-person interaction was not significant ($b = .0001$, $p = .51$). This indicates that for high neuroticism participants, positive daily events do not buffer the impact of negative events on negative affect (see Fig. 1). The simple slopes analyses for participants low in neuroticism revealed a significant main effect for negative daily events ($b = .004$, $p < .05$) and a non-significant main effect for positive events ($b = -.002$, $p = .11$) predicting negative affect. In addition, there was a significant Positive Events × Negative events within-person interaction ($b = -.001$, $p < .01$).

Following Aiken and West (1991), the within-person interaction was probed by calculating simple slopes for low neuroticism people one standard deviation above and below the mean on daily positive events. As illustrated by the regression lines in Fig. 1, the simple slope tests revealed a positive relation between negative events and negative affect on days when participants with low neuroticism experienced fewer positive events ($b = .007$, $\beta = .23$, $p < .01$). In contrast, there was no significant relation between negative events and negative affect on days when individuals low in neuroticism experienced more positive events ($b = .001$, $\beta = .01$, $p = .57$). In support of Hypothesis 1, the results suggest that positive events do buffer the effect of negative events on negative affect for individuals low in neuroticism. On the other hand, individuals high in neuroticism do not experience these same buffering effects, as more positive events have no bearing on negative affect.

3.4. Neuroticism, positive and negative daily events predicting night-time stress

Do positive events buffer the effect of negative events on night-time stress differentially for individuals high and low in neuroticism? As shown in Table 3, we found significant main effects for negative events, depression and neuroticism predicting night stress. In addition, there was a marginally significant Neuroticism × Positive Events × Negative Events interaction.

The simple slopes analysis for participants high in neuroticism revealed a significant main effect for negative events ($b = .02$,

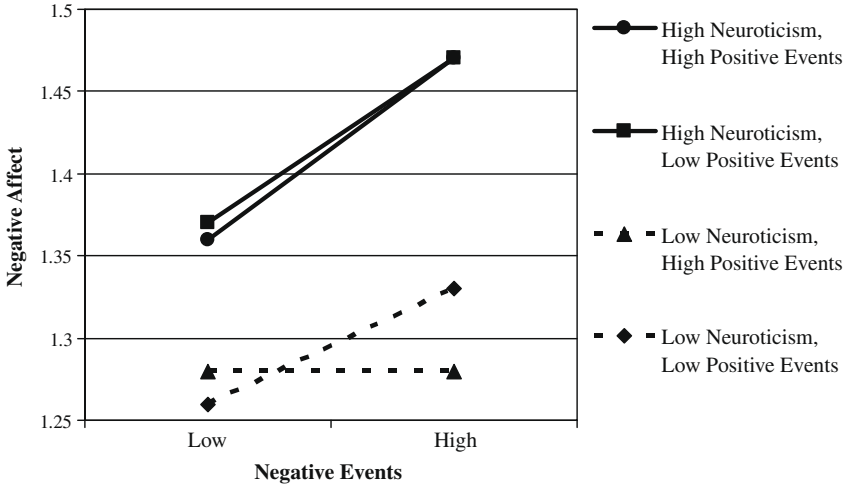

Fig. 1. Predicting negative affect from the within-person interaction between positive and negative daily events for participants high and low in neuroticism.

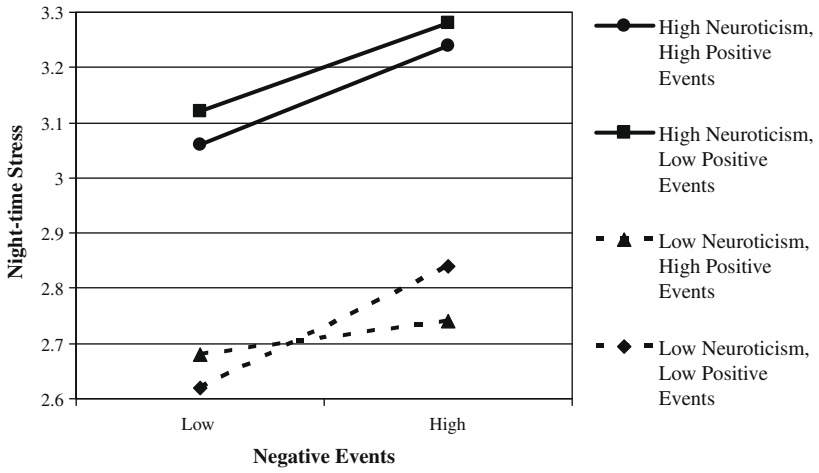

Fig. 2. Predicting night stress from the within-person interaction between positive and negative daily events for participants high and low in neuroticism.

$p < .01$) and a non-significant main effect for positive events ($b = -.01$, $p = .28$) predicting night-time stress. However, the Positive Events × Negative Events within-person interaction predicting night-time stress was non-significant ($b = .0002$, $p = .75$). The simple slopes analyses for participants low in neuroticism revealed a significant main effect for negative events ($b = .02$, $p < .05$) and a non-significant main effect for positive events ($b = -.002$, $p = .78$) predicting night-time stress. There was also a marginally significant Positive Events × Negative Events within-person interaction predicting night-time stress ($b = -.002$, $p = .07$). As shown in Fig. 2, for participants low in neuroticism who experienced fewer (as compared to greater) positive events, negative events were significantly related to an increase in night-time stress ($b = .02$, $\beta = .13$, $p < .01$). For participants low in neuroticism who experienced greater (as compared to fewer) positive events, negative events were unrelated to their level of night-time stress ($b = .01$, $\beta = .03$, $p = .41$). These findings provide additional support for Hypothesis 1: positive events buffered the effect of negative daily events on night-time stress for participants low in neuroticism, but not for participants high in neuroticism.

3.5. Extraversion, positive and negative daily events predicting negative affect

To determine if positive events buffer the effect of negative events on negative affect differentially for individuals high and low in extraversion we examined the Extraversion × Positive Events × Negative Events three-way interaction predicting negative affect (see Table 4). This analysis revealed significant main effects for negative daily events, depression, and neuroticism and a significant Extraversion × Negative Events cross-level interaction. This two-way interaction was qualified by a significant Extraversion × Positive Events × Negative Events interaction.

The simple slopes analyses for participants high in extraversion revealed a significant main effect for negative events predicting negative affect ($b = .006$, $p < .001$) and a marginally significant main effect for positive events predicting negative affect ($b = -.002$, $p = .09$). There was also a significant Positive Events × Negative Events within-person interaction ($b = -.0004$, $p < .05$). The regression lines depicted in Fig. 3 revealed a positive relation between negative events and negative affect on days when participants high in extraversion experienced fewer positive events ($b = .008$, $\beta = .12$, $p < .001$). There was also a significant relation between negative events and negative affect on days when participants high in extraversion experienced more positive events ($b = .004$, $\beta = .08$, $p < .05$), however this relationship between negative events and negative affect was significantly weaker for participants high in extraversion who experienced more (vs. fewer) positive events. In contrast, as also depicted in Fig. 3, for participants low in extraversion there is only a main effect of negative events on negative affect ($b = .011$, $p < .001$). The Positive Events × Negative Events within-person interaction is not significant for participants low in extraversion ($b = .0002$, $p = .24$). In support of Hypothesis 2, these findings suggest that positive events weaken the effect of negative events on negative affect for participants high in extraversion, but not for participants low in extraversion.[5]

We re-ran the model, pitting the Extraversion × Positive Events × Negative Events and the Neuroticism × Positive Events × Negative Events interactions against each other to predict negative affect. When both three-way, cross-level interactions are entered into the same model, only the interaction term for the Neuroticism × Positive Events × Negative Events remained significant, indicating that only Neuroticism was a significant moderator of the buffering effect.

Table 4
Multilevel regression results for extraversion, positive and negative daily events predicting negative affect.

Dependent variable	Negative affect	
	B	SE
Intercept	1.357**	.017
Positive affect	−.157**	.005
Depression	.144*	.056
Neuroticism	.06**	.019
Positive events	−.001	.001
Negative events	.009**	.001
Extraversion	.011	.022
Positive events × Negative events	−.0001	.0001
Positive events × Extraversion	−.001	.001
Negative events × Extraversion	−.003*	.002
Positive events × Negative events × Extraversion	−.0004*	.0002

Note: $N = 575$.
* $p < .05$.
** $p < .01$.

[5] Trait level moderation of the interaction between positive and negative events predicting positive affect was also explored. We found no evidence that negative events dampen the relation between positive events and positive affect differentially for individuals high and low in neuroticism and high and low in extraversion.

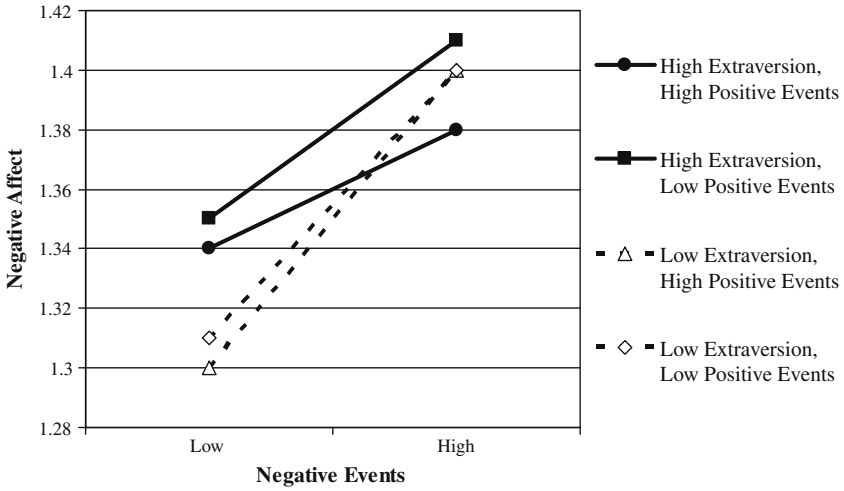

Fig. 3. Predicting negative affect from the within-person interaction between positive and negative daily events for participants high and low in extraversion.

Table 5
Multilevel regression results for extraversion, positive and negative daily events predicting night-time stress.

Dependent variable	Night-time stress	
	b	SE
Intercept	2.946**	.057
Depression	.397*	.168
Neuroticism	.226**	.056
Positive events	−.004**	.004
Negative events	.018**	.005
Extraversion	.011	.063
Positive events × Negative events	−.0004	.001
Positive events × Extraversion	−.004	.006
Negative events × Extraversion	.0003	.006
Positive events × Negative events × Extraversion	−.001	.001

Note: $N = 575$.
† $p < .10$.
* $p < .05$.
** $p < .01$.

3.6. Extraversion, positive and negative daily events predicting night-time stress

Do positive events buffer the impact of negative events on night-time stress differentially for individuals high and low in extraversion? As shown in Table 5 a final multilevel regression analysis was run to test the Extraversion × Positive Events × Negative Events interaction predicting night-time stress. We found significant main effects for negative events, depression and neuroticism predicting night-time stress. However, all two-way interactions and the hypothesized three-way interaction were non-significant. Positive events do not appear to differentially buffer the relation between negative daily events and night-time stress for participants high or low in extraversion.

4. Discussion

The current diary study examined the relations among personality (neuroticism and extraversion) and positive and negative daily events predicting daily negative affect and night stress in college students. In particular, daily positive events buffered the impact of daily negative events on negative affect and night-time stress for college students low in neuroticism, but not for students high in neuroticism. That is, there was no significant relation between negative events and negative affect (or night-time stress) on days when individuals low in neuroticism experienced more positive events (as there was on days they experienced fewer positive events). In addition, positive events buffered the impact of negative events on negative affect for college students high in extraversion, but not for those low in extraversion. That is, the relation between negative events and negative affect was weaker on days when participants high in extraversion experienced more positive events than on days they experienced fewer positive events. However, extraversion did not moderate the buffering effect of positive events on the effect of negative events on night-time stress.

The results of the current study are consistent with previous research on neuroticism and negative affect and stress. Previous research suggesting that individuals high in neuroticism are more reactive to negative events and stimuli (Bolger & Schilling, 1991; Larson & Ketelaar, 1991; Marco & Suls, 1993), have a more connected negative semantic memory system (Robinson et al., 2006), as well as previous studies reporting that neuroticism is negatively related to both the savoring of positive affect and events (Bryant, 2003; Wood et al., 2003) seem to support the lack of a buffering effect for individuals high in neuroticism. An increased reactivity to negative events, coupled with a reduced likelihood of savoring positive events, prohibits individuals high in neuroticism from reacting to positive events in a way that may reduce the negative impact of negative events on both affect and distress. Moreover, the performance benefits associated with negative affect for individuals high in neuroticism (Tamir, 2005; Tamir & Robinson, 2004) may motivate these individuals to sustain negative affectivity or maintain a chronic level of distress, further weakening any impact positive events may have had on both negative affect and night-time stress.

The results are also consistent with previous research demonstrating extraverts' propensity to savor positive events (Bryant, 2003; Wood et al., 2003). That is, for extraverts, daily increases in positive events were able to weaken the effects of negative events on negative affect, presumably by taking the focus away from negative events and placing it on positive events. Furthermore, because extraversion has been consistently linked with positive affect (Costa & McCrae, 1980; McCrae & John, 1992; Zelenski & Larsen, 1999), it seems plausible to suggest that extraverts are motivated to dampen trait-inconsistent negative affect. Savoring positive events, especially in the face of negative events, may be the method by which participants high in extraversion can reduce the impact of negative events on negative affect and thus reduce affect that is inconsistent with their personality. However, these results should be interpreted with caution. Because there was a similar pattern of findings for

neuroticism and extraversion predicting negative affect (and these variables were moderately correlated), we ran an analysis with both in the model. Only neuroticism remained a significant moderator. In addition, extraversion did not moderate the buffering effect of positive events on the relation between negative daily events and night stress, suggesting that neuroticism may be the most reliable moderator of the buffering effect.

Previous research by Nezlek and Allen (2006) has reported that positive events can buffer the effect of negative events on negative affect, but these researchers also report that neither neuroticism nor extraversion moderated their results. How can we reconcile Nezlek and Allen's (2006) findings with the present findings, where neuroticism and extraversion moderated the buffering effect? In the current study, by asking participants to report the desirability (vs. undesirability) of events that had occurred each day, participant ratings determined whether an event was coded as positive or negative. As a result, positive and negative events are an indication of participants' subjective experience of daily events. On the other hand, Nezlek and Allen (2006) used a more objective measure of daily events, where events were predetermined to be positive or negative at the outset of the study. In their research, participants reported the occurrence and importance of a set of predetermined positive and negative daily events. These two valid but different ways of assessing daily events may be responsible for our conflicting findings. Particularly for the moderating role of neuroticism, it seems likely that neuroticism is related to participants' subjective experience of an event as (un)desirable, but not necessarily their interpretation of an event's importance.

The current study also reports a buffering effect of positive events on the relation between negative daily events and night stress. These daily diary findings expand on previous longitudinal research suggesting that positive events can act as a stress buffer, reducing the effect of negative events on psychiatric distress (Reich & Zauntra, 1981). Using a daily diary design, we were able to explore the within-person contingencies between daytime events and night-time stress. A benefit to exploring these within-person effects is that they provide insight into the day to day relations between events and stress that are independent and often different from the relationships at the between-person level (e.g., Gable & Reis, 1999; Nezlek, 2001; Tennen, Affleck, Armeli, & Carney, 2000). In addition, because night stress was reported on the following day's diary survey, there was a temporal lag between reports of daily events and reports of stress that evening. Therefore, we were able to show that today's events predict tonight's stress (as reported the next day). However, we should note that reports of tonight's stress are retrospective and may be influenced by the next day's events.

4.1. Future directions

We have suggested that neuroticism and extraversion moderate the within-person interaction between positive and negative daily events and negative affect. However, because daily affect and events were measured at the same time each day, it is difficult to determine the causal direction of these findings. Though it is possible that participants' affective states influenced the type of events they reported or the types of events they experienced, the current study proposes that the interaction of positive and negative daily events caused changes in daily affect. Previous diary research that has examined the causal relation between events and affect has shown that events that occurred on the previous day predicted current day affect, but previous day's affect did not predict current day's events (Gable et al., 2000). Consistent with these findings (and our findings for night-time stress), it seems reasonable to assume that daily events predicted changes in daily affect in the current study. Future research in which events and affect are assessed multiple times per day will help tease apart these causal relations.

The homogeneity of our sample in terms of both ethnicity and age poses a limitation to the current study. Specifically, our participants were mostly Caucasian college students who comprised a restricted age range ($M = 18.79$). Future research should examine whether daily events interact differently with traits of neuroticism and extraversion at different stages in people's lives.

Future research should explore the processes that underlie the buffering effects for certain people. We have speculated, based on previous research looking at the savoring of positive events (Bryant, 2003; Wood et al., 2003), a possible explanation for the lack of the buffering effect of positive events for individuals high in neuroticism. It would be fruitful to explore whether differences in savoring are responsible for the present findings. Another possible mechanism is motivation to experience a certain mood state. For example, negative moods can enhance performance for individuals high in neuroticism (Tamir, 2005; Tamir & Robinson, 2004) and this may motivate these individuals to maintain a negative affective state or chronic level of stress, even in the presence of positive events. Perhaps such motivations would be particularly evident on days college students high in neuroticism were expected to engage in some sort of performance task, such as an exam. In addition, the effectiveness of coping strategies is another possible underlying mechanism. The coping literature suggests that neuroticism is associated with inefficient coping skills (Gunthert et al., 1999; Suls & Martin, 2005; Watson & Hubbard, 1996), which may inhibit individuals high in neuroticism from experiencing the benefits of positive events, particularly when experiencing high amounts of negative events. On the other hand, extraversion is associated with coping strategies that successfully reduce negative affect in the face of stress (Kokkonen & Pulkkinen, 2001b; Watson & Hubbard, 1996), possibly increasing extravert's likelihood to use positive events to reduce the effect of negative events on negative affect specifically. Future research should address the role coping mechanisms may play in the likelihood of experiencing the buffering effect of positive events.

Nevertheless, the present study has revealed that positive events can buffer the effect of negative events on negative affect and stress, demonstrating the importance of studying positive daily events in conjunction with negative daily events. Moreover, the present results suggest that personality moderates the interaction between positive and negative events when predicting negative affect and stress. Neuroticism specifically seems to be a key moderator for the buffering effect, and thus a closer inspection of why individuals high and low in neuroticism differ in the extent to which positive events influence the relationship between negative events and affect, and negative events and stress is warranted.

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