



# Positive daily experiences can buffer the negative effects of daily stress: A conceptual replication



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## ABSTRACT

The present study replicates previous research demonstrating that daily positive events can buffer the effects of daily stress on well-being. The present study differs from previous research in two ways. First, we examined buffering effects among a sample of adults residing in the community. Previous research studied student samples. Second, we measured daily stress more directly (reports of events) than in previous studies (checklists). The present study replicated key findings from previous research. Within-person relationships between daily stress and daily well-being were weaker on days when daily events were more positive than on days when they were less positive. The results support the contention that positive daily experiences can buffer the negative effects of daily stress on daily well-being.

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## 1. Introduction

The present paper describes the results of a conceptual replication of two previous studies (Nezlek & Allen, 2006; Nezlek & Plesko, 2003) that demonstrated that positive daily events can diminish the strength of the relationships between daily negative events and well-being. We thought a conceptual replication of these results was needed because both studies used the same measures of events and outcomes and studied American collegians. The present study used different measures of daily events and well-being and examined the buffering effect in a sample of adults living in Poland.

Similar to the previous two studies, participants in the present study answered a series of questions at the end of each day for two weeks. These questions concerned their daily experiences and their daily well-being defined in terms of affect, self-esteem, and other measures of self-evaluation. The analyses examined the extent to which relationships between the stress of daily events and well-being varied as a function of how positive daily events were.

For present purposes, we relied on the definition of a buffering effect offered by Cohen and Wills (1985, p. 310) in their review of research concerning the buffering effects of social support. They emphasized that buffering refers to a “Stress X Support interaction” in the prediction of well-being not to a main effect for support (i.e., people with more support feel better). Although Cohen and Wills discussed how trait levels of social support buffer the effects of stress, there is no reason to limit the conceptualization of a buffer to either social support or to trait level constructs. We should note however, that the bulk of research on buffering stress appears to concern how trait social support buffers reactions to stress.

The possibility that positive experiences might buffer the effect of negative experiences is consistent with the general emphasis of Fredrickson’s Broaden and Build Model (e.g., Fredrickson, 2013). Fredrickson describes the results of numerous studies that indicate that positive emotions can offset or counter the effects of negative emotions to a degree greater than would be expected by a simple additive model. Although the level of analysis of much of the work Fredrickson and colleagues have done is finer than the level of analysis of the present study, the mechanisms Fredrickson describes may still operate at the more macro level of the present study. We return to this issue in the discussion section.

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The present study examined buffering at the within-person level of analysis, an approach consistent with an increasing interest in within-person variability among personologists. Moreover, we thought that the within-person level of analysis was particularly appropriate to study reactions to stress. By collecting data from the same person across time, we were able to model how daily well-being varied as a function of daily stress. In turn, by collecting data about daily positive experiences we were able to model how daily stressfulness and positivity interacted in the prediction of well-being.

## 2. Method

### 2.1. Participants and procedure

Participants were adults living in or near Warsaw, Poland. They responded to notices posted on internet sites for participants in a “study about everyday functioning.” As part of the study participants completed the Mini International Neuropsychiatric Interview (Sheehan et al., 1998), and individuals who had a current or past history of psychiatric disorders were excluded from the analyses (22 of the 153 participants who provided diary data). For the remaining participants ( $N = 131$ ), the mean age was 36.9 ( $SD = 14.1$ , range 16–71), and 88 were women. Participants were paid approximately \$60. At an introductory session, participants were told about the study and how to use a website to provide their daily reports. For two weeks, at the end of each day participants logged onto this website and answered questions about their daily well-being and the events that had occurred to them that day. Sample sizes were determined in part by estimates of the coverage of confidence intervals provided by Maas and Hox (2005). Their work indicated that with 130 level 2 units and 14 level 1 units there is only a 5% error rate for coverage of the 95% confidence interval.

### 2.2. Measures

#### 2.2.1. Daily well-being and daily events

We defined daily well-being in terms of affect, self-esteem, depressogenic adjustment, rumination, and how much people worried. For affect, we relied upon a circumplex model (Feldman Barrett & Russell, 1998), a combination of positive-negative, active-deactive emotions. Each of these four combinations was measured with three items. All items started with the stem “Today, I felt...”, and participants responded using 7-point scales with endpoints labeled 1 (“Did not feel this way at all”) to 7 (“Felt this way very strongly”). Positive active affect (PA) was defined in terms of happy, proud, and excited/enthusiastic, positive deactive affect (PD) was defined in terms of calm, satisfied, and relaxed, negative active affect (NA) was defined in terms of upset, stressed, and angry, and negative deactive affect (ND) was defined in terms of sad, bored, and disappointed.

Daily self-esteem was measured with three items taken from Rosenberg (1965): Today, I felt that I was a valuable person, at least as good as others; Today, I felt like a failure (reversed); and Today I'm satisfied with myself. Daily depressogenic adjustment was measured using three items based on Beck's (1972) triad: Thinking about today in general how positive were your thoughts about yourself? How well did things go today? Today, how optimistic are you about how your life (in general) will be tomorrow? We measured daily worry with three items based on Meyer, Miller, Metzger, and Borkovec (1990): How much did your worries overwhelm you today? How much today you were not able to stop worrying once you've started to worry? How much did you worry today? Daily rumination was measured with three items based on

Trapnell and Campbell (1999): How much today did you “ruminate” or dwell on things that happened to you? How much today did you play back over in your mind how you acted in a past situation? How much time today did you spend rethinking things that are over and done with? All of these items were answered using 1–7 scales, scored so that higher numbers indicated higher self-esteem, better adjustment, and more worrying. NB: All items were translated and backtranslated by researchers fluent in both English and Polish.

#### 2.2.2. Daily events

When describing the events that occurred each day, participants were told to “recall all the important events that happened today.” Using 7-point scales anchored with 1 = *not at all* and 7 = *very much*, participants rated each event in terms of stressfulness, positivity, importance, and presence (how mindful they were during the event). Using a 10-category system, they also indicated what occurred. In this article we consider only ratings of stressfulness and positivity. The ratings for these items were “how stressful was this event for you and how positive was this event for you?” For each event, a new screen and set of responses appeared, and each day participants could describe as many events as they wanted to describe.

We conceptualized the buffering effect of positivity in terms of a within-person interaction between positivity and stress. We created the term representing this interaction by multiplying daily stress and daily positivity scores. To do this we calculated the mean positivity and stress of the events people reported each day. Stress and positivity ratings were centered on each person's mean stress and positivity (the mean was subtracted from the daily score). These centered scores were then cross-multiplied to create the interaction term. See Nezlek (2011, pp. 36–41) for an explanation of this procedure.

### 2.3. Compliance with instructions

Before analyzing the data we excluded invalid entries. A valid entry was defined as one made after 8:00 pm of the day in question or before noon of the following day. Of the original 1738 daily entries, we deleted 36 because they were entered outside of this interval. This left 1702 days of valid data ( $M = 12.94$ ,  $SD = 2.64$ , range 6–15), and 14,768 events ( $M = 8.65$  per day, between-person  $SD = 2.21$ , within-person  $SD = 1.27$ ).<sup>1</sup> Our MLM analyses took into account differences between people in the number of daily entries, and between- and within-person differences in the number of events. The raw data that were analyzed are available via the Open Science Framework (Nezlek, 2017b).

## 3. Results

### 3.1. Reliability analyses

We examined the reliability of our daily measures before conducting our primary analyses following the recommendations of Nezlek (2017a). We used multilevel models in which the items for each measure were nested within days and days were nested within persons. These analyses provided the equivalent of a Cronbach's alpha, corrected for between- and within-person differences in the number of days people provided. The data were analyzed using HLM (Raudenbush et al., 2011).

We thought the reliabilities for the daily measures, presented in Table 1, were acceptable. Moreover, they could not be meaningfully improved by the removal of an item. Therefore, we defined

<sup>1</sup> Events were described on only 1695 days.

**Table 1**

Descriptive statistics for daily measures and coefficients between daily well-being and daily event scores.

Measure	Mean	Variance		Reliability	Coefficients		
		Between	Within		Positivity	Stress	Interaction
Self-esteem	5.07	.55	.94	.55	.40***	-.15***	.11***
Beck's triad	4.93	.48	.68	.79	.33***	-.15***	.10***
Worry	2.95	.80	1.51	.81	-.27***	.54***	-.10***
Rumination	2.65	.98	1.06	.72	-.09*	.25***	-.07 <sup>a</sup>
Affect PA	3.88	.85	1.05	.56	.55***	.04	.04
Affect PD	3.74	.73	1.03	.90	.45***	-.28***	.00
Affect NA	2.91	.91	1.7	.82	-.22***	.73***	-.07*
Affect ND	2.51	.65	1.08	.59	-.35***	.30***	-.07**
Event stress	2.81	.61	.58				
Event Positivity	4.27	.37	.66				

Note:

<sup>a</sup>  $p < .10$ .\*  $p \leq .05$ .\*\*  $p < .01$ .\*\*\*  $p < .001$ .

daily measures as the mean response to the items constituting each scale. We did not estimate the reliability of the stress and positivity scores because there is no reason to assume that the events that occur on a particular day should be similar in terms of positivity and stress.

### 3.2. Descriptive statistics

Our primary analyses were two-level multilevel models (days nested within persons). Before testing our hypotheses, we conducted a series of unconditional models (no predictors at either level of analysis). These models estimated the mean, and the between- and within-person variance estimates, and these estimates are presented in Table 1. For all measures, nearly half or more of the total variance was at the within-person level, suggesting that within-person analyses could be informative. Note: We conducted two (rather than three) level models because well-being was measured at the day and not at the event-level.

### 3.3. Relationships between well-being and daily events

Daily well-being was regressed onto daily positivity, daily stress, and the interaction of positivity and stress. Positivity and stress were entered group-mean centered, and because it was the product of two centered measures, the interaction term was entered uncentered. All coefficients were initially modeled as randomly varying. To take into account the different number of events people had each day, level-1 observations were weighted by the number of events that occurred each day.<sup>2</sup> The level-1 model is below.

$$\text{Level-1: } y_{ij} = \beta_{0j} + \beta_{1j}(\text{Positivity}) + \beta_{2j}(\text{Stress}) + \beta_{3j}(\text{Positivity} * \text{Stress}) + r_{ij}.$$

The results of these analyses are summarized in Table 1. All measures of well-being were significantly related to the positivity of daily events, and with the exception of PA, were significantly related to stress. Relationships between positivity and positively valent measures were positive, relationships between positivity and negatively valent measures were negative, and relationships between well-being and stress were in the opposite direction. Well-being was higher on days when people felt less stress than it was on days when people felt more stress, and well-being was higher on days when people's experiences were more positive than on days when their experiences were less positive.

<sup>2</sup> The results of analyses that did not weight level-1 observations were similar to the results we report.

### 3.4. Event positivity as a buffer of relationships between well-being and stress

As can be seen from the coefficients presented in Table 1, the positivity-stress interaction was significant in the analyses of five of our eight measures of well-being, and approached conventional levels of significance (.07) for one. To interpret these interactions we generated predicted values for days that were high and low in positivity and high and low in stress. We defined high and low as 1 SD above and below each person's mean for positivity and stress. Note that the SDs used for these estimates were the level 1 SDs estimated by the unconditional models of positivity and stress (Nezlek, 2011; pp. 36–41).

These estimated means are presented in Table 2. As expected, the relationships between daily stress and self-esteem, the measure of Beck's triad, worry, rumination (as a trend), NA, and ND were smaller on days when positivity of daily experience was higher than on days when it was lower. For the majority of our measures, the positivity of daily events buffered the effects of stress on well-being.

## 4. Discussion

As expected, positive daily experiences buffered the effect of negative daily experiences on well-being. This buffering effect occurred for measures of the self (self-esteem), for measures of more cognitively focused constructs (worry and rumination), and for two of four measures of affect (NA and ND). The buffering effect did not occur for PA because there was no relationship between PA and stress to buffer.

These results are largely although not completely consistent with previous research. In both Nezlek and Allen (2006) and Nezlek and Plesko (2003) a buffering effect was found for the Beck's triad measure, whereas the buffering effect for self-esteem was significant only in Nezlek and Plesko (2003). Similar to the present results, Nezlek and Plesko (2003) reported a buffering effect for NA and PD, whereas Nezlek and Plesko (2003) did not, although they used a different measure of affect than the present study. Neither of the two previous studies reported analyses of rumination or worry. Admittedly, the results are not perfectly consistent across the three studies, but the general conclusion is the same: Positive daily experiences are associated with a reduction in the strength of the relationships between daily well-being and daily negative experiences.

We believe the similarity in results across these studies is meaningful for two reasons.

**Table 2**

Predicted values illustrating buffering effects of positivity of daily events on relationships between daily well-being and daily stress.

Positivity Stress	Low Low	Low High	High Low	High High	Buffering Effect
Self-esteem	5.04	4.71	5.46	5.35	0.23
Beck's triad	4.96	4.62	5.29	5.17	0.21
Worry	2.58	3.51	2.33	3.04	0.21
Rumination	2.47	2.91	2.42	2.73	0.14
Affect PA	3.41	3.43	4.10	4.20	0.09
Affect PD	3.21	3.64	3.81	4.24	0.00
Affect NA	2.46	3.64	2.25	3.27	0.15
Affect ND	2.43	2.97	2.04	2.42	0.15

Note: The "buffering effect" is the absolute difference between the effects for stress at low vs. high levels of event positivity.

1. Participants in the previous studies were American collegians, and participants in the present study were adults residing in the community in Poland. Collegians are in a specific life space, and the US is a specific culture. Although we had no reason to suspect that the findings of the previous studies were specific to collegians or Americans, finding conceptually similar results in a sample that differed in terms of age and culture provides important corroboration of the original results.
2. The present study used different measures of daily experiences than the previous two studies (which used similar measures). In the previous studies, daily events were measured using a checklist, whereas in the present research participants rated the events that occurred in their days without any sort of list of possible events. Replicating findings with different measures reduces the likelihood that an effect is limited to a specific set of measures.

#### 4.1. How does positive daily experience buffer the effects of negative experience?

Research and theorizing about buffering effects has focused primarily on how trait levels of social support buffer the effects of stress. Nevertheless, a buffer is something that reduces reactions to stress, and there is no reason to limit buffering to trait social support. Due to the differences in the levels of analysis and the constructs involved, explanations of how trait social support buffers reactions to stress (e.g., Cohen & Pressman, 2004) may not be relevant to how daily positive experiences buffer the effects of stress.

The present results are also somewhat similar to the results of Gross et al. (2011), a diary study of worker fatigue. In their analyses of fatigue Gross et al. found an interaction of daily negative events and positive events, similar to the pattern we found (p. 660). Although Gross et al. did not discuss their results in terms of the buffering hypothesis per se, they did consider their work in terms of some of Fredrickson's work such as the undoing effect – how positive events may accelerate recovery from negative emotions (e.g., Fredrickson & Levenson, 1998).

Fredrickson's (2013) Broaden and Build Model may provide a useful context to understand why positive events buffered the effects of negative events. Similar to the effects of positive emotions, positive events may also "widen the array of thoughts, action urges, and percepts that spontaneously come to mind" (p. 17). This may occur because positive events elicit positive emotions, or this may occur positive events encourage or lead people to think differently about their present and future circumstances and opportunities, independent of emotions. Similar to the effects of positive emotions, positive events may lead to the development of more adaptive ways of reacting to stress, such as broad-minded coping (e.g., Fredrickson & Joiner, 2002). Unfortunately, the data collected in the present study did not provide a basis to examine these and related possibilities.

#### 4.2. Limitations and conclusions

The present study is not without limitations. For example, daily positivity and stress were based upon reports of events. There may have been other sources of positivity and stress that we did not capture. Although there is no reason to suspect a specific process, there may have been something about how events were measured that led to the present results. Regardless, we believe that the present results advance our understanding of the factors that influence well-being, and they suggest an approach to understanding situational influence that can be used in other contexts.

Much of the research on relationships between daily events and well-being has relied upon additive models. Well-being is usually modeled as a function of stress of some kind, perhaps with a measure of positive events or other states. To our knowledge, interactive effects between different types of events or between events and other daily measures are relatively uncommon, and such analyses can be fruitful. The present results suggest within-person relationships between negative events and well-being vary as a function of the positive occurrences in a person's daily life, suggesting that other such interactive effects may be worth examining.

#### Authors' note

All authors contributed to the design and execution of this study and to the analyses of the data and the preparation of the final paper.

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