

# Ups and Downs of Daily Life: Age Effects on the Impact of Daily Appraisal Variability on Depressive Symptoms

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**Objectives.** Day-to-day variability in appraisals has emerged as an index of emotion regulation and overall well-being; there is also evidence that such emotion regulation processes change with age. We investigate the impact of day-to-day variability in positive and negative event appraisals on depressive symptoms, focusing on (a) how variability and mean appraisal characteristics interact to impact well-being and (b) whether these effects differ by age.

**Methods.** Participants from the Notre Dame Study of Health & Well-Being (aged 40–75 years,  $N = 654$ ) completed daily diaries for up to 56 days, along with a global survey. Measures included daily data on life events and appraisals and global assessments of depressive symptoms (Center for Epidemiologic Studies Depression scale) and neuroticism.

**Results.** Both mean and variability components of daily positive and negative event appraisals predict global depressive symptoms; mean and variability interactions were also significant. The negative appraisal effects became less pronounced with age.

**Discussion.** Findings suggest that those in later life are better able to manage the impact that their cognitive and emotional responses to daily stressors have on depressive symptoms. The results also highlight the importance of examining daily variability—in addition to mean levels—in understanding the impact of daily events and appraisals on well-being.

**Key Words:** Appraisal—Daily stressors—Depression—Intra-individual variability.

A substantial literature has established the value of examining well-being processes at the daily level, rather than relying solely on global indicators (Almeida, 2005; Eckenrode & Bolger, 1995). Items asking about how an individual feels, thinks, or behaves “in general”—which characterize global-level assessments—may be informative when it comes to overall outcomes, but answers to questions of this type are limited in what they can reveal about the underlying day-to-day processes at work. Daily diary studies have been used with great success in the investigation of daily well-being processes and have consistently documented day-to-day fluctuations in stress and well-being indicators that are dependent on one’s experiences on a given day or even the day before (Almeida, 2005; Eaton & Funder, 2001; Johnson et al., 2008; Ong, Bergeman, Bisconti, & Wallace, 2006; Whitehead & Bergeman, 2012); these daily life event patterns predict global well-being indicators as well (Peeters, Nicolson, Berkhof, Delespaul, & deVries, 2003; Sliwinski, Almeida, Smyth, & Stawski, 2009).

One characteristic of daily experience that is likely to influence overall well-being is the within-person—or *intra-individual*—variability that exists across days for event appraisals, which tap the individual’s cognitive assessment of, and emotional reaction to, a given day’s events and experiences. In this context, appraisal patterns that vary highly from day to day reflect individuals who are more volatile in their response to daily events and

experiences, whereas appraisal patterns that are more stable across days represent those who are less reactive. A number of studies have established that higher levels of within-person variability in day-level cognitive and emotional processes is detrimental to global well-being outcomes, having been associated with higher levels of negative affect (Kuppens, Oravecz, & Tuerlinckx, 2010), perceived stress (Carels, Blumenthal, & Sherwood, 2000; Van Eck, Nicholson, & Berkhof, 1998) and depressive symptoms (Carels et al., 2000; Peeters et al., 2003), and lower levels of self-esteem (Kuppens et al., 2010). Considering appraisals specifically, there is evidence that being more variable in assessments of stress is detrimental to well-being, having been linked with higher levels of global perceived stress (Sliwinski et al., 2009) and negative affect (Stawski, Sliwinski, Almeida, & Smyth, 2008). In light of literature indicating that processes involved in cognitive and emotional experience may be different or change with age (Carstensen, 1995; Urry & Gross, 2010), we are particularly interested in whether the influence of day-to-day variability in event appraisals on well-being is different in later life compared with middle adulthood. Because of its ties with emotional reactivity, appraisal variability should be especially predictive of well-being outcomes related to mood or affect. In this initial investigation, we therefore examine the extent to which intra-individual variability in daily event appraisals affects global depressive symptoms in midlife and older adults.

### *Age and Emotion*

Because a primary aim of this study is to investigate how age may impact the strength and presence of the appraisal variability effects outlined previously, and because of the close association between emotional experience and event appraisal, we will begin with a brief discussion of the existing literature on age and emotion. First, a study of age effects on correlates and processes of positive and negative affect across adulthood has highlighted the presence of a “paradox of well-being,” based on the consistent finding that emotional well-being indicators tend to remain stable or even increase from young adulthood through at least the early years of old age, despite the inevitable declines in physical, cognitive, and social resources associated with aging (Windsor & Anstey, 2010). This “paradox” has contributed to the development of Socioemotional Selectivity Theory (SST; Carstensen, 1995; Carstensen, Isaacowitz, & Charles, 1999), which suggests that a sense of dwindling time left motivates older adults to focus their resources on enhancing positive experiences and emotions while avoiding negative experiences and emotions. Indeed, one study found age-related increases in positive affect to be largely explained by a reduction in exposure to stressors with age (Charles et al., 2010). A great many studies have found that older adults consistently report a higher number of positive events and a lower number of negative events than younger adults (Almeida, 2005; Charles et al., 2010; Mroczek & Almeida, 2004; Stawski et al., 2008), indicating that older adults allocate more of their resources to engaging and savoring positive experiences than to reacting to negative ones.

Additionally, adults in later life tend to be less physically and emotionally reactive to stressful events than adults at earlier points in the life span (Almeida, 2005; Carstensen et al., 2011; Neupert, Almeida, & Charles, 2007; Stawski et al., 2008) and are more likely than younger adults to cognitively reframe negative aspects of a situation into neutral or positive ones (Benyamini, Idler, Leventhal, & Leventhal, 2000). In terms of day-to-day variability, there is evidence that emotional experience becomes more stable with age (Carstensen et al., 2011); older adults also report being better at controlling their emotions than younger adults (Gross, Carstensen, Tsai, Skorpen, & Hsu, 1997), although some suggest that it becomes increasingly difficult for older adults to regulate negative emotions in the face of cognitive declines that accompany aging (Labouvie-Vief, 2003). In their review article on the subject, Urry and Gross (2010) apply the broad theory of Selection, Optimization, and Compensation (SOC; Baltes & Baltes, 1990) to the area of Emotion Regulation (SOC-ER). They suggest that older adults use selection and optimization to strengthen existing (and/or develop new) emotion regulation strategies, thereby compensating for age-related losses in certain other emotion regulation capacities; one such strategy is Cognitive Reappraisal, which serves to modulate one’s emotional

reaction to an event via cognitive processes (Urry, 2010). Although emotion regulation is a process distinct from event appraisal, the two are considered to be complementary components of the overall response/reactivity process, with day-level event appraisal processes being closely linked with daily affective responses (Almeida, 2005; Moberly & Watkins, 2008; Stawski et al., 2008; Zautra, Affleck, Tennen, Reich, & Davis, 2005). Therefore, we use these theories to inform our hypotheses.

Thus, based on the combination of the empirical literature evidencing reduced event reactivity with age and the theories suggesting changes in emotional and reactive processes that come with age, we expect (a) that event appraisals will be less variable with age and (b) that when higher levels of appraisal variability do occur, the impact of that variability on well-being will lessen with age because older adults should be better able to modulate its long-term impact.

### *Negative and Positive Appraisal Processes*

According to the stress and coping model laid out by Lazarus and Folkman (1984), one’s *appraisal* of a situation consists of an evaluation of how threatening or challenging it is to him or her. If the event is appraised as largely nonthreatening, then it should not have any long-term detrimental effect on well-being; on the other hand, if the individual does appraise the event as stressful, then he or she is likely to experience at least a short-term decline in well-being, and depending on the efficacy of coping resources, long-term well-being may be affected as well. Although mean levels of daily negative appraisals are informative when it comes to well-being, they do not necessarily tell the entire story. Two people can have the same propensity when it comes to average negative appraisals, but the effect that this moderate appraisal level has on well-being is likely to depend on how variable each person is around his or her mean. Based on the existing literature relevant to appraisal variability and depressive symptoms (Carels et al., 2000; Peeters et al., 2003), we expect greater intra-individual variability in event appraisals to be associated with higher global levels of depressive symptoms. A theoretical exception to this—which we evaluate in this study—is the case of someone who tends to perceive every negative event as very stressful (i.e., has a very high mean), for whom variability from that tendency would be beneficial.

Positive event appraisals appear to operate in a manner distinct from the stress process. Zautra and colleagues (2005) specifically argued that the terms used to describe the negative appraisal process, such as *exposure* and *reactivity* are not relevant when it comes to positive appraisals; instead, they suggest that the terms *engagement* and *responsiveness* more accurately reflect the active processes that tend to surround positive appraisals. This language acknowledges the fact that negative events tend to be external circumstances that happen to us, prompting appraisals as reactions, whereas positive events tend to be experiences we actively seek out

and benefit from as a result of our response (Zautra et al., 2005). Fredrickson (1998) also argues that the functions of positive and negative affect differ, suggesting that *negative emotions* are more state dependent and reflect reactions to specific circumstances, which narrow one's focus in order to facilitate a quick and effective response, whereas *positive emotions* are more general and reflect a wider range of protective mechanisms, which serve to expand one's focus and encourage creativity and growth. In this light, high appraisals of positive events reflect the savoring aspect of positive experiences, as individuals seek to increase positive emotions and better themselves through them; this has been supported empirically by Geschwind and colleagues (2010), who identified the ability to experience boosts in positive affect in response to pleasurable daily events as predictive of long-term resilience to adversity. In the context of this study, those who report higher, less variable daily positive appraisals should report fewer depressive symptoms on the global level compared with those who tend to rate positive events as less pleasing or are more variable in their appraisals. If an individual demonstrates a higher degree of variability in positive appraisals from day to day, it indicates an inability to savor and benefit from daily positive events, which should have a detrimental effect on global well-being and be associated with higher levels of depressive symptoms.

It is important to recognize that patterns of cognitive and emotional reactions to everyday events are often influenced by trait-level characteristics of personality (Bolger & Schilling, 1991; David & Suls, 1999; Mroczek & Almeida, 2004). Because neuroticism is a personality component marked by heightened reactivity to daily stressors (Suls & Martin, 2005) and a more volatile emotional profile in general (e.g., *anxiety*, *impulsiveness*, and *vulnerability* domains; Costa & McCrae, 1988), it is considered here as a potential confound to the day-to-day variability processes of primary interest. That is, individuals high in neuroticism are likely to have greater intra-individual variability in daily event appraisals, as they tend to be more reactive to everyday experiences. In addition to the reactivity component, neuroticism is also marked by a *depression* domain (Costa & McCrae, 1988) and has been shown to increase one's vulnerability to depressive symptomatology (Saklofske, Kelly, & Janzen, 1995)—the dependent variable here—making it an important aspect of trait-level experience to control. In order to ensure that the intra-individual variability measured and its effect on depression is capturing the role of day-to-day variations in appraisals (rather than simply indexing one's level of personality neuroticism and its tie with depression), we included trait-level neuroticism as a covariate in the analyses.

### Present Study

Here, we use daily diary data that document daily positive and negative events and their respective appraisals to investigate the impact of individual differences in both mean levels and day-to-day variability of appraisals on

global depressive symptoms; such depressive symptomatology has been shown to have potentially debilitating effects on individuals' psychological and physical functioning as they age (Covinsky et al., 2010). Based on the literature on age differences in emotional and appraisal processes cited earlier, we also evaluate the degree to which age moderates the strength or presence of these effects.

We hypothesize that there will be main effects for both mean and variability of negative and positive appraisals on depressive symptoms, even after controlling for exposure to negative and positive life events across the 56-day period. Specifically, we predict that higher mean levels of negative appraisals across days will be associated with higher levels of global depressive symptoms, whereas higher mean levels of positive appraisals will predict lower symptomatology; in addition, we expect higher variability across days in both negative and positive appraisals to be related to higher levels of depressive symptoms on the global level. We also hypothesize an interaction effect in which one's variability in appraisals will moderate the impact that one's mean level of appraisals has on global depressive symptoms. Specifically, for negative appraisals, the hypothesized deleterious impact of having a high mean is expected to be more pronounced for someone with less variability because this would indicate that he or she consistently maintains a high level of stressful appraisals without many occasions of low or moderate stress appraisals to break up the pattern. Similarly, for positive appraisals, we expect the hypothesized beneficial impact of a high mean level of positive appraisals to be less pronounced for someone with higher daily variability. Based on the SST and the SOC-ER theories, along with the empirical literature on age effects on cognitive and emotional reactivity discussed previously, we expect older adults to report more positive events and fewer negative events, to have higher mean positive (pleasure) appraisals and lower mean negative (stress) appraisals, and to have lower day-to-day variability in both positive and negative appraisals than younger adults (correlations will test these age associations). If significant age effects emerge in the regression models, we predict that the hypothesized main effects and interactions on depressive symptoms will be less pronounced for adults at later points in the life span.

## METHODS

### Participants and Procedure

Participants were 654 individuals (aged 40–75 years; mean age 59.3) drawn from the Notre Dame Study of Health & Well-Being (NDHWB), which is designed to explore stress, resiliency, and well-being processes in the context of adult development and aging. Participants in the NDHWB study (full sample,  $N = 763$ ) were recruited based on lists of adults in the northern Indiana area provided by a market research firm; the lists were compiled based on census data and the Survey of Residential Households. Participants first

received the global questionnaire packet in the mail, which they completed and returned at their convenience in a postage-paid return envelope supplied by the researchers. Once these surveys were returned, participants who consented were sent “batches” of daily diary questionnaires in a variable pattern (e.g., the first week, then the next 3 weeks, then 2 weeks, and so on) in order to discourage forward- and backfilling. Daily diaries typically began within 2–3 weeks of the completed global questionnaire and continued for 8 weeks, with participants returning the batches of completed diaries in postage-paid envelopes. Participants received gift cards to an establishment of their choice for their participation in each portion of the project (\$20.00 for each yearly questionnaire and \$10.00 per week for daily diaries). To be included in the analyses, participants had to have both daily and global data; additionally, preliminary analyses identified two participants as outliers (more than 3 standard deviations [*SD*] above the mean of daily variability in negative appraisals), and they were dropped from the analyses.

Demographic characteristics for the full sample ( $N = 654$ ) are as follows: 59% of participants are female; 53% of participants are married, 25% are divorced or separated, 11% are widowed, and 11% are single; 97% have at least a high school education and 32% have a college degree. The sample is 86% Caucasian, 9% African American, 2% Hispanic or Latino, 1% Asian or Pacific Islander, and 2% other. Income is relatively normally distributed: 4% make less than \$7,500 annually, 11% earn between \$7,500 and \$14,999, 15% earn between \$15,000 and \$24,999, 24% earn between \$25,000 and \$39,999, 30% earn between \$40,000 and \$74,999, 9% earn between \$75,000 and \$99,999, and 8% earn \$100,000 or more. Participants in the final sample were slightly more likely to be Caucasian but were not otherwise significantly different from those not included in the analyses on demographic variables; those excluded ( $n = 91$ ) also reported significantly more global depressive symptoms.

### Measures

*Daily event appraisals.*—A condensed form of the Inventory of Small Life Events (ISLE; Zautra, Guarnaccia, & Dohrenwend, 1986) consisting of 50 of the original 178 items was included in the daily diary assessment: 10 items related to health (*I had to see a doctor*); 6 assessed finances (*I received money as a refund*); 12 items concerned one’s spouse/partner (*I expressed love to my spouse/partner*); 9 items related to one’s family, other than spouse (*I visited with family members, in person or on the phone*); and 13 items had to do with friends and acquaintances (*I argued with a friend/acquaintance*). According to the original ISLE measure, of the 50 items included in the daily diaries, 23 were negative small life events and 27 were positive small life events. The average count of positive and negative events endorsed across days was used as a covariate in the analyses, to control for event exposure.

The version of the ISLE included in the daily diary assessments asked participants to rate any life events they endorsed on a given day on how “pleasurable” (for positive events) or “stressful” (for negative events) they were for them, 1 being *not at all* and 5 being *extremely*; it is the daily averages of these appraisal ratings that are used to calculate the daily mean, variance, and temporal dependency terms for each person.

*Depression.*—The Center for Epidemiologic Studies Depression (CES-D) scale (Devins & Orme, 1985) assessed global depression. The scale used here included 20 items, such as *I felt depressed* and *I felt hopeful about the future*, rated according to the frequency that an individual felt or behaved that way in the last week. The 4-point rating scale ranged from 1 = *rarely or none of the time (<1 day)* to 4 = *most or all of the time (5–7 days)*. Four of the 20 items were reverse scored, so that higher scores indicate greater overall depressive symptoms ( $\alpha$  at Year 1 = 0.86). Although the CES-D scale can be used as a diagnostic tool for classifying individuals as clinically depressed, we interpret this measure as representing a continuum of depressive symptomatology and an indicator of overall psychological well-being in a community sample of adults.

*Neuroticism.*—In order to control for the possibility that the daily appraisal variability of interest reflects the neuroticism component of an individual’s personality, 12 items drawn from the neuroticism scale of the NEO Personality Inventory (Costa & McCrae, 1991) were used to create a neuroticism covariate. Each of the six subareas of the original measure (Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability) was represented by two items in the reduced scale. Items were asked in a global manner and rated on a 4-point scale (1 = *strongly agree*, 4 = *strongly disagree*); 8 items were reverse scored so that higher scores indicate more neuroticism ( $\alpha$  at Year 1 = 0.88).

### Analyses

The day-level data were converted to the person-level variables of interest here by calculating the average positive and negative appraisals for each person-day. Each person’s daily average appraisals was then used to calculate six person-level variables: mean daily positive and negative appraisals, variance in daily positive and negative appraisals, and temporal dependency in positive and negative appraisals. These terms were then used as predictor variables and covariates in the regression analyses.

Intra-individual variability in positive and negative event appraisals was operationalized by calculating each individual’s variance in average appraisals across days. Because it is possible for a given variance value to reflect linear or nonlinear patterns in the data along with the day-to-day variability of interest here (Deboeck, Montpetit, Bergeman, &

Boker, 2009), two steps were taken to control for such patterns, and thus, enable us to consider the variance term as an indicator of daily fluctuations in appraisals. First, we plotted each participant's data and detrended those individuals who showed a significant linear trend across days, thereby controlling for linear patterns in the data. Second, we calculated temporal dependency parameters for both positive and negative appraisals for each person via a 1-day-lag autocorrelation procedure (resulting in terms capturing the within-person correlation between one day's appraisals and the next day's appraisals); by using these terms as covariates in the models, we are controlling for the presence of nonlinear (e.g., quadratic, cyclical) patterns in the data and permitting a more accurate picture of intra-individual variability than an analysis using only a variance term would provide (Wang, Hamaker, & Bergeman, 2012).

In order to ascertain the individual and combined influence of each main effect and interaction on depression, analyses were conducted in two steps. First, a model including all covariates (trait neuroticism, event exposure, temporal dependency) and predictor variables (mean and variance appraisal terms, mean  $\times$  variance interaction terms, age) was run. Next, the interaction effects of the linear age term were added to the model.

## RESULTS

### Descriptive Statistics

Means, standard deviations, and correlations of all variables are shown in Table 1. Note that neuroticism, mean negative appraisals, and depressive symptoms are all negatively correlated with age (i.e., older participants tend to have lower levels of each), whereas mean positive events and mean positive appraisals are positively correlated with age (i.e., older participants tend to have higher levels of each); these associations are in line with the age effect predictions outlined previously. Also note that all predictor variables, with the exception of the temporal dependency terms, correlate significantly with depressive symptoms in the hypothesized direction.

### Variability Models

The first model in Table 2 depicts the results of the first regression model on depressive symptoms, omitting age interactions. Concerning the covariates, higher levels of neuroticism, greater exposure to daily negative events, and lesser exposure to daily positive events were significantly associated with higher levels of depressive symptoms, as predicted; neither of the temporal dependency terms had a significant effect on depressive symptomatology.

In terms of the predictor variables of interest, having a higher mean level of negative (stress) appraisals and being more variable in either negative or positive appraisals was associated with higher levels of depressive symptoms; the mean positive appraisal term was not significant. The mean  $\times$  variance interaction term was significant for both negative and positive appraisals, with the estimate in the negative direction in both cases. The plots (all plots created using the online interaction utility found at [www.quantpsy.org/interact/mlr2.htm](http://www.quantpsy.org/interact/mlr2.htm); Preacher, Curran, & Bauer, 2010–2012) of these two interactions (Figure 1) demonstrate that both interactions align with the hypotheses: for negative appraisals, the positive association between mean appraisals and global depressive symptoms is more pronounced for those lower ( $-1$  *SD*) in variability than it is for those higher ( $+1$  *SD*) in variability; this indicates that having high mean negative appraisals is most damaging when one varies little around that mean. The positive appraisal interaction plot illustrates that the negative association between mean positive appraisals and depressive symptoms—in which higher mean appraisals are associated with fewer depressive symptoms—is most pronounced for those higher ( $+1$  *SD*) in variability and least pronounced for those varying less; this stems primarily from the difference in depression level when the mean = 0 and indicates that having low mean positive appraisals is most detrimental when there is very little variability around that low mean.

Examining the age interaction model, we first find that the linear age variable is not associated with depressive symptoms; the fact that this is the case despite the significant correlation between age and depression indicates that

Table 1. Means (*M*), Standard Deviations (*SD*), and Correlations for Dependent and Independent Variables (*N* = 654)

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1 Age	59.26	9.26	—									
2 Neuroticism	25.75	5.72	<b>-.17</b>	—								
3 Mean negative events	1.53	1.45	.04	<b>.28</b>	—							
4 Mean positive events	2.92	1.89	<b>.18</b>	<b>-.11</b>	<b>.52</b>	—						
5 Temporal dependency in negative appraisals	0.16	0.30	.02	.05	<b>.18</b>	<b>.11</b>	—					
6 Temporal dependency in positive appraisals	0.15	0.25	-.01	.03	.10	.09	-.003	—				
7 Mean negative appraisals	2.79	0.67	<b>-.19</b>	<b>.30</b>	.09	<b>-.17</b>	.09	-.02	—			
8 Mean positive appraisals	3.57	0.62	<b>.10</b>	<b>-.28</b>	<b>-.26</b>	.04	.02	-.08	<b>.24</b>	—		
9 Variability in negative appraisals	0.57	0.40	-.01	-.06	<b>-.28</b>	-.06	.07	-.08	<b>.16</b>	<b>.33</b>	—	
10 Variability in positive appraisals	0.34	0.28	-.06	<b>.26</b>	.03	-.34	.03	<b>.11</b>	<b>.20</b>	<b>-.13</b>	<b>.20</b>	—
11 Depression at Year 1	29.76	9.47	<b>-.17</b>	<b>.68</b>	<b>.34</b>	<b>-.11</b>	.09	-.004	<b>.33</b>	<b>-.29</b>	<b>-.09</b>	<b>.26</b>

Note.  $p < .0001$  in **bold**;  $p < .01$  in **bold italics**;  $p < .05$  in *italics*.

Table 2. Regression Models on Depressive Symptoms

Effect	Main effects model	Age interaction model
Intercept	0.29	-10.75
<i>Neuroticism</i>	0.85***	0.84***
<i>Mean negative events</i>	1.42***	1.45***
<i>Mean positive events</i>	-0.55**	-0.59**
<i>Negative temporal dependency</i>	1.09	1.03
<i>Positive temporal dependency</i>	-2.09	-2.20*
Mean negative appraisals	3.43***	11.67*
Mean positive appraisals	-0.42	-6.58
Variability in negative appraisals	7.63*	73.45**
Variability in positive appraisals	21.83**	64.64
Mean × variability—negative appraisals	-2.50*	-20.50**
Mean × variability—positive appraisals	-5.67**	-16.13
Age	-0.04	0.15
Age × mean negative appraisals		-0.13
Age × mean positive appraisals		0.10
Age × variability in negative appraisals		-1.10**
Age × variability in positive appraisals		-0.77
Age × mean/variability interaction—negative		0.30*
Age × mean/variability interaction—positive		0.19

Note. Covariate terms are in italics.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .0001$ .

the variables used in the model fully explain/account for the impact of age on depressive symptoms. Neither mean appraisal effect was moderated by age nor was the variability or interaction term for positive appraisal. The impact of negative appraisal variability was significantly dependent on age, however, such that the impact of having high variability in negative appraisals is more pronounced at younger ages. Considering the moderating effect of age on the mean × variability interactions, the effect for positive appraisals was not significant, whereas the strength of the negative appraisal interaction was significantly dependent on age; that is, the exacerbating effect that having less variability in

negative appraisals has on the impact of high mean negative appraisals on depressive symptoms is less pronounced for those of more advanced age.

## DISCUSSION

The results of the regression analyses aligned with the rationale presented in the Introduction section regarding daily negative and positive appraisal processes (Fredrickson, 1998; Lazarus & Folkman, 1984; Zautra et al., 2005) and also supported the hypothesized age effects based on the literature on emotion and aging (Carstensen, 1995; Urry & Gross, 2010). We will discuss the age effects first, and then consider the results in the more general context of how and why daily appraisal processes are associated with global depressive symptoms.

To begin, the descriptive findings highlight the impact of age on the association between appraisal variability and depressive symptoms. As projected, the number of positive life events endorsed goes up with age, and ratings of positive events tend to get more pleasurable with age; negative events, on the other hand, tend to be appraised as less stressful with advancing age. This pattern supports the prediction of SST (Carstensen, 1995) that older adults allocate their cognitive and emotional resources to seeking out and appreciating positive events while limiting their reaction to negative events. We also predicted that both the positive and negative appraisals would become less variable with age, but this was not the case for our sample—there was no indication that the degree of day-to-day appraisal variability differed by age. Despite this, the hypothesis that the impact of appraisal variability on depressive symptoms would decline with age was partially confirmed: the age × variability interaction for negative appraisals indicates that those in later life experience a less deleterious effect

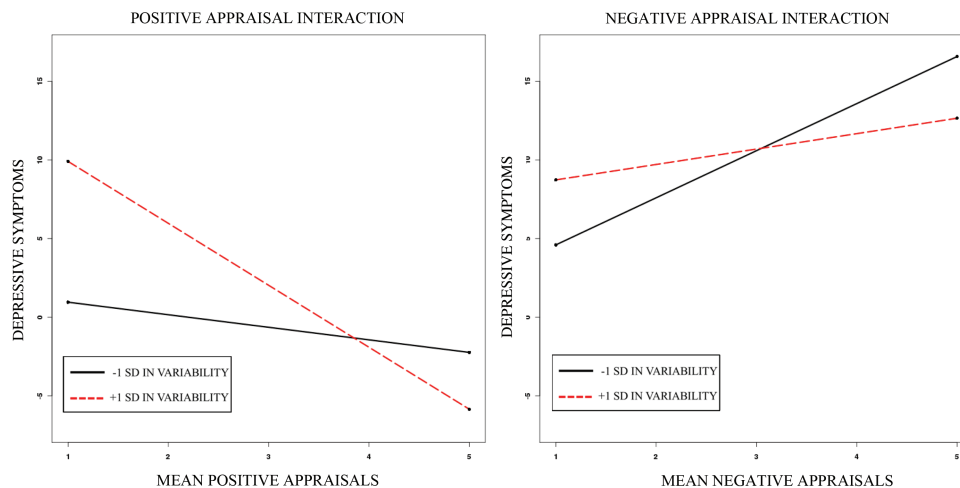


Figure 1. Plots of mean × variance appraisal interactions in the main effects model. The left panel displays the positive appraisal interaction, with the association between mean positive appraisals and global depression plotted for individuals at  $-1 SD$  and  $+1 SD$  on positive appraisal variability; the right panel displays the negative appraisal interaction, with the association between mean negative appraisals and global depression plotted for individuals at  $-1 SD$  and  $+1 SD$  on negative appraisal variability.

on well-being from higher levels of negative appraisal variability than do adults at earlier points in the life span. The role of positive appraisal variability did not depend on age. Age also affected the degree to which the effect of negative appraisal variability on depressive symptoms was dependent on mean levels, as the strength of the mean  $\times$  variability appraisal interaction decreased with age. Specifically, with increasing age, the association between mean levels of negative appraisals and global depressive symptoms was less dependent on one's variability around that mean.

In considering possible explanations for these age effects, we first turn to the emotion regulation and aging literature presented in the Introduction section. In addition to the theoretical rationale (Carstensen, 1995; Urry & Gross, 2010) and existing empirical evidence (Almeida, 2005; Carstensen et al., 2011; Stawski et al., 2008) suggesting that individuals become more adept at regulating negative emotions and reactions to negative events with age, the present results further suggest that those in later life are better able to manage the impact that their cognitive and emotional responses to daily stressors have on their global depressive symptoms. That is, older adults in this study—despite experiencing comparable levels of appraisal variability to younger adults—appear to be better able to keep their day-to-day variability in event experiences and appraisals from becoming detrimental to their overall sense of well-being compared with participants still in the midlife years. This conclusion is in line with research that has shown older adults' well-being to be less contingent on daily positive and negative events than adults at earlier points in the life span (Mroczek & Almeida, 2004; Stawski et al., 2008). Further, as indicated by the significant three-way interaction, mean and variability components of negative appraisal processes become less contingent with age; this—combined with the finding that the direct effect of negative appraisal variability on depressive symptoms decreases with age, whereas that of mean negative appraisals does not—may indicate that variability in stress appraisals becomes less salient to global well-being with age, as mean patterns of negative appraisals take precedence.

Another potential factor contributing to the age effects may stem from age differences in the nature of broad life experiences and events that the daily events measure does not capture (Staudinger & Bluck, 2001). For example, there is a body of literature highlighting how the many roles and competing demands of midlife (e.g., career, parenting, caring for aging parents) can become overwhelming and negatively impact both mental and physical well-being (Lanza di Scalea et al., 2012; Matthews, Gump, & Owens, 2001; Wheaton, 1997). This feeling of being overwhelmed may reduce one's capacity to keep volatile reactions to daily stressors from having a detrimental impact on overall well-being; this could explain why negative appraisal variability—although not different in level across age—has a greater effect on well-being for

participants at the younger span of the age range. Future work should investigate these effects.

In addition to the age findings, the results provide evidence that variability in event appraisals has a significant impact on global well-being over and above mean levels: greater variability in both negative event (stress) appraisals and positive event (pleasure) appraisals predicted higher levels of depressive symptoms, and significant mean  $\times$  variability interactions for both negative and positive appraisals indicate that the impact of mean appraisals on well-being depends on how variable (from day to day) one is around their mean. Considering these mean  $\times$  variability appraisal interactions more closely, we find that low variability in negative appraisals was most beneficial for those with low mean levels of negative appraisals but was more detrimental for those with high mean negative appraisals. Higher variability in positive appraisals, on the other hand, consistently exacerbated the negative impact of having low mean positive appraisals. These variability effects held even when event exposure and neuroticism—both of which were significantly associated with depressive symptoms—were accounted for, indicating that appraisal variability reflects more than individual differences in number of events experienced or the emotional lability aspects of personality.

The question becomes, then, what is it about the variability in event appraisals captured here that is so detrimental to well-being? From an emotion regulation perspective, the between-person differences in appraisal variability index the tendency of highly variable individuals to react more strongly to negative or positive events than those who are less variable. This idea was highlighted in the Introduction section, as people low in appraisal variability were characterized as being less reactive to daily life events compared with those who vary more; we controlled for the extent to which this lability is tapping a trait characteristic by accounting for neuroticism. In this light, those individuals who are more variable in positive or negative appraisals from day to day are appraising events more inconsistently due to potentially disproportionate reactions to events, which indicates that highly variable individuals have difficulty regulating their appraisals of daily events. Dysregulation of cognitive and emotional responses—particularly poor regulation of negative emotions—has a strong tie with well-being outcomes, having been linked with greater vulnerability to depression (Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010), increased cardiovascular and cognitive stress responses (Jamieson, Nock, & Mendes, 2012), and lower life satisfaction (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Regulation of positive emotions has also been linked with resilience and successful coping (Tugade & Fredrickson, 2007), with strategies promoting the savoring of event-prompted positive emotions promoting higher overall life satisfaction (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Future investigations

should more explicitly link appraisal processes with affect and emotion regulation in order to more fully understand the mechanisms at work here.

We must stop short, however, of suggesting that lower variability in appraisals is always better; although the direct effects indicated a consistent deleterious impact of higher appraisal variability on depressive symptoms, the mean  $\times$  variability interactions revealed that low variability can be detrimental in certain contexts. Specifically, individuals who tend to perceive daily negative events as highly stressful actually benefit from higher levels of variability, although this effect does seem to become less pronounced with age. This once again points to the importance of regulating cognitive and emotional reactions to daily events and indicates that even infrequent days of healthier appraisal patterns can serve to significantly reduce the detrimental impact of high mean negative appraisals on well-being.

One potential limitation of this study is the use of variance terms as our measure of daily variability; although we did control for linear trends (via detrending) and nonlinear patterns (via temporal dependency terms), which do permit us to consider the variance term as capturing the day-to-day (nonpatterned) fluctuations in appraisals of interest, there are more sophisticated methods (e.g., derivatives; Deboeck et al., 2009) that could yield a more nuanced picture. Now that we have established the presence and effects of intra-individual variability in daily event appraisals on global depression in the straight-forward manner used here, future investigations can employ more complex approaches in order to further elucidate the processes at work. Additionally, the age data here are cross-sectional in nature, meaning that these findings should not be used as evidence of age-related change; rather, we can only speak of age differences that the significant age interactions highlight. Another potential limitation is the fact that, although we are treating the global and daily data as assessments of concurrent experience across levels, and hypothesizing that day-level appraisal characteristics influence overall depressive symptoms, the day-level data were actually collected beginning 2–3 weeks after the global questionnaires. Data collection was designed this way so that we could capture both day- and global-level experience without the participant burden that collecting both concurrently would cause. Studies able to assess the long-term impact of daily appraisal characteristics on depression and other health and well-being outcomes in a longitudinal manner would be able to further inform the directionality of the processes explored here.

The primary message that emerged from this study is that it is not beneficial to only have low mean levels of negative appraisals (tend to rate negative events as not very stressful) or high mean levels of positive appraisals (tend to rate positive experiences as highly pleasurable). Yes, these two appraisal patterns do benefit overall well-being, as they reflect an ability to (a) modulate one's reaction to

stressful daily experiences and (b) savor and benefit from positive daily experiences, but the extent of these benefits also tends to depend on how variable one is around that mean. Overall, our findings indicate that having a moderate level of variability from day to day around healthy appraisal tendencies (low stress appraisals, high pleasure appraisals) is the most optimal pattern in promoting well-being, suggesting a target range of appraisal that can potentially be fostered through effective coping and/or emotion regulation strategies. The age effects also point back to the extensive literature suggesting age-related improvements in processes associated with cognitive reactions and emotional responses to events and experience that come with age. Specifically, the finding that appraisal variability exerts a less detrimental effect on well-being as we get older may point to an increased motivation to savor everyday positive experiences and let negative experiences “roll off the back” in the pursuit of greater joy, fulfillment, and quality of life in our later years.

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