Optimism, Daily Stressors, and Emotional Well-being Over Two Decades in a Cohort of Aging Men

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Word count: 5021

References: 49

Data elements: Two tables and two figures

Abstract

Objectives: Growing evidence supports optimism as a health asset, yet how optimism influences well-being and health remains uncertain. We evaluated one potential pathway – the association of optimism with daily stress processes and tested two hypotheses. The *stressor exposure hypothesis* posits that optimism would preserve emotional well-being by limiting exposure to daily stressors. The *buffering hypotheses* posits that higher optimism would be associated with lower emotional reactivity to daily stressors and more effective emotional recovery from them.

Methods: Participants were 233 men from the Veterans Affairs Normative Aging Study who completed the MMPI-2 Revised Optimism-Pessimism Scale in 1986/1991 and participated in up to three eight-day daily diary bursts in 2002-2010 (age at first burst: *M*=76.7, *SD*=6.5). Daily stressor occurrence, positive (PA) and negative affect (NA) were assessed nightly. We evaluated the hypotheses using multilevel structural equation models.

Results: Optimism was unrelated to emotional reactivity to or recovery from daily stressors. Higher optimism was associated with higher average daily PA (B=2.31, 95% Bayesian credible interval [BCI]: 1.24, 3.38) but not NA, independent of stressor exposure. Lower stressor exposure mediated the association of higher optimism with lower daily NA (indirect effect: B=-0.27, 95%BCI: -0.50, -0.09), supporting the stressor exposure hypothesis.

Discussion: Findings from a sample of older men suggest that optimism may be associated with more favorable emotional well-being in later life through differences in stressor exposure rather than emotional stress response. Optimism may preserve emotional well-being among older adults by engaging emotion regulation strategies that occur relatively early in the emotion-generative process.

Keywords: Psychological well-being, stress, emotional reactivity, emotional recovery

Introduction

Accumulating evidence supports optimism as a psychosocial health asset, yet the mechanisms through which optimism may be associated with health and well-being remain unclear (Kubzansky et al., 2015). While more optimistic individuals have greater emotional well-being across a wide range of stressful contexts from major life events (Boelen, 2015) to laboratory-based stressors (Nes et al., 2005), how optimism influences emotional responses to daily stressors has seldom been investigated. Greater daily stressor exposure is associated with worse health outcomes such as heightened risks of metabolic syndrome (Ross et al., 2011) and mortality (Jeong et al., 2016). Moreover, growing evidence has linked exaggerated emotional fluctuations in the context of daily stressors to multiple health outcomes beyond mean levels of any emotions (Mroczek et al., 2015; Ong & Steptoe, 2020). Therefore, examining the relationship between optimism and daily stress processes – that is, how individuals perceive, interpret, and respond to daily stressors – may help elucidate the mechanisms by which optimism influences adult health. In this study, we examined the prospective association of optimism and emotional responses to daily stressors in older men.

Optimism, Emotion Regulation, and Aging

Optimism is defined either as having generalized expectations for positive outcomes or based on explanation of causes for past events (Scheier & Carver, 2018). For example, optimistic individuals tend to appraise the causes of negative events as transient, situation-specific, and external to oneself, whereby future negative occurrences are deemed less likely. Optimism is a temporally stable trait that pertains to diverse contexts. Mean optimism levels increase slightly from early to late adulthood, while individual differences in rank-ordering remain largely stable, with test-retest correlations over five to ten years ranging from 0.71 to 0.87 among middle-aged

and older adults (Lee et al., 2019; Scheier & Carver, 2018). When confronted with stressors, more optimistic individuals may preserve their emotional well-being through effective use of regulatory processes, including emotion regulation.

Emotion regulation refers to attempts to influence the experience and expression of emotions (Gross, 2014). *Antecedent-focused emotion regulation* strategies target how individuals respond to emotion cues and triggers *before* emotions occur, such as avoiding or directing attention away from situations expected to trigger negative emotions, and altering the appraisal of such situations or of one's capacity to deal with them (Gross, 2014). For example, optimism has been linked to directing visual attention away from punishment (Singh et al., 2020). Among patients newly diagnosed with cancer, lower levels of helpless/hopeless appraisals accounted for the association between optimism and improved emotional functioning following surgery (Schou et al., 2005). More versus less optimistic undergraduates were more likely to appraise a difficult experimental task as a challenge rather than a threat, which explained their lower levels of post-task negative affect (Baumgartner et al., 2018). *Response-focused emotion regulation* involves strategies that can amplify, diminish, prolong, or curtail emotional experience or expression (Gross, 2014). For example, more versus less optimistic cancer patients were less likely to suppress anger, and this accounted for their better immune function (Penedo et al., 2006). Evidence also suggests that optimism may influence emotional experience indirectly via behavioral effects, although mediation has not been formally evaluated. For example, meta-analytic findings confirm a positive association between optimism and physical activity (Boehm et al., 2018) and randomized clinical trials find exercise reduces depressed mood (Schuch et al., 2016).

How optimism may affect emotion regulation in later life is unclear, however, research has clearly established that emotional well-being improves in this period. Socioemotional selectivity theory (SST) posits that perceiving a diminishing time horizon motivates older adults to prioritize emotional well-being (Charles & Carstensen, 2013). The Strength and Vulnerability Integration model (SAVI; Charles, 2010) attributes improved socioemotional competence with age to accrued social experience and expertise, such as greater social cue sensitivity and improved ability to predict emotions in self and others. In parallel, age-related reductions in physiological flexibility may also shape emotion regulation, in part by promoting a preference for strategies that minimize exposure to high-arousal and distressing situations. The role of optimism in later-life emotional well-being has seldom been explicitly investigated. Supporting the idea that optimism may confer benefits on emotional aging, Wrosch and colleagues (2016) found optimism was associated with lower depression over six years among older adults. They also noted the emotional benefits of optimism somewhat diminished in very old age, perhaps because older-old adults increasingly encounter uncontrollable stressors and loss. However, that study used an indirect measure of stressor exposure, derived from a measure of perceived stress. Direct investigation of how older adults experience and respond emotionally to stressors in day-to-day lives may provide additional valuable insight.

Optimism and Emotional Responses to Daily Stressors

Emotional reactivity and recovery represent two ways stressor exposure affects emotional well-being within persons over time (Almeida et al., 2011). They capture dynamic processes that are missed when examining static levels of stressor exposure or emotions. Emotional ups and downs tied to daily stressors are uniquely associated with worse mental and physical health beyond the effects of stressor exposure and may signify difficulties with emotion regulation and

susceptibility to psychiatric disorders (Charles et al., 2013). Emotional reactivity refers to the extent to which individuals react emotionally to stressors; it is generally operationalized as an increase in negative affect (NA) or a decrease in positive affect (PA) comparing levels before and after stressor occurrence. Heightened emotional reactivity is associated with greater risks of affective disorders (Charles et al., 2013), inflammation (Sin et al., 2015), and mortality (Mroczek et al., 2015). Emotional recovery from stressors refers to the capacity to return to pre-stressor affect levels following exposure. Leger et al. (2018) operationalized emotional recovery as the extent to which stressor-related NA was present on the day following stressor occurrence. They found that individuals who experienced greater NA following a stressor day reported more chronic conditions and worse functional limitations ten years later. While studies on age differences in emotional reactivity have produced inconsistent findings (see review by Schilling & Diehl, 2015), a coordinated analysis of five ecological momentary assessment (EMA) and two daily diary studies reported that lower NA reactivity to daily stressors in older age, although the effect size was small (Stawski et al., 2019). Few studies have examined emotional recovery to daily stressors.

Most studies on the association of optimism with emotion regulation examined the emotional sequelae of coping with health threats among patients. Laboratory-based studies have considered the role of optimism in acute cognitive and affective processes occurring in response to negatively-valenced stimuli. Limited work has examined optimism in relation to stressor exposure and emotional responses to stressors in the daily context, which has high ecological validity. In a daily diary study, McHale et al. (2015) found more versus less optimistic college students had fewer negative thoughts during sad mood episodes and used mood repair strategies

more readily. However, optimism did not enhance the effects of mood repair strategies, and whether these associations generalize to older adults are unknown.

Current Study

This study leverages a longitudinal daily diary design to examine the association of optimism with emotional well-being in the context of daily stressors. We drew from a sample of older men who completed an optimism assessment and then participated in up to three daily diary bursts conducted 14 or more years later. Given the potential role of optimism in maintaining age-related strengths in emotional aging as posited by SST and SAVI, we expected optimism to be associated with greater emotional well-being in later life through effective use of antecedent- and response-focused emotion regulation strategies. Specifically, if higher optimism is associated with greater use of antecedent-focused emotion regulation strategies, optimistic individuals may experience more favorable emotional well-being by limiting exposure to potentially stressful circumstances. Our *stressor exposure hypothesis* posits that more optimistic individuals would report lower daily stressor exposure, which in turn would be associated with greater emotional well-being (lower NA and higher PA).

Second, if optimism is associated with greater use of response-focused emotion regulation strategies, optimistic individuals may be more effective in managing their emotional reactions to and recovering from stressors. Our *buffering hypothesis* posits that optimism would mitigate the negative emotional impact of daily stressors, such that higher optimism would be associated with lower emotional reactivity (less same-day NA increase and PA decrease) and more effective emotional recovery (less next-day NA elevation and PA attenuation) from daily stressors. The two hypotheses are not mutually exclusive; they represent different mechanisms by which optimism may relate to daily emotional well-being.

Methods

Sample and design

The sample was drawn from the Veterans Affairs (VA) Normative Aging Study (NAS), a longitudinal study of normative aging processes in 2,280 initially healthy, community-dwelling men, aged 21 to 81 years, when enrolled at the VA Boston Outpatient Clinic in 1961-1970 (Spiro & Bossé, 2001). Being a military veteran was *not* an inclusion criterion. Since enrollment, participants complete periodic mail surveys and regular in-person examinations. Optimism was assessed in mail surveys in 1986 and 1991. In August 2002, 671 men who had participated in a 2001 NAS psychosocial survey and an additional 176 who did not but were due for an in-person examination, were eligible for an 8-day daily diary study on stressors, mood, and other factors. The first daily diary burst took place between September 2002 and November 2003. Subsequently, eligible men were re-contacted for two follow-up daily diary bursts in 2004-2005 and 2008-2010. Of 847 eligible men, 329 (39%) agreed to participate in ≥1 bursts, of whom 248 (75%) returned usable diaries. After excluding 15 men missing optimism data, the analytic sample included 233 men, across a total of 364 bursts and 2,888 diary days. Over half (57%) of the analytic sample participated in one burst, 30% in two, and 13% in three. In 99% of the bursts, men provided data on all eight days. Supplemental Document 1 reports comparisons of men based on their eligibility for the daily diary studies and inclusion in the analytic sample. All participants provided written consent and the VA Boston Institutional Review Board approved this research.

At the start of each burst, participants received eight daily diary booklets by mail. They were asked to complete the diary one-half hour before bedtime over eight consecutive nights and

to return the diaries in a pre-paid envelope. Each diary contained short, semi-structured questionnaires about their daily experiences.

Measures

Optimism. Explanatory style optimism was assessed with the Revised Optimism-Pessimism scale (PSM-R; Malinchoc et al., 1995). Malinchoc et al. (1995) applied the Content Analysis of Verbatim Explanations technique to Minnesota Multiphasic Personality Inventory-II items (MMPI-II; Butcher et al., 1989) and developed a bipolar score on a continuum ranging from optimistic to pessimistic; 263 dichotomous items were weighted by their levels on three explanatory style domains including internality, stability, and globality. PSM-R scores are on a T-score metric (i.e., mean=50, standard deviation [*SD*]=10) based on the original MMPI normative sample (Malinchoc et al., 1995). For ease of interpretation, PSM-R scores were reverse-coded and converted into a z-score metric, such that each additional unit corresponds to one standard deviation (*SD*) higher in optimism level. Total scores were also categorized into quintiles for descriptive purposes. Example items are: "I usually expect to succeed in things that I do" and "I cannot do anything well" (reverse-coded). The PSM-R had good reliability (Kuder-Richardson-20=.87) and stability (r=.87, p<.001) over five years in NAS. To maximize follow-up time, we used the PSM-R score from the earlier assessment when possible (n=214, 92%).

Daily stressors. Daily stressors were measured using the Daily Inventory of Stressful Events (DISE; Almeida et al., 2002). Seven items asked whether participants experienced each of the following stressor categories in the past 24 hours: arguments, potential arguments, stressors at work or volunteer setting, home stressors, network stressors, health stressors, and other stressors. From the responses, we computed two observed variables: 1) a binary day-level indicator of whether any stressors occurred in the past 24 hours; 2) burst-level stressor exposure,

quantified as the average number of stressor categories experienced per day in a given burst. To separate between-burst versus between-person effects of stressor exposure, the observed burst-level stressor exposure variable was decomposed during analyses into two orthogonal latent variables (Muthén & Muthén, 1998-2017), including: 1) burst-specific stressor exposure representing the difference between the observed stressor exposure at each burst and the person's average value across bursts, and 2) person-specific stressor exposure representing his average stressor exposure (categories per day) across bursts.

Daily affect. The outcome variables, daily NA and PA, were each assessed with 10 items from the Positive and Negative Affect Schedule (Watson et al., 1988). Respondents indicated the extent to which they experienced each item in the past 24 hours from 0 (very slightly or not at all) to 4 (extremely). Example items include "distressed" and "irritable" for NA, and "excited" and "enthusiastic" for PA. Item scores were summed to yield a total daily NA and PA score, separately, with higher scores indicating higher affect levels. Both scales have good to excellent internal consistency in our sample (Cronbach's alpha: 0.90 for PA, 0.85 for NA).

Emotional reactivity and recovery. Emotional reactivity was assessed as two burst-level variables, operationalized as the slope of daily NA or PA regressed on the presence of same-day stressors. In a given burst, emotional reactivity represents the average difference in daily affect between stressor days versus non-stressor days. Higher versus lower reactivity indicates stronger NA elevation and greater PA attenuation on stressor days.

Emotional recovery was assessed as two burst-level variables, operationalized as the slope derived from regressing daily NA or daily PA on the presence of *prior-day* stressors. In a given burst, emotional recovery represents the average difference in current-day affect when the previous day was a stressor day versus a non-stressor day. Greater versus less emotional

recovery indicate less NA elevation and less PA attenuation following stressor versus no-stressor days.

Temporal trends in affect, emotional reactivity, and emotional recovery. We considered four temporal trends which could obscure associations of interest (Sliwinski et al., 2009). These include affect drift, which refers to the linear change in PA or NA occurring over days *within a given burst*, as well as linear change *over years since the first burst* in three parameters: daily affect levels, emotional reactivity (or recovery), and magnitude of within-burst affect drift (see Supplemental Document 2).

Covariates. Covariates included age at the first burst (mean-centered at 77 and divided by ten for ease of interpretation given a wide age range of 60 to 92), education (years completed), and marital status (married or not at each burst). Baseline depression was indicated by the depression subscale score of the Symptom Checklist 90-Revised (Derogatis, 1977) administered in 1985.

Statistical analyses

We used multilevel structural equation models (MSEMs; Preacher et al., 2011) to accommodate the hierarchical nature data structure and assess mediation. All models were run using Mplus version 8.4 (Muthén & Muthén, 1998-2017) and used full information maximum likelihood robust estimation to handle missing data, which is robust to non-normal data distribution and assumes data are missing at random (see Supplemental Document 3 on missing data treatment). Our MSEMs include regression analyses at each level. Regression coefficients at lower levels are modeled as latent variables at higher levels, which represent true means across days and bursts more accurately than observed aggregates (Rush et al., 2019). Level 1 (day-level) analyses assessed the association between daily stressor occurrence and daily affect. Level

2 (burst-level) analyses examined the association between latent burst-specific stressor exposure and latent burst-specific affect. Level 3 (person-level) analyses tested the associations of optimism with latent person-specific means of emotional reactivity, emotional recovery, stressor exposure, and daily affect.

To test the stressor exposure hypothesis, with separate MSEMs for PA and NA we considered the indirect effect of optimism on affect via stressor exposure, and the direct effect of optimism with average affect levels, irrespective of stressor exposure. Each indirect effect was the product of its component paths. We used Bayesian estimation to obtain the indirect effects and associated 95% credible interval (BCI), which accommodates their potentially non-normal distribution. Bayesian models used Mplus default priors. We conducted prior sensitivity analysis (Depaoli & van de Schoot, 2017; van Erp et al., 2018), which suggested our prior selection is reasonable (see Supplemental Document 4).

To test the buffering hypothesis, with separate MSEMs for PA and NA we tested the associations of optimism with emotional reactivity and recovery. Emotional recovery analyses were limited to non-stressor days, which isolates the source of variation in stressor exposure to the prior day. See Supplemental Document 2 and Supplemental Figure for detailed descriptions.

Because daily stressors and affect were assessed concurrently using a past 24-hour frame, reverse causality is possible. To account for the possibility that individuals predisposed to experience emotional ill-being may be more likely to endorse stressor occurrence, in sensitivity analyses we re-ran all the models while further adjusting for baseline depressive symptoms.

Results

Descriptive statistics

Men averaged 76.7 (*SD*=6.5) years old at their initial burst; over 90% were married. The average optimism score was 45.9 (*SD*=10.1) in the original PSM-R metric for which higher scores represent more pessimism. Across the three bursts, men reported ≥1 stressor(s) on 42% of days. The mean number of stressors on a given day in the first, second, and third burst was 0.8 (*SD*=0.8), 0.7 (*SD*=0.7), and 0.5 (*SD*=0.6), respectively. Avoided argument/disagreement was the most frequently endorsed stressor category. Stressors were rated between "a little" to "somewhat" stressful on average (see Supplemental Table 1 for stressor descriptive statistics). More optimistic men tended to be older, had higher education levels, endorsed fewer daily stressors, and had higher PA and lower NA levels (Table 1).

Overall, most temporal trends were not apparent and minimally influenced our findings (Supplemental Table 2). For NA, we observed a significant fixed effect of NA drift, indicating that NA decreased by 0.05 points (95% confidence interval [CI]: -0.10, -0.01) per day within each burst, but this within-burst NA decline did not change in magnitude across bursts. All other fixed and random effects reflecting NA temporal trends were nonsignificant. For PA, all fixed effects of temporal trends were nonsignificant. Among random effects, burst-to-burst fluctuations (U=0.17, 95%CI: 0.04, 0.30) and individual differences (U=0.22, 95%CI: 0.05, 0.38) were evident in PA drift. Henceforth we report results from models run with only statistically significant temporal trend parameters to adjust for their potential influence on the associations of interest.

Stressor exposure as a mediator of the association between optimism and daily affect

For our stressor exposure hypothesis, the direct effect of optimism on daily NA was minimal (Figure 1). However, each 10-point higher in optimism was associated with 0.14 fewer daily stressors on average across bursts (95% CI: -0.22, -0.05); in turn, each additional stressor

was associated with 2.00 points higher average daily NA across bursts (95%CI: 0.23, 3.78). In other words, lower levels of stressor exposure mediated the association of higher optimism to lower daily NA (indirect effect: B=-0.27; 95%BCI: -0.50, -0.09). Of the total effect of optimism on NA, 57% was attributable to individual differences in stressor exposure levels.

In contrast to the daily NA findings, the direct path from optimism to daily PA was substantial (Figure 2). Each 10-point higher in optimism was linked to 2.31 points higher average daily PA (95%CI: 1.24, 3.38). However, person-specific stressor exposure did not mediate the association of optimism to PA, because stressor exposure was not meaningfully associated with average daily PA. In sensitivity analyses adjusting for baseline depressive symptoms, the pattern of findings for NA and PA was unchanged and not elaborated here (Supplemental Table 3).

Optimism in relation to daily affect and emotional reactivity

For the buffering hypothesis, we first examined optimism in relation to daily NA and NA reactivity to daily stressors (Table 2a, columns 1-2, and Supplemental Table 4a). Neither optimism (B=-0.22, 95%CI: -0.57, 0.12) nor person-specific stressor exposure (B=1.54, 95%CI: -0.31, 3.38) was associated with average daily NA. Optimism was also not associated with NA reactivity to daily stressors (B=-0.02, 95%CI: -0.27, 0.24). However, men with greater stressor exposure on average showed stronger NA reactivity. That is, with each additional stressor per day across bursts, NA was on average 0.79 points higher (95%CI: 0.004, 1.57) on stressor versus non-stressor days.

Results for the association of optimism with daily PA and PA reactivity to daily stressors are shown in Table 2b, columns 1-2 (full results in Supplemental Table 4b). Each 10-point higher in optimism was associated with 2.30 points higher average daily PA (95%CI: 1.22, 3.39). No association was evident between average stressor exposure across bursts and average daily

PA (B=-0.09, 95% CI: -3.44, 3.25). Optimism was not associated with PA reactivity to daily stressors (B=0.03, 95%CI: -0.33, 0.38), and neither was average stressor exposure across bursts (B=0.45, 95%CI: -1.84, 0.27). Adjusting for baseline depressive symptoms did not alter the pattern of findings for the NA and PA reactivity models (Supplemental Table 5a and 5c).

Optimism in relation to daily affect and emotional recovery

We next examined optimism in relation to daily NA and NA recovery from *prior-day* stressors, considering these affective experiences only on days when men did not experience a stressor (Table 2a, columns 3-4; and Supplemental Table 6a). Optimism was not related to average daily NA (B=-0.18, 95%CI: -0.55, 0.18), and neither was person-specific average stressor exposure across bursts (B=1.92, 95%CI: -0.79, 4.62). Furthermore, neither optimism (B=-0.02, 95%CI: -0.24, 0.21) nor average stressor exposure across bursts (B=0.37, 95%CI: -1.18, 1.93) was associated with NA recovery from prior-day stressors.

Results for the association of optimism to daily PA and PA recovery from prior-day stressors are shown in Table 2b, columns 3-4 (full results in Supplemental Table 6b). With each 10 point higher in optimism score, men had 2.11 points higher mean daily PA across bursts (95%CI: 0.89, 3.33). Person-specific average stressor exposure across bursts was unrelated to average daily PA (B=-3.78; 95%CI: -8.26, 0.71). Optimism was unrelated to PA recovery from prior-day stressors (B=0.24, 95%CI: -0.26, 0.73); however, greater average stressor exposure across bursts was associated with greater PA recovery. That is, for each additional daily stressor across bursts, men scored 3.88 points higher in PA following a stressor (versus non-stressor) day. Adjusting for baseline depressive symptoms did not alter the pattern of findings for the NA and PA recovery models (Supplemental Table 5b and 5d).

Discussion

In this prospective study on optimism and daily stress processes, our hypothesis that optimism would buffer effects of daily stressors on daily affect was not supported. Optimism was unrelated to PA and NA reactivity to same-day stressors, and unrelated to PA and NA recovery from prior-day stressors. However, our stressor exposure hypothesis was partially supported. Higher optimism levels were related to lower daily NA, and over half of this association was mediated by fewer daily stressors among more optimistic men. More optimistic men had higher overall levels of daily PA, irrespective of their overall stressor exposure levels. By considering optimism in relation to affect dynamics in everyday life, these findings provide some insight into pathways by which optimism may promote emotional well-being in later life.

Support for the stressor exposure hypothesis but not the buffering hypothesis suggests that optimism may protect emotional well-being in later life through antecedent-focused emotion regulation strategies that intervene earlier in the emotion-generative process, such as attention deployment and situation selection, rather than through response-focused strategies, including behaviors and thought processes that aim to mitigate NA increase and PA decrease after stressor occurrence. Our mediation findings suggest lower daily stressor exposure accounted for over half of the association between higher optimism and lower daily NA. Scott et al. (2013) reported that older adults' lower levels of global perceived stress accounted for their lower emotional reactivity relative to younger adults. Their finding suggests that in later life, individuals may become less stress-reactive because they perceive their psychosocial environments as being more favorable and/or their environments truly are less stressful. Thus, optimism may protect emotional well-being through emotion regulation strategies that limit exposure to, and possibly perception of, potentially distressing situations. Indeed, studies have found that older versus younger adults favor passive strategies (e.g., "doing nothing") when dealing with interpersonal

problems (Birditt et al., 2005). While some work has suggested passive emotion regulation strategies are maladaptive (Aldao et al., 2010), they may be adaptive in light of age-related physiological and cognitive vulnerabilities (Charles, 2010). During moments of intense distress, older versus younger adults require more time to downregulate physiological response and have fewer cognitive resources with which to recalibrate negative appraisals. Preemptively limiting events that might trigger strong emotional responses might be more efficacious than response-focused strategies that target negative emotions as they occur (Livingstone & Isaacowitz, 2021).

Failure to find evidence of buffering may be partly due to who comprised our sample, namely, older men who were on average in their late 70s at the first daily diary burst, and nearly all of whom provided data on all evenings of a given burst. Our sample may over-represent well-adjusted individuals who experienced minimal disruption from their daily stressors, which could weaken our ability to detect some associations. However, the proportion of stressor days and number of daily stressors were comparable to those found in a large, middle-aged national sample (Koffer et al., 2016). Stress-buffering effects were unobserved not only on the day of stressor occurrence but also the following day, as optimism was unrelated to NA recovery from prior-day stressors. Neubauer et al. (2018) reported that anticipating a stressor that did not materialize was associated with elevated NA. It might be fruitful for future studies to consider the role of optimism in stressor anticipation and emotional recovery from anticipated versus unanticipated stressors.

Contrary to the NA findings, the association of optimism to higher daily PA was independent of stressor exposure. The dissimilar processes relating optimism to NA versus PA reinforce the notion that positive psychological well-being is not simply the obverse of ill-being (Kubzansky et al., 2015). These findings add to evidence documenting differential patterns of PA

versus NA response to everyday stressors (Scott et al., 2013), and the growing distinction between emotion regulation tactics that enhance positive aspects versus minimize negative aspects of a situation (Livingstone & Isaacowitz, 2021).

Other findings on the relationship between stressor exposure and daily affect are worth noting. Men with higher overall stressor exposure showed higher *PA* on the day following a stressor versus no-stressor day. This may depict a "rebound" effect wherein men experienced a boost in positive mood during a reprieve from frequent experiences of daily stressors. Subsequent research should examine optimism in relation to emotional recovery from varying degrees of stressor "pile-up" (Schilling & Diehl, 2014). Consistent with prior findings (Koffer et al., 2016), NA reactivity was higher among men with higher overall stressor exposure. Future work may want to consider contextual factors, including background stressors, that influence daily stress processes.

Our findings should be considered in light of several limitations. Our sample was all-male, mostly white, and had higher socioeconomic status than the general population. These characteristics may limit the generalizability of our findings. Nonetheless, despite social gradients in optimism (Boehm et al., 2015), optimism has similar associations with health outcomes across diverse groups (e.g., Tindle et al., 2009). Use of emotion regulation strategies was not measured but inferred from the pattern of findings. Daily stressors and affect were assessed concurrently using a past-24-hour frame, limiting our ability to understand the directionality of their association. However, sensitivity analyses suggested that irrespective of one's predisposition to experience emotional ill-being, optimism was linked to lower daily stressor exposure, which in turn was associated with lower daily NA. Measurement-intensive

designs, such as EMA with repeated, same-day measurements of stressor exposure and affect, will help clarify temporality.

Finally, most participants completed one or two bursts, thus burst-level coefficients represent mainly these individuals. The limited number of burst-level (and indirectly, day-level) units in our analytic sample also raises the question of whether failure to find support for the buffering hypothesis could represent a true null effect versus imprecise effect size estimation. We assess this by considering the 95%CI as an indicator of effect size precision (Cumming, 2014; Lash et al., 2021). Considering the associations of optimism with NA and PA reactivity and recovery, three of the four effect sizes are very close to the null value of zero and have narrow and symmetric CIs, suggesting the true effects are at or near zero. The width of these CIs is comparable to that of the 95%BCI for the significant indirect effect from the NA mediation model, suggesting the differential findings for the buffering versus stressor exposure hypotheses are not entirely attributable to lower effect size precision in cross-level moderation compared with person-level mediation. For a given set of analyses (e.g., the association of optimism with emotional reactivity), despite identical sample size the CIs were wider for effect sizes involving PA versus NA and there was greater variability in daily PA versus NA (Table 1), suggesting some unmeasured factors contribute to the unexplained PA variance. However, perhaps because emotional recovery was examined only on stressor-free days (resulting in fewer observations), our estimate for the association of optimism with PA recovery (which has a wider CI) does not preclude the possibility of a true weak association that might become more apparent in larger samples. Taken together this suggests we had adequate statistical power to detect a small effect for all but one of the hypothesized relationships.

These limitations notwithstanding, leveraging multiple bursts of daily diaries embedded within a longitudinal study, we were able to capture the prospective associations of optimism with components of daily stress processes over 14 or more years. Daily diaries allowed us to examine stressor exposure and affect in an ecologically valid manner, while the multi-burst design enhance the reliability of estimates. Results suggest optimism may potentiate age-related strengths in emotional aging and preserve emotional well-being in later life through strategies that target earlier stages of the emotion-generative process to limit older adults' exposure or perception of stressful circumstances. Differential processes may underlie the associations of optimism to positive versus negative emotional functioning. Altogether, our findings illustrate the complex manner by which optimism is associated with affect dynamics in daily life; they also highlight the importance of identifying factors that may provide promising intervention targets to improve emotional well-being in later life.

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Table 1.

Sample characteristics by optimism quintiles (Q1 = least optimistic), N=233.

	Q1 (n=47)		Q2 (n=47)		Q3 (n=46)		Q4 (n=47)		Q5 (n=46)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Number of daily diary bursts	1.47	0.72	1.53	0.69	1.54	0.72	1.55	0.75	1.72	0.72
Age at baseline	75.87	5.9	75.61	6.64	77.15	7.55	77.18	5.98	77.64	6.16
Married at baseline	90%	--	92%	--	97%	--	78%	--	88%	--
Education (years)	14.29	2.1	14.4	2.09	14.05	1.28	13.76	2.63	14.87	2.07
Mean # daily stressors, all bursts	0.93	0.93	0.61	0.62	0.84	0.91	0.52	0.56	0.51	0.49
Mean PA at first burst	14.12	9.01	18.65	8.23	15.37	8.93	19.06	8.52	21.28	9.27
Mean NA at first burst	2.74	2.84	2.36	2.6	2.73	4.33	1.52	1.89	1.35	2.22

Note. PA = positive affect; NA = negative affect. For PA and NA, the possible range of score is 0-40, with higher scores indicating higher levels of affect. The PSM-R score ranges (in the original metric) for optimism quintiles were >54.5 (Q1), 54.5 to 46.7 (Q2), 42.1 to 46.7 (Q3), 37.0 to 42.1 (Q4), and ≤37 (Q5).

Table 2.

Optimism and daily stressor exposure in relation to emotional (negative or positive affect) reactivity and recovery.

	Reactivity models				Recovery models			
(a) Negative affect (NA) models:	Person-specific daily NA		Person-specific NA reactivity		Person-specific daily NA		Person-specific NA recovery	
	B	95%CI	*B*	95%CI	*B*	95%CI	*B*	95%CI
Optimism	-0.22	(-0.57, 0.12)	-0.02	(-0.27, 0.24)	-0.18	(-0.55, 0.18)	-0.02	(-0.24, 0.21)
Person-specific stressor exposure	1.54	(-0.31, 3.38)	**0.79**	**(0.004, 1.57)**	1.92	(-0.79, 4.62)	0.37	(-1.18, 1.93)
(b) Positive affect (PA) models:	Person-specific daily PA		Person-specific PA reactivity		Person-specific daily PA		Person-specific PA recovery	
	B	95%CI	*B*	95%CI	*B*	95%CI	*B*	95%CI
Optimism	**2.30**	**(1.22, 3.39)**	0.03	(-0.33, 0.38)	**2.11**	**(0.89, 3.33)**	0.24	(-0.26, 0.73)
Person-specific stressor exposure	-0.09	(-3.44, 3.25)	0.45	(-1.84, 2.74)	-3.78	(-8.26, 0.71)	**3.88**	**(1.08, 6.69)**

Note. Bold indicates estimates for which the 95% confidence interval does not overlap with zero. *B* = unstandardized regression coefficient representing the adjusted mean difference in units of the outcome for each unit higher in optimism or stressor exposure. CI = confidence interval. Only Level 3 (person-level) results pertaining to the study hypotheses are shown here. Full parameter estimates are shown in Supplemental Tables 1-2. Models for emotional reactivity were based on 233 men, 364 bursts, and 2888 diary days. Models for emotional recovery were based on 214 men, 325 bursts, and 1484 diary days.

Emotional (NA or PA) reactivity was derived from the random slope of the Level 1 regression of daily NA or daily PA on the presence (versus absence) of stressors on that day. Emotional (NA or PA) recovery was derived from the random slope of the Level 1 regression of daily NA or PA on the presence (versus absence) of prior-day stressors. Person-specific emotional reactivity (or recovery) is a latent variable representing the average level of a participant's mean NA or PA reactivity (or recovery) across all bursts, adjusted for model covariates. Person-specific daily NA or PA is a latent variable representing the average level of his mean daily NA or PA across days and bursts, adjusted for model covariates. Person-specific stressor exposure is a latent variable representing the average of his observed burst-level stressor exposure across all bursts.

Figure Captions

Fig. 1. Person-level results from multilevel structural equation model on the indirect effects of optimism in relation to negative affect via daily stressor exposure. Unstandardized regression coefficients (95% Bayesian credible interval [BCI]) representing the difference in outcome per unit change in the predictor are shown for each regression path. Bold indicates estimates for which the 95%BCI does not overlap with zero.

Fig. 2. Person-level results from multilevel structural equation model on the indirect effects of optimism in relation to positive affect via daily stressor exposure. Unstandardized parameter estimates (95% Bayesian credible interval [BCI]) representing the difference in outcome per unit change in the predictor are shown for each regression path. Bold indicates estimates for which the 95%BCI does not overlap with zero.

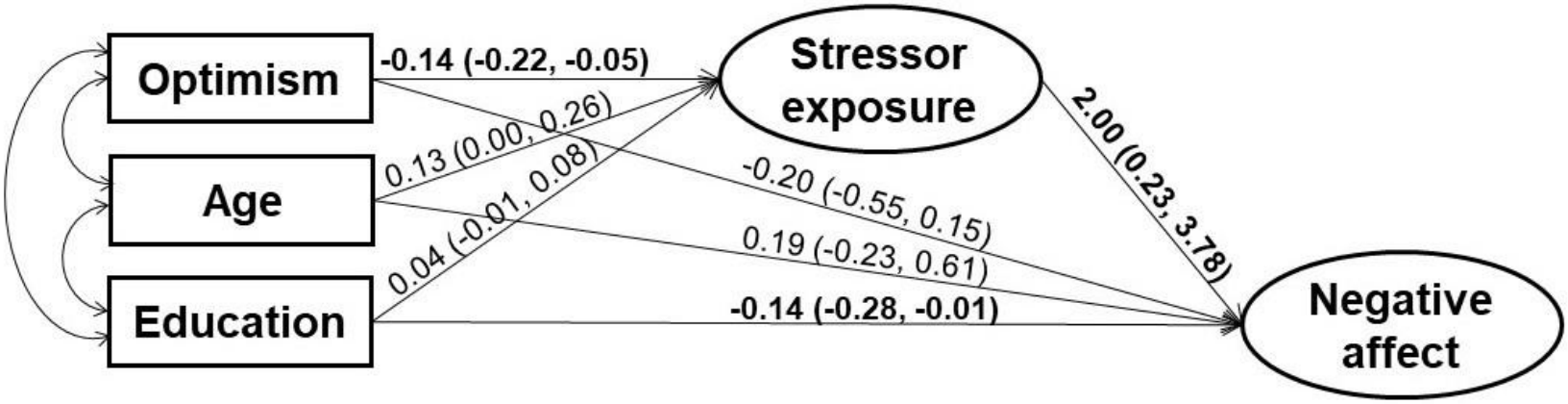
Funding

This work was supported by funding from the NIH (grant numbers R01-AG053273, K08-AG048221, RF1-064006, R00-CA201542, UL1-TR001430, R01-AG018436); and a Senior Research Career Scientist Award from the Clinical Science R&D Service, US Department of Veterans Affairs. The VA NAS is a research component of the Massachusetts Veterans Epidemiology Research and Information Center and is supported by the VA Cooperative Studies Program/Epidemiological Research Centers. The views expressed in this paper are those of the authors and do not necessarily represent the views of the support institutions.

Acknowledgments

This study was not pre-registered. We analyzed archival data that are owned by the U.S. Department of Veterans Affairs. Requests to access the data and study materials can be submitted to Avron Spiro at avron.spiro3@va.gov and will be considered on a case-by-case basis. Analysis scripts and output files will be made available upon request to the corresponding author.

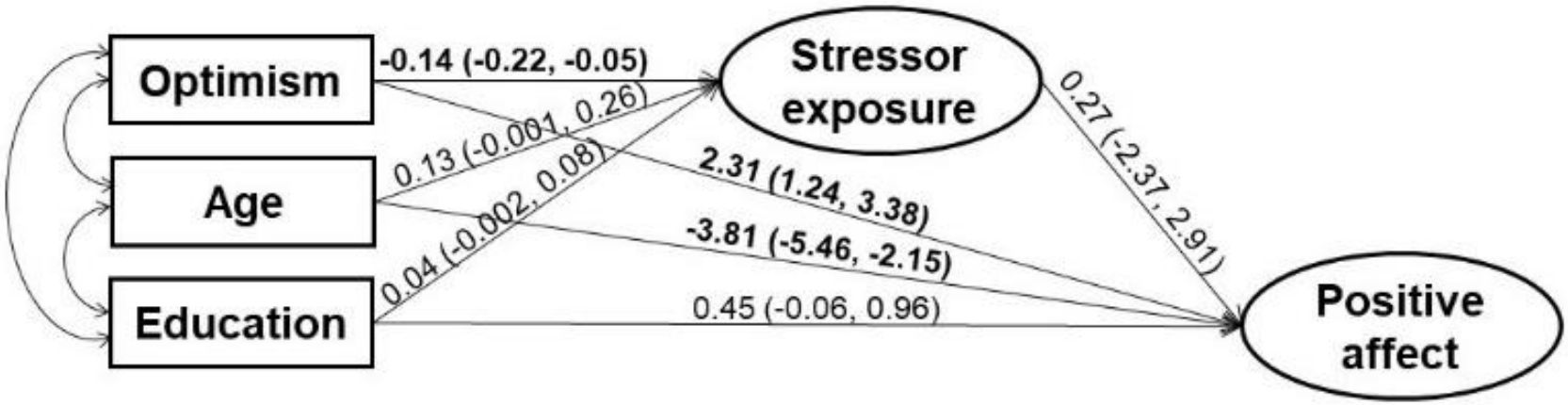
Figure 1.



Indirect effect from optimism via stressor exposure to negative affect:
B = -0.27, 95%BCI: -0.50, -0.09

Total effect of optimism on negative affect:
B = -0.47, 95%BCI: -0.77, -0.17

Figure 2.



Indirect effect from optimism via stressor exposure to positive affect:
B = -0.03, 95%BCI: -0.44, 0.36

Total effect of optimism on positive affect:
B = 2.28, 95%BCI: 1.22, 3.35