Emotional Experience Related to Daily Uplifts and Stressors: Age-differential Effects in the Context of Age-related Gains and Losses

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Abstract

Objective: Emotional aging research has been dominated by the idea of age-related improvements in emotional experience. However, current mixed empirical findings call for a more differentiated, context-dependent approach. It has been proposed that age-related improvements in emotional experience are present in benign contexts and when age-related gains (e.g., in life experience and knowledge) are salient. In adverse contexts and when age-related losses (e.g., in physical and cognitive functioning) are salient, emotional experience in late adulthood could be more negative.

Method: Combining data from two 14-day daily diary samples (total N = 268, 50-92 years), we tested the association between daily events and positive and negative affect and whether those were moderated by awareness of age-related gains and losses, indicating age-related strengths and vulnerabilities. We also tested whether these associations varied by chronological age.

Results: The association between stressors and negative affect was moderated by age-related losses and age. Participants reported more negative affect on days with above-average stressor occurrence and more age-related losses. This relation was moderated by age and was most pronounced in our oldest participants (72 years and older). The association between uplift occurrence and positive affect was moderated by daily age-related gains, with more positive affect being experienced on days with more uplifts and below-average age-related gains.

Discussion: Our findings support the idea of a differentiated, context-dependent approach to emotional aging and highlight the importance of considering awareness of age-related losses as a vulnerability factor for emotional experience in late adulthood.

Keywords: well-being, daily stressors, daily uplifts, aging, age-related vulnerabilities

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Prominent theories of emotional aging (Carstensen, 2021; Labouvie-Vief, 2003) propose age-related improvements in emotional experience. Although these theories differ in the assumed underlying processes, they predict that older adults experience more positive and less negative emotions than younger and middle-aged adults. While these predictions mostly hold for cross-sectional data (Carstensen et al., 2020), meta-analyses of longitudinal data indicate declines in positive affect and stability or increases in negative affect with increasing age (Buecker et al., 2023; Pfund et al., 2024). Age differences and changes in everyday emotional experience (Charles et al., 2023; Stawski et al., 2019) or processes underlying momentary affect fluctuations (i.e., reactivity or regulation; Isaacowitz, 2022; Wirth et al., 2023) also do not speak for unequivocal improvements. Thus, improvements in emotional experience may not be found for all older adults or in all situations.

Heightened or sustained negative affect may occur in particularly stressful contexts and when age-related vulnerabilities or losses are salient (Charles & Piazza, 2024; Wrzus et al., 2013). Being in pleasant contexts and capitalizing on age-related gains could lead to more positive emotions (Charles & Piazza, 2024; Chen et al., 2022). Emotional experience in late adulthood could, thus, not only depend on events encountered in daily life but also on the age-related gains and losses pertinent to the respective context. Being or becoming aware of age-related gains and losses is captured by the concept of awareness of age-related change (AARC). AARC entails "…individuals' awareness that their behavior, level of performance, or ways of experiencing their lives have changed due to aging" (Diehl & Wahl, 2024, p.1). AARC focuses on concrete and everyday experiences related to aging in five domains (health and physical functioning, cognitive functioning, interpersonal relationships, social-cognitive and social-

emotional functioning, and lifestyle and engagement). As the balance between age-related gains and losses becomes increasingly unfavorable with increasing age (Baltes, 1987; Riediger et al., 2014), these associations likely also depend on chronological age. In the current study, we tested the association between daily events and emotional experience and whether this was moderated by daily age-related gains or losses and chronological age. Studying those contextual factors that exacerbate or mitigate the association between daily life events and emotional experience could inform interventions fostering emotional well-being in late adulthood (Blaxton et al., 2023).

Emotional Reactions to Stressors and Uplifts: Effects of Gains and Losses

Theoretical ideas concerning age-related improvements mostly pertain to habitual emotional well-being (Carstensen, 2021; Labouvie-Vief, 2003), but have also been applied to everyday emotional experience (Koffer & Kamarck, 2022; Pfund et al., 2024; Wirth & Rothermund, in press). Habitual emotional well-being entails individuals' typical emotional experience over a longer time period and is assessed retrospectively (Wirth & Rothermund, in press). Everyday emotional experience entails situational experience of feelings, assessed daily or several times per day across several days. Everyday emotional experience is not static but fluctuates and is often related to events that individuals experience (Wirth et al., 2023). Encountering stressors (e.g., having an argument; Almeida et al., 2002) typically is related to more negative emotions, whereas uplifts (e.g., meeting friends) are related to more positive emotions (Klaiber et al., 2021; Zautra et al., 2005).

It has been proposed that age differences in how daily events relate to everyday emotional experience may depend on additional contextual factors. Theoretical frameworks, including the Strength and Vulnerability Integration Model (SAVI; Charles & Piazza, 2024; Luong & Charles, 2014) or the overpowering hypothesis (Wrzus et al., 2013), point to the importance of age-related changes in gains and losses. In particularly stressful contexts and when age-related losses are

salient, older adults might experience more negative emotions than younger adults. The occurrence of stressors, even minor ones, produces deviations from one's normal level of (emotional) functioning or homeostasis, and adjusting to those stressful circumstances may incur costs (e.g., psychological and physiological, Lazarus, 1993). Particularly stressful contexts may pose demands that exceed older adults' capacity and resources for adjustment and are related to more negative emotional experiences (Charles & Piazza, 2024; Wrzus et al., 2013). Being aware of age-related losses might even exacerbate this detrimental association between stressful contexts and negative emotions in late adulthood. Age-related losses could act as stress-diathesis and lead to an increased vulnerability to stressful events (Bellingtier et al., 2017). Notably, age-related losses can already occur during midlife and become more frequent during later life (Riediger et al., 2014; Sabatini et al., 2021). Thus, in stressful contexts and when age-related losses are salient, age differences in negative emotions could be reversed, resulting in less favorable outcomes for older adults.

Concerning everyday positive emotions, older adults are assumed to thrive emotionally in pleasant or uplifting contexts and when age-related gains are salient (Carstensen, 2021; Charles & Piazza, 2024). Due to motivational shifts linked to an increasingly limited future lifetime, older adults aim to increase positive emotions and, thus, should prefer to engage with positive situations and savor them more (Growney et al., 2025). Noticing or creating more opportunities for positive experiences may enhance well-being, and emotional benefits of uplifts should be larger in late adulthood (Chen et al., 2022; Klaiber et al., 2021). Being aware of age-related gains might exacerbate the positive relation between uplifts and positive emotions in late adulthood. Perceiving age-related gains in terms of personal resources (e.g., cognitive, psychological, or social) could support savoring attempts and more generally engaging in positive thinking, which in turn, could result in maximizing and prolonging positive experiences related to uplifting events

(Chen et al., 2022; Growney et al., 2025). Perceiving age-related gains may be especially important for emotional experience during late adulthood, as gains generally become increasingly restricted with increasing age (Sabatini et al., 2021). Thus, age-related improvements in positive emotional experience could be expected in particularly pleasant contexts and when age-related gains are salient.

Studies that investigated either daily events and/or age-related gains and losses offer some support for the proposed contextual relations and also point to potential age moderations. Concerning negative emotions, Blaxton and colleagues (2023) showed that on particularly stressful days (i.e., those with an above-average number of stressors) older adults reported higher negative affect than younger adults. Wrzus and colleagues (2013) showed that older adults reported more negative affect when stressors affected multiple life domains compared to younger adults. No age differences emerged for circumscribed stressors. Concerning the relation between stressors, age-related losses, and negative affect, in a sample of middle-aged and older adults, Wilton-Harding and colleagues (2022) showed that higher perceived losses than usual exacerbated the effect of stressful contexts on negative affect. Whether this combination of particularly stressful contexts and age-related losses was related to higher negative affect in old compared to middle-aged adults, however, was not examined. Concerning positive emotions, studies that have investigated the association between uplifts and positive affect indicate no age differences (Chen et al., 2022; Klaiber et al., 2021; Wirth et al., 2023). No study has investigated the role of gains, or the combination of uplifts and gains, or whether this varies by age.

Taken together, some emotional aging frameworks (Charles & Piazza, 2024; Wrzus et al., 2013) propose that age differences in everyday emotions are related to contextual and person-specific characteristics. Both the association between stressors, age-related losses, and negative affect and the association between uplifts, age-related gains, and positive affect should be more

pronounced in late adulthood. While current research offers partial support, additional research is needed to uncover the relations between daily events, perceived age-related changes, and emotional experience in late adulthood.

Present Study

Building on the assumption of complexity and context-dependency of late-life emotional experiences (Charles & Piazza, 2024), we tested age-differential relations between daily events, perceived losses and gains, as well as everyday emotional experience. Similar to previous studies (Wilton-Harding et al., 2022), we focused on middle-aged and older adults as age-related gains and losses are especially relevant in these life phases (Diehl & Wahl, 2024).

Following ideas that older adults experience more negative emotions in particularly stressful contexts and when age-related losses are salient (Charles & Piazza, 2024; Wrzus et al., 2013), we expected that on days with more stressors and more age-related losses than usual, our oldest participants report higher negative affect than middle-aged and young-old participants. Following ideas that older compared to middle-aged adults are more hedonically motivated and benefit emotionally more from uplifts when age-related gains are salient (Carstensen, 2021; Charles & Piazza, 2024), we expected that on days with more uplifts than usual, our oldest participants report higher positive affect, particularly when they also experience more age-related gains. However, given previous results (Chen et al., 2022; Klaiber et al., 2021; Wirth et al., 2023), age may not moderate the relation between uplifts and positive affect.

Method

Participants

We combined data from two German-speaking samples of a larger international diary study. Samples were collected about one year apart (January-April 2023 and February-June 2024, respectively). The first sample included 69 adults between 52 to 75 years of age (M = 62.72, SD

= 5.57; 58.0% female). The second sample included 199 adults between the ages of 50 to 91 years (M = 65.08, SD = 8.06; 65.8% female). Demographic information for both samples can be found in Table 1. We combined samples to follow simulation-informed recommendations of Nezlek (2020): For diary studies interested in cross-level interactions, data assessment should encompass 14 days and at least 125 participants. This was also done to address known problems of small sample sizes (Stawski et al., 2019). Compliance was high (93.2%, Min = 57.1%, Max =100%), and participants provided 3,497 diary entries.

Participants were recruited through personal contacts or social media. After providing written informed consent, participants completed a baseline questionnaire including demographic information. Following completion of the baseline questionnaire, participants received questionnaires on 14 consecutive days, including the day-level variables (AARC, uplifts and stressors, and positive and negative affect). Participants received monetary compensation. Ethical approval was granted by the Ethics Review Panel at the University of Luxembourg (ERP-22-086-DACE) and at the Friedrich-Schiller-University Jena (project title “Expectations for active ageing”; FSV 22/018).

Measures

A complete list of items can be found at https://osf.io/peqf2?view_only=e4f6712fbb4a4591aaac5ded1d2883ce.

Occurrence of Daily Stressors and Uplifts

Participants indicated for each of 7 stressors, whether it had occurred (“Please tell us about stressful experiences that may have happened to you in the past 24 hours"). Stressors were taken from previous research (Neupert et al., 2006): a) having an argument, b) avoiding an argument, c) stressful event at the workplace/ volunteer setting, and d) stressful event at home, d) stressful

event happening to friend or relative, e) a health stressor, f) anything else considered stressful. Responses were summed for each day, thus, scores ranged from 0 to 7.

Participants indicated whether they had experienced one or more of 10 uplifts in the past 24 hours: a) relating well with spouse, b) relating well with friend, c) completing a task, d) feeling healthy, e) getting enough sleep, f) eating out, g) meeting responsibilities, h) visiting, phoning, or writing someone, i) spending time with family, j) a home that pleases you. Participants were instructed that uplifts are events that make them feel good. The 10 uplifts selected were used in previous research (Early et al., 2024) and include those most frequently mentioned in the original study by Kanner and colleagues (1981). For each uplift, participants indicated whether it had occurred or not, and we computed a sum score of uplift experience, ranging from 0 to 10.

Participants reported at least one stressor on 45.5% of measurement occasions and at least one uplift on 95.3% of the occasions.

Daily age-related gains and losses

AARC facets were assessed using 20 items from previous research (Neupert & Bellingtier, 2017). All items started with the phrase "With my awareness of aging in the past 24 hours, I realize that…" and were rated on a 5-point scale from 1 = "not at all" to 5 = "very much". An example item for gains was "…I appreciate relationships and people much more." and for losses, "…I am slower in my thinking." Gain and loss items covered the domains of cognitive and physical functioning, social and emotional functioning, and lifestyle. An indicator of daily gains was computed by aggregating responses across 10 items and 10 items for daily losses. Higher aggregated values indicate higher gains and losses. McDonald's omega was calculated using omegaSEM (Geldhof et al., 2014) in *R* (R Core Team, 2025) and indicated good reliability for the gains scale $\omega = .752$ on the within-person and $\omega = .949$ on the between-person level. Reliability for the loss scale was $\omega = .683$ on the within-person and $\omega = .935$ between-person level.

Intraclass correlations (ICC) indicated that 85.5% of the variation in age-related gains and 82.7% of variation in age-related losses was due to between-person differences.

Daily Positive and Negative Affect

Daily negative and positive affect were measured using six items used in previous research (Early et al., 2024). Participants rated how "cheerful", "in good spirits", "extremely happy", "calm and peaceful", "satisfied", "full of life", "depressed that nothing could cheer them up", "hopeless", "restless and fidgety", "everything was an effort", "worthless", and "nervous" they had felt in the past 24 hours on a 5-point Likert scale ranging from 1 ("none of the time") to 5 ("all of the time"). The positive affect scale had good within-person (ω = .806) and between-person (ω = .872) reliability. Reliability for the negative affect scale was ω = .683 on the within-person and ω = .886 between-person level. ICCs indicated that 63.4% of the variation in positive affect and 63.0% of the variation in negative affect were due to between-person differences.

Analytic Plan

Using multilevel modeling (MLM), we predicted negative affect by stressor occurrence, age-related losses, age, as well as their interaction. In a second model, we predicted positive affect by uplift occurrence, gains, age, as well as their interaction. To follow suggestions by Hoffman (2015), we decomposed the variance of our Level-1 predictors into within- and between-person variation and included between-person effects into our model. The focus of our research, however, is on the within-person relations, so effects on the between-person level are reported for completeness only. We also ran models including retirement status, education, sex, and subjective health as covariates. As results remained unchanged, we report models without covariates.

MLM analyses were carried out with Level-1 predictors centered around each participant's mean and Level-2 predictors centered around the sample mean (Enders & Tofighi, 2007). The

models included random intercepts for participants[1]. Analyses were conducted using *R* version 4.5.1 (R Core Team, 2025), the lmerTest (Kuznetsova et al., 2017), interactions (Long, 2019), and ggeffects (Lüdecke, 2018) packages. We were most interested in potential age differences in the association between daily events and age-related gains and losses. Thus, follow-up analyses of interactions including age were tested at $M_{age} - 1\ SD_{age}$ (56.99 years), mean age (64.60 years), and $M_{age} + 1\ SD_{age}$ (72.21 years). For follow-up analyses, *p*-values were adjusted for multiple comparisons. Model equations can be found in Appendix A. We ran the analyses separately for each sample to see whether results replicated (Appendix B, Table B1 & B2). Based on theoretical ideas (Charles & Piazza, 2024; Wrzus et al., 2013), we were most interested in the 3-way interaction between stressors × losses × age and uplifts × gains × age but also ran models including all context predictors (e.g., predicting negative affect by uplifts, Appendix B, Table B3). In these models, original results regarding the 3-way interactions remained unchanged.

Results

Descriptive Statistics and Bivariate Relations

As displayed in Table 2, participants reported medium positive and low negative affect, few stressors, many uplifts, moderate AARC gains, and few AARC losses. Within- and between-person correlations can also be found in Table 2. On the within-person level, higher negative affect was significantly related to less positive affect, higher age-related losses, more stressors, and fewer uplifts. Higher positive affect was related to lower age-related losses, higher age-related gains, fewer stressors, and more uplifts. On the between-person level, higher negative affect was related to lower positive affect, higher age-related losses, and more stressors. Higher positive affect was related to lower age-related losses, more age-related gains, fewer stressors, and more uplifts. Age was only significantly related to stressors; older adults reported fewer stressors.

Predicting Negative Affect

For negative affect (Table 3, Model 1), there were significant main effects of stressor occurrence on the within- and between-person level. On days with above-average stressors, individuals reported higher negative affect, estimate = 0.083, *SE* = 0.005, $p < .001$. Individuals who generally reported higher stressor occurrence reported higher negative affect, estimate = 0.091, *SE* = 0.028, $p = .001$. There was a main effect of losses on both levels. On days with above-average losses, individuals reported higher negative affect, estimate = 0.274, *SE* = 0.019, $p < .001$. Individuals who generally reported more losses reported higher negative affect, estimate = 0.326, *SE* = 0.036, $p < .001$. Age was not related to negative affect. There was a significant interaction between stressors and age, but only on the within-person level, estimate = 0.002, *SE* = 0.001, $p = .019$. Follow-up analyses indicated no significant differences in stressor slopes at the tested ages, all comparisons *p*s > .056.

The effect of losses was also qualified by an age interaction, on the within- and between-person levels. Days with more losses were related to more negative affect and this relation was most pronounced in participants with below-average age (M_{age} -1 SD_{age}, 52 years), estimate = 0.333, *SE* = 0.026, $p < .001$, compared to participants with average age (65 years), estimate = 0.273, *SE* = 0.019, $p < .001$ and above-average age (M_{age} +1 SD_{age}, 72 years), estimate = 0.214, *SE* = 0.025, $p < .001$. The relation was also more pronounced for participants with average age, compared to participants with above-average age, all comparisons *p*s < .002. On the between-person level, follow-up analyses indicated no significant differences in loss slopes at the tested ages, all comparisons *p*s > .106.

The stressor × loss interaction was significant on the within- and between-person levels. On the within-person level, the positive relation between stressors and negative affect was more pronounced on days with above-average losses, estimate = 0.112, *SE* = 0.007, $p < .001$, compared

to days with average loss, estimate = 0.083, *SE* = 0.005, $p < .001$, or below-average loss, estimate = 0.053, *SE* = 0.008, $p < .001$. The relation was also more pronounced on days with average loss compared to days with below-average loss, all comparisons *p*s < .001. On the between-person level, the relation between stressors and negative affect was more pronounced for individuals who reported above-average losses, estimate = 0.171, *SE* = 0.029, $p < .001$, compared to individuals reporting average losses, estimate = 0.091, *SE* = 0.028, $p = .001$, and those reporting below-average losses, estimate = 0.011, *SE* = 0.042, $p = .787$. The relation was also more pronounced for individuals with average compared to below-average losses, all comparisons *p*s = .001.

As predicted, there was a significant three-way interaction between stressors, losses, and age on the within-person level (Figure 1A), estimate = 0.008, *SE* = 0.003, $p = .003$. Follow-up analyses indicated that age did not affect the relation between stressors and negative affect on days with below-average losses, for all comparisons *p*s > .990, or on days with average losses, for all comparisons *p*s > .680. Age differences only emerged on days with above-average losses. On these days, the oldest participants reported more negative affect related to stressors, estimate = 0.139, *SE* = 0.011, $p < .001$, compared to participants with below-average age, estimate = 0.050, *SE* = 0.011, $p < .001$, and with average age, estimate = 0.095, *SE* = 0.008, $p < .001$. Participants with average age reported more negative affect related to stressors compared to participants with below-average age, all comparisons *p*s < .008. As can be seen in Table B1 (Appendix B), this three-way interaction was consistent across subsamples. The 3-way interaction was not significant on the between-person level.

Predicting Positive Affect

For positive affect (Table 3, Model 2), there was a main effect of uplifts on the within- and between-person levels. On days with above-average uplift occurrence, individuals reported more

positive affect, estimate = 0.089, *SE* = 0.006, $p < .001$. Individuals who reported more uplifts reported higher positive affect, estimate = 0.118, *SE* = 0.019, $p < .001$. There was a main effect of gains on both levels. On days with more gains, individuals reported more positive affect, estimate = 0.198, *SE* = 0.021, $p < .001$, and individuals with more gains reported more positive affect, estimate = 0.094, *SE* = 0.046, $p = .039$. Age was not related to positive affect.

The effect of gains was moderated by age, but only on the within-person level, estimate = -0.008, *SE* = 0.003, $p = .003$. Follow-up analyses showed that the within-person relation between gains and positive affect was most pronounced in participants with below-average age, estimate = 0.262, *SE* = 0.031, $p < .001$, compared to participants with average age, estimate = 0.198, *SE* = 0.021, $p < .001$, and those with above-average age, estimate = 0.135, *SE* = 0.288, $p < .001$, all comparisons *p*s < .009. The relation between uplifts and positive affect was not moderated by age.

There were significant uplift × gains interactions on the within- and between-person levels. The within-person relation between uplifts and positive affect was most pronounced on days with below-average gains, estimate = 0.116, *SE* = 0.008, $p < .001$, compared to days with average gains, estimate = 0.089, *SE* = 0.006, $p < .001$, and above-average gains, estimate = 0.061, *SE* = 0.008, $p < .001$. The relation was also more pronounced on days with average gains compared to days with above-average gains, all comparisons *p*s < .001. Individuals who reported more gains had a stronger relation between uplifts and positive affect, estimate = 0.182, *SE* = 0.028, $p < .001$, compared to participants with average gains, estimate = 0.118, *SE* = 0.019, $p < .001$, and those with below average gains, estimate = 0.053, *SE* = 0.017, $p = .002$. The relation was also more pronounced for individuals with average compared to below average gains, all comparisons *p*s < .001.

There was also a three-way interaction between uplifts, gains, and age, but only on the within-person level, estimate = 0.005, *SE* = 0.002, *p* = .047. For participants with below-average and average age, simple slopes showed the same pattern as the gains × uplift interaction, with the relation being most pronounced on days with fewer gains (below-average age: estimate = 0.134, *SE* = 0.012, *p* < .001; average age: estimate = 0.116, *SE* = 0.008, *p* < .001) compared to days with average gains (below average age: estimate = 0.094, *SE* = 0.008, *p* < .001; average age: estimate = 0.089, *SE* = 0.006, *p* < .001) and above-average gains (below average age: estimate = 0.054, *SE* = 0.012, *p* < .001; average age: estimate = 0.062, *SE* = 0.008, *p* < .001), all comparisons *p* < .001. For participants with above-average age, this result pattern was not found, all comparisons *p* < .255. However, the relation between uplifts and gains did not significantly differ for the tested ages. The three-way interaction was not found in Sample 1 (Table B2, Appendix B).

Discussion

We investigated whether age-related gains and losses moderate the relation between daily events and emotional experience in middle-aged and older adults. Our results showed a complex pattern indicating that understanding how individuals manage and maintain their emotional well-being in later life requires the joint consideration of contextual and person-specific characteristics.

Predicting Negative Affect

Age was related to fewer daily stressors, unrelated to negative affect, but moderated the relation between stressor occurrence and negative affect. However, follow-up analyses showed that these age differences in slopes were small and did not reach significance for the tested ages. The age × stressor interaction was not significant in Sample 1, which was less than half the size of Sample 2. These small sample sizes should be taken into consideration when interpreting results of Sample 1 and the consistency across samples. Small sample sizes are a known problem

in research studying age differences in everyday emotions (Röcke et al., 2009; Stawski et al., 2019)

On days with above-average stressor occurrence and losses, participants reported higher negative affect. As predicted, this association was most pronounced in our oldest participants. The combination of stressors and age-related losses exemplifies a context of high emotional vulnerability in late adulthood. Generally, dealing with stressful situations requires sufficient resources. If one perceives that those are not available, one might have lower confidence in regulation attempts and, thus, might not engage in emotion regulation (Neupert & Bellingtier, 2017; Wilton-Harding et al., 2022). Our results also offer support for the idea that age-related losses can act as a stressor-diathesis (Neupert & Bellingtier, 2017). As participants reported on stressors and losses at the end of each day, it is also possible that experiencing stressful situations and engaging with them depleted resources and, thus, participants indicated above-average age-related losses.

The association between stressors, losses, and negative affect was particularly pronounced in our oldest participants. This is in line with ideas that age-associated advantages in emotional experience are absent or reversed when age-related vulnerabilities become apparent or when older adults lack resources to deal with stress (Charles & Piazza, 2024; Wrzus et al., 2013). Our oldest participants may have appraised losses more readily as hindrances to dealing with stressors, leading to increased negative affect. However, this interpretation would contradict findings that older adults feel more confident in dealing with stressful situations (Isaacowitz, 2022). Even if our oldest participants tried to deal with stressors, unassessed age-related vulnerabilities such as decreased physiological flexibility may have impaired these attempts (Charles & Piazza, 2024; Wrzus et al., 2013). It will be important to identify whether the association between stressors, losses, and negative affect might be explained by age-related

differences in objective indicators of functioning. This combined consideration of subjective and objective vulnerabilities could help to identify individuals who are at risk for deterioration of emotional experience in late life (Charles & Piazza, 2024).

Predicting Positive Affect

Replicating previous studies (Chen et al., 2022; Klaiber et al., 2021; Wirth et al., 2023), our results regarding positive affect indicated few age differences. Uplifts and positive affect were unrelated to age, and overall, age did not moderate the relation between uplifts and positive affect. The interaction between uplifts and gains revealed an interesting pattern that differed for the within- and between-person level. Positive affect related to uplifts was higher on days with few age-related gains. In contrast, individuals who reported above-average uplifts and above-average gains reported higher positive affect. One explanation could be that on days with fewer gains, individuals may try to create uplifts. The positive affect elicited by uplifts might, in turn, facilitate resource accumulation, potentially resulting in the perception of age-related gains (Klaiber et al., 2021; Zautra et al., 2005). However, this interpretation is not consistent with the positive within-person correlation between uplifts and gains in our study. An alternative interpretation is that on days with fewer gains, individuals may have paid more attention to or savored occurring uplifts more.

Although we found the predicted significant interaction between uplifts, gains, and age on the within-person level, the interpretation of this interaction is complex. Beneficial effects of uplifts at lower levels of age-related gains were not found for our oldest participants. However, age differences in this relation were negligible in absolute terms. Our results seem to contradict ideas that older adults should report more positive affect related to uplifts because they savor positive situations more (Charles & Piazza, 2024; Chen et al., 2022; Growney et al., 2025). Previous studies indicate that savoring might not moderate the relation between uplifts and

positive affect (Peleg et al., 2025). Unfortunately, we did not assess savoring tendencies or everyday savoring and, thus, cannot elucidate the role of savoring in our participants' emotional experience.

More generally, the question arises whether experiencing high positive affect related to uplifts is desirable in late adulthood. Pronounced changes in positive affect may signal a vulnerability of the emotional system, potentially impeding health (Ong & Ram, 2017). Health limitations already present in late adulthood may accentuate this vulnerability. As theoretical ideas and empirical research often focus on emotional experience related to stressors (Chen et al., 2022; Klaiber et al., 2021), it would be important to specify and investigate when and why age-related differences in positive affect related to uplift may occur and which (long-term) effects they might have (Sin & Almeida, 2018).

Theoretical Implications

Our results indicate that age differences in emotional experience are multidimensional, multidirectional, and context-dependent. Similar to previous work (Wilton-Harding et al., 2022), we incorporated individuals' perceptions of their aging as moderators of emotional experience in midlife and late adulthood. These self-perceptions of aging, including AARC, set the background that shapes expectations and interpretations of experiences individuals have as they grow older (Kornadt et al., 2020; Rothermund et al., 2021). For example, for our middle-aged participants, who should be less familiar with age-related losses, experiencing age-related losses seemed more detrimental to their emotional experience. Generally, self-perceptions of aging are important when understanding whether and how developmental opportunity structures are perceived and used in later life (Diehl & Wahl, 2024; Rothermund et al., 2021). Integrating self-perceptions of aging into emotional aging theories could help to qualify predictions concerning conditions that pose a risk to emotional well-being.

Limitations

Our study elucidates how daily event processes and aging perceptions represent a complex constellation of risk factors related to emotional experience in midlife and late adulthood. However, some limitations deserve note. The limited age range of our sample, which did not include younger adults and only few old-old individuals, could be one explanation why we did not find lower negative affect in older adults as indicated by previous research (Wirth & Rothermund, in press). Including more old-old individuals and, thus, studying emotional experience and self-perceptions of aging when the human system reaches its highest level of vulnerability could help to refine boundary conditions of age-related improvement in emotional well-being.

We also sampled high-arousal affect that might not be representative of emotions that middle-aged and older adults experience frequently (Mak & Schneider, 2022). Currently, the role of arousal for age differences in everyday emotions is unclear (cf. Riediger & Rauers, 2024). Additionally, the AARC items had high between-person stability (for similar results, see O'Brien & Smyth, 2023). Using other indicators of self-perception of aging with higher within-person variability might increase the likelihood of finding strong(er) relations with daily events and emotional experience.

The assessment of daily events potentially affects the age differences in event-related emotional experience. While many studies use a dichotomous conceptualization (no event vs. at least one event, e.g., Stawski et al., 2019), we accounted for event occurrence in different domains. Although this provides a more comprehensive assessment of events, results might be different if we had assessed how many events occurred within each domain. Additionally, we did not assess when participants experienced daily events and can, thus, not account for effects of

time since events. Event recency, however, might be an important factor for detecting age differences in emotional experience (Scott et al., 2017).

The nature of our data remains correlative, limiting our ability to determine causal relations between constructs of interest. Experimental and intervention studies varying events that individuals are exposed to, as well as how individuals perceive their aging, could elucidate cause-and-effect relations (cf. Wilton-Harding et al., 2022).

Conclusion

Although emotional aging research is dominated by ideas of age-related improvements in emotional experience, empirical findings are mixed, and age differences might be absent or reversed in specific contexts. Considering potential boundary conditions, we tested whether the relation between daily events and emotional experience is moderated by perceived age-related gains and losses in a sample of middle-aged and older adults. Our results indicate that age differences in emotional experience are multifaceted and neither exclusively deficit- nor potential-oriented. Stressor-related increases in negative affect were most pronounced on days with above-average losses, and this effect was stronger for our oldest participants. Uplift-related increases in positive affect were generally higher on days with below-average gains. Integrating self-perceptions of aging into emotional aging theories could help to qualify predictions concerning conditions that pose risks to emotional well-being.

Author Notes

[1] Models containing random slopes for each day did not converge.

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Table 1

Demographic information for Samples 1 and 2.

Demographics	Sample 1 (N = 69)	Sample 2 (N = 199)	difference
Mean age (*SD*)	62.72 (5.57)	65.08 (8.06)	$t(171.63) = -2.97$, $p = .008$
Gender (%)			$\chi(1) = 1.051$, $p = .305$
female	40 (57.9%)	45 (65.8%)	
male	29 (42.1%)	26 (34.2%)	
Primary education (%)			$\chi(6) = 16.717$, $p = .010$
elementary or middle school	2 (2.9%)	1 (0.5%)	
some high school	12 (17.4%)	28 (14.1%)	
completed high school	15 (21.7%)	15 (7.5%)	
College degree	9 (13.1%)	42 (21.1%)	
university degree	23 (33.3%)	83 (41.7%)	
doctorate	4 (5.8%)	22 (11.1%)	
other	4 (5.8%)	8 (4.0%)	
Retired (%)	36 (52.2%)	128 (64.3%)	$\chi(1) = 2.693$, $p = .101$
Relationship status (%)			$\chi(4) = 8.162$, $p = .086$
single	3 (4.3%)	10 (5.0%)	
married	56 (81.2%)	130 (65.4%)	
separated/divorced	3 (4.3%)	30 (15.1%)	
widowed	2 (2.9%)	14 (7.0%)	
with partner	5 (7.3%)	15 (7.5%)	
Living arrangement (%)			$\chi(2) = 10.008$, $p = .006$
alone	9 (13.0%)	47 (23.6%)	
one other person	43 (62.3%)	131 (65.8%)	
more than one other person	17 (24.7%)	21 (10.6%)	
Residence (%)			$\chi(2) = 1.052$, $p = .591$
own household	69 (100%)	196 (98.5%)	
assisted living	0 (0.0%)	1 (0.5%)	

Independent living in group home	0 (0.0%)	2 (1.0%)	
number of children (*SD*)	1.45 (1.08)	1.84 (1.08)	$t(118.43) = -2.617$, $p = .009$
number of grandchildren (*SD*)	0.84 (1.53)	1.61 (2.05)	$t(157.66) = -3.294$, $p = .001$
financial situation (*SD*)[a]	3.75 (0.79)	3.76 (0.78)	$t(116.47) = -0.092$, $p = .927$
subjective health (*SD*)[b]	3.48 (0.76)	3.68 (0.86)	$t(132.80) = -1.410$, $p = .161$

Note. [a]Financial situation was assessed with one item "How would you describe your financial situation?", on a response scale of 1 (not good at all) to 5 (excellent). [b]Subjective health was assessed by a single item, "How would you describe your health?" with a response scale from 1 (not good at all) to 5 (excellent).

Table 2

Within- and Between-person correlations for main study variables.

	M (*SD*)	negative affect	positive affect	AARC losses	AARC gains	stressors	uplifts
negative affect	1.309 (0.475)	-	-.437***	.295***	-.063	.297***	-.169***
positive affect	3.442 (0.715)	-.566***	-	-.174***	.188***	-.297	.280***
AARC losses	1.856 (0.610)	.577***	-.433***	-	.296***	.135***	-.089**
AARC gains	3.108 (0.897)	.013	.263***	.350***	-	-.021	.142***
stressors	0.839 (1.178)	.434***	-.287***	.361***	.206**	-	-.122***
uplifts	6.482 (2.506)	-.072	.337***	.122	.556***	.173*	-
age	64.474 (7.559)	-.057	.003	.099	.020	-.188**	.015

Note. Values above the diagonal indicate within-person relations, and values below the diagonal indicate between-person relations. *p*-values were adjusted for multiple comparisons using the method proposed by Holm (1979). *** $p < .001$, ** $p < .01$, * $p < .05$

Table 3

Multilevel Model estimates for predicting negative and positive affect

Predictors	Model 1 (Negative Affect)				Model 2 (Positive Affect)			
	Est.	*SE*	*p*	*effect size*	*Est.*	*SE*	*p*	*effect size*
Fixed effects								
Intercept	1.332	0.021	<.001		3.364	0.037	<.001	
Day	-0.005	0.001	<.001	0.003	0.001	0.002	.406	0.000
Chronological age	-0.005	0.003	.064	0.001	-0.001	0.005	.792	0.000
$Uplifts_{wp}$					0.089	0.006	<.001	0.027
$Uplifts_{bp}$					0.118	0.019	<.001	0.090
$Stressors_{wp}$	0.083	0.005	<.001	0.033				
$Stressors_{bp}$	0.091	0.028	.001	0.024				
AARC $gains_{wp}$					0.198	0.021	<.001	0.010
AARC $gains_{bp}$					0.094	0.046	.039	0.011
AARC $losses_{wp}$	0.274	0.019	<.001	0.028				
AARC $losses_{bp}$	0.326	0.036	<.001	0.172				
$Stressors_{wp}$ × Age	0.002	0.001	.019	0.001				
$Stressors_{bp}$ × Age	0.002	0.004	.539	0.001				
$Stressors_{wp}$ × AARC $losses_{wp}$	0.119	0.021	<.001	0.005				
$Stressors_{bp}$ × AARC $losses_{bp}$	0.143	0.040	<.001	0.028				
AARC $losses_{wp}$ × Age	-0.008	0.002	<.001	0.002				
AARC $losses_{bp}$ × Age	0.008	0.004	.036	0.010				
AARC $losses_{wp}$ × $Stressors_{wp}$ ×Age	0.008	0.003	.003	0.001				
AARC $losses_{bp}$ × $Stressors_{bp}$ ×Age	0.001	0.005	.783	0.000				
AARC $gains_{wp}$ × Age					-0.008	0.003	.003	0.001
AARC $gains_{bp}$ × Age					0.009	0.007	.204	0.004
$Uplifts_{wp}$ × Age					-0.001	0.001	.383	0.000
$Uplifts_{bp}$ × Age					0.001	0.003	.814	0.000

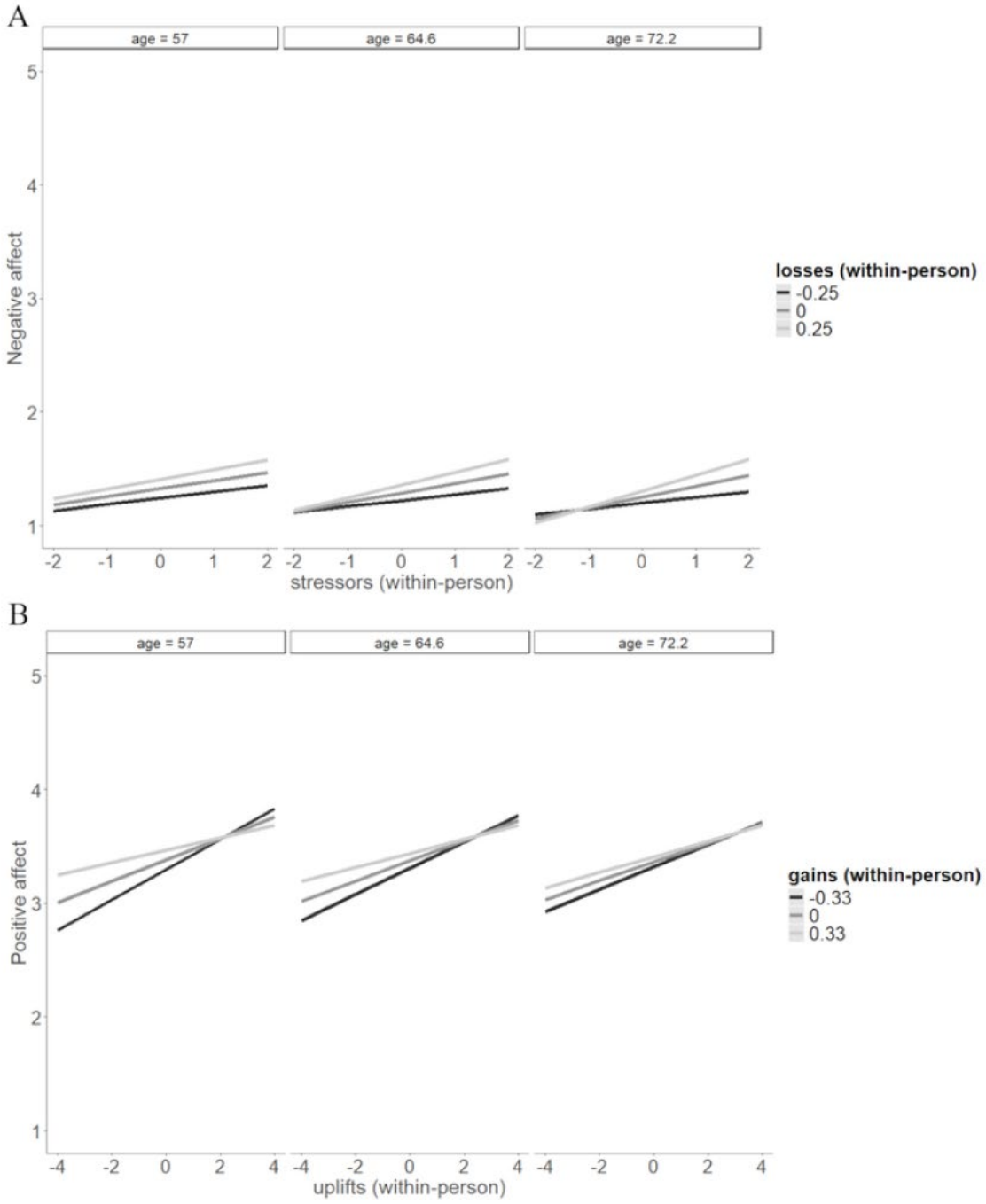
$Uplifts_{wp}$ × $AARC\ gains_{wp}$			-0.081	0.017	<.001	0.003
$Uplifts_{bp}$ × $AARC\ gains_{bp}$			0.077	0.016	<.001	0.068
$Uplifts_{wp}$ × $AARC\ gains_{wp}$ × Age			0.005	0.002	.047	0.001
$Uplifts_{bp}$ × $AARC\ gains_{bp}$ × Age			0.002	0.004	.640	0.001
Random Effects						
Residual variance σ^2	0.069	0.169				
random intercept var. participant	0.084	0.261				
ICC	.546	.607				
N	268	268				
Observations	3497	3497				
Marginal R^2	0.336	0.173				
AIC	1517.428	4668.055				

Note. Effect size is a decomposition of model marginal R^2 for each fixed effect as calculated using R package multilevelTools and based on (Johnson, 2014). $_{wp}$ =within-person, $_{bp}$ = between-person, AARC = Awareness of age-related Change, ICC = Intraclass Correlations, AIC = Akaike Information criterion.

Figure Captions

Figure 1

(A) Age-differential relations between stressors and losses for negative affect and (B) Age-differential relations between uplifts and gains for positive affect.



Appendix A

Equations for MLMs testing effects of daily events, AARC, and chronological age on affective experience

$$\text{Negative Affect}_{ij} = \beta_0 + \beta_1(\text{Day}_{ij}) + \beta_2(\text{Stressors}_{ij}) + \beta_3(\text{Stressors}_i) + \beta_4(\text{Losses}_{ij}) + \beta_5(\text{Losses}_i) + \beta_6(\text{Age}_i) + \beta_7(\text{Stressors}_{ij} \times \text{Age}_i) + \beta_8(\text{Stressors}_i \times \text{Age}_i) + \beta_9(\text{Losses}_{ij} \times \text{Age}_i) + \beta_{10}(\text{Losses}_i \times \text{Age}_i) + \beta_{11}(\text{Stressors}_{ij} \times \text{Losses}_{ij}) + \beta_{12}(\text{Stressors}_i \times \text{Losses}_i) + \beta_{13}(\text{Stressors}_{ij} \times \text{Losses}_{ij} \times \text{Age}_i) + \beta_{14}(\text{Stressors}_i \times \text{Losses}_i \times \text{Age}_i) + u_{0i}(\text{Subject}_i) + r_{ij}$$

$$\text{Positive Affect}_{ij} = \beta_0 + \beta_1(\text{Day}_{ij}) + \beta_2(\text{Uplifts}_{ij}) + \beta_3(\text{Uplifts}_i) + \beta_4(\text{Gains}_{ij}) + \beta_5(\text{Gains}_i) + \beta_6(\text{Age}_i) + \beta_7(\text{Uplifts}_{ij} \times \text{Age}_i) + \beta_8(\text{Uplifts}_i \times \text{Age}_i) + \beta_9(\text{Gains}_{ij} \times \text{Age}_i) + \beta_{10}(\text{Gains}_i \times \text{Age}_i) + \beta_{11}(\text{Uplifts}_{ij} \times \text{Gains}_{ij}) + \beta_{12}(\text{Uplifts}_i \times \text{Gains}_i) + \beta_{13}(\text{Uplifts}_{ij} \times \text{Gains}_{ij} \times \text{Age}_i) + \beta_{14}(\text{Uplifts}_i \times \text{Gains}_i \times \text{Age}_i) + u_{0i}(\text{Subject}_i) + r_{ij}$$

Appendix B

Table B1

MLM estimates for predicting negative affect separately for Samples 1 and 2.

Predictors	Model 1 (Negative Affect – Sample 1)				Model 2 (Negative Affect – Sample 2)			
	Est.	*SE*	*p*	*effect size*	*Est.*	*SE*	*p*	*effect size*
Fixed effects								
Intercept	1.316	0.051	<.001		1.307	0.024	<.001	
Day	-0.005	0.003	.042	0.004	-0.005	0.001	<.001	0.003
Chronological age	-0.015	0.007	.020	0.041	-0.002	0.003	.449	0.002
$Stressors_{wp}$	0.117	0.016	<.001	0.038	0.076	0.006	<.001	0.031
$Stressors_{bp}$	0.087	0.084	.303	0.008	0.121	0.031	<.001	0.050
AARC $losses_{wp}$	0.246	0.045	<.001	0.020	0.269	0.021	<.001	0.027
AARC $losses_{bp}$	0.412	0.074	<.001	0.201	0.306	0.043	<.001	0.153
$Stressors_{wp}$ × Age	0.002	0.002	.293	0.001	0.002	0.001	.011	0.002
$Stressors_{bp}$ × Age	0.000	0.009	.971	0.000	0.004	0.004	.272	0.004
$Stressors_{wp}$ × AARC $losses_{wp}$	0.202	0.056	<.001	0.015	0.101	0.023	<.001	0.003
$Stressors_{bp}$ × AARC $losses_{bp}$	0.460	0.097	<.001	0.155	0.061	0.045	.187	0.004
AARC $losses_{wp}$ × Age	-0.014	0.007	.046	0.003	-0.007	0.002	.003	0.001
AARC $losses_{bp}$ × Age	0.011	0.011	.317	0.006	0.005	0.004	.259	0.004
$Stressors_{wp}$ × AARC $losses_{wp}$ × Age	0.021	0.009	.017	0.007	0.007	0.003	.016	0.001
$Stressors_{bp}$ × AARC $losses_{bp}$ × Age	0.040	0.016	.012	0.042	-0.006	0.005	.226	0.006
Random Effects								
Residual variance σ^2	0.085				0.065			
random intercept var. participant	0.064				0.082			
ICC	.431				.558			

N	69	199
Observations	822	2675
Marginal R^2	0.453	0.331
AIC	581.598	1001.698

Note. Effect size is a decomposition of model marginal R^2 for each fixed effect as calculated using R package multilevelTools and based on (Johnson, 2014). $_{wp}$ =within-person, $_{bp}$ = between-person, AARC = Awareness of age-related Change, ICC = Intraclass Correlations, AIC = Akaike Information criterion.

Table B2

MLM estimates for predicting positive affect separately for Samples 1 and 2.

Predictors	Model 3 (Positive Affect – Sample 1)				Model 4 (Positive Affect – Sample 2)			
	Est.	*SE*	*p*	*effect size*	*Est.*	*SE*	*p*	*effect size*
Fixed effects								
Intercept	3.396	0.096	<.001		3.363	0.040	<.001	
Day	-0.006	0.004	.120	0.001	0.004	0.002	.050	0.001
Chronological age	0.019	0.014	.176	0.020	-0.004	0.005	.406	0.002
$Uplifts_{wp}$	0.059	0.013	<.001	0.011	0.095	0.006	<.001	0.033
$Uplifts_{bp}$	-0.004	0.400	.917	0.000	0.187	0.023	<.001	0.214
AARC $gains_{wp}$	0.217	0.048	<.001	0.011	0.189	0.024	<.001	0.010
AARC $gains_{bp}$	0.243	0.110	.027	0.051	0.049	0.052	.346	0.003
AARC $gains_{wp}$ × Age	-0.008	0.010	.415	0.000	-0.008	0.003	.005	0.001
AARC $gains_{bp}$ × Age	0.038	0.021	.069	0.036	0.007	0.007	.366	0.003
$Uplifts_{wp}$ × Age	-0.012	0.013	.350	0.010	-0.000	0.003	.994	0.000
$Uplifts_{bp}$ × Age	-0.006	0.002	.009	0.003	0.000	0.001	.825	0.000
$Uplifts_{wp}$ × AARC $gains_{wp}$	-0.038	0.037	.303	0.001	-0.103	0.021	<.001	0.004
$Uplifts_{bp}$ × AARC $gains_{bp}$	0.033	0.032	.292	0.013	0.044	0.026	.091	0.009
$Uplifts_{wp}$ × AARC $gains_{wp}$ × Age	0.004	0.008	.629	0.001	0.006	0.003	.021	0.001
$Uplifts_{bp}$ × AARC $gains_{bp}$ × Age	-0.010	0.013	.416	0.006	0.004	0.004	.353	0.003
Random Effects								
Residual variance σ^2	0.210				0.156			
random intercept var. participant	0.292				0.223			
ICC	.582				.588			
N	69				199			

Observations	822	2675
Marginal R^2	0.130	0.255
AIC	1362.30	3355.444

Note. Effect size is a decomposition of model marginal R^2 for each fixed effect as calculated using R package multilevelTools and based on (Johnson, 2014). $_{wp}$ =within-person, $_{bp}$ = between-person, AARC = Awareness of age-related Change, ICC = Intraclass Correlations, AIC = Akaike Information criterion.

Table B3

MLM estimates for predicting negative affect including all context effects.

Predictors	Model 1 (Negative Affect)				Model 2 (Positive Affect)			
	Est.	*SE*	*p*	*effect size*	*Est.*	*SE*	*p*	*effect size*
Fixed effects								
Intercept	1.333	0.021	<.001		3.446	0.032	<.001	
Day	-0.006	0.001	<.001	0.004	-0.004	0.002	.011	0.001
Chronological age	-0.004	0.003	.084	0.007	-0.001	0.004	.850	0.000
$Uplifts_{wp}$	-0.023	0.004	<.001	0.005	0.069	0.006	<.001	0.021
$Uplifts_{bp}$	-0.006	0.010	.513	0.002	0.079	0.017	<.001	0.056
$Stressors_{wp}$	0.077	0.005	<.001	0.029	-0.116	0.008	<.001	0.031
$Stressors_{bp}$	0.112	0.028	<.001	0.038	-0.151	0.037	<.001	0.037
AARC $gains_{wp}$	-0.107	0.014	<.001	0.008	0.266	0.021	<.001	0.022
AARC $gains_{bp}$	-0.082	0.027	.002	0.020	0.234	0.040	<.001	0.074
AARC $losses_{wp}$	0.307	0.019	<.001	0.034	-0.321	0.029	<.001	0.017
AARC $losses_{bp}$	0.366	0.037	<.001	0.210	-0.477	0.056	<.001	0.159
$Stressors_{wp}$ × Age	0.002	0.001	.005	0.001				
$Stressors_{bp}$ × Age	0.003	0.004	.365	0.002				
$Stressors_{wp}$ × AARC $losses_{wp}$	0.112	0.021	<.001	0.004				
$Stressors_{bp}$ × AARC $losses_{bp}$	0.101	0.041	.014	0.011				
AARC $losses_{wp}$ × Age	-0.007	0.002	.001	0.001				
AARC $losses_{bp}$ × Age	0.007	0.004	.071	0.008				
AARC $losses_{wp}$ × $Stressors_{wp}$ ×Age	0.007	0.003	.014	0.001				
AARC $losses_{bp}$ × $Stressors_{bp}$ ×Age	-0.001	0.005	.805	0.001				
AARC $gains_{wp}$ × Age					-0.006	0.003	.017	0.001
AARC $gains_{bp}$ × Age					0.010	0.016	.095	0.006
$Uplifts_{wp}$ × Age					-0.000	0.001	.653	0.000
$Uplifts_{bp}$ × Age					0.000	0.003	.903	0.000

$Uplifts_{wp}$ × $AARC\ gains_{wp}$			-0.071	0.016	<.001	0.002
$Uplifts_{bp}$ × $AARC\ gains_{bp}$			0.029	0.014	.036	0.013
$Uplifts_{wp}$ × $AARC\ gains_{wp}$ × Age			0.005	0.002	.035	0.001
$Uplifts_{bp}$ × $AARC\ gains_{bp}$ × Age			0.001	0.003	.842	0.000
Random Effects						
Residual variance σ^2	0.066	0.151				
random intercept var. participant	0.795	0.177				
ICC	.541	.540				
N	268	268				
Observations	3497	3497				
Marginal R^2	0.369	0.372				
AIC	1424.766	4222.448				