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Another Year Older, Another Year Wiser? Emotion Regulation Strategy Selection and Flexibility Across Adulthood

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Abstract

Several influential theories posit that improvements in emotion regulation contribute to enhanced emotional well-being in older adulthood. However, surprisingly little is known about whether there are age differences in emotion regulation strategy use. We addressed this question by testing whether older adults report using typically adaptive strategies more often and regulate more flexibly than relatively younger adults. In a two-part study, 136 married couples (N = 272) aged 23-85 years completed individual difference measures of cognitive reappraisal and expressive suppression, and then nine daily reports of a broader range of emotion regulation strategies, now including situation selection, situation modification, and distraction. Older adults reported greater habitual use of suppression, but age did not predict situation selection, situation modification, distraction, or reappraisal. In terms of emotion regulation flexibility, a similar number of strategies were reported on a daily basis regardless of the regulator's age. Unexpectedly, relatively older adults were less variable in their self-reported daily use of each strategy and middle-aged adults were the least variable in their strategy repertoire across different days. These findings counter the common notion that older adults use typically adaptive strategies more than younger adults. Instead, they suggest older adults may be more consistent in their emotion regulation patterns across situations, potentially suggestive of less flexibility. Implications for aging, emotion regulation, and well-being are discussed.

Keywords

emotion regulation; aging; strategy selection; flexibility; emotional well-being

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"The longer I live the more beautiful life becomes." – Frank Lloyd Wright

Despite the declines in physical health and cognitive functioning that often accompany older adulthood, Wright's words appear to hold true. At least until very late in life (Teachman, 2006), emotional well-being improves with age (Birditt & Fingerman, 2003; Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Carstensen et al., 2011; Charles, Reynolds, & Gatz, 2001).Researchers have posited that one key mechanism that drives this change is a healthier emotion regulation pattern, which involves choosing typically adaptive strategies and deploying them effectively (e.g., Carstensen, Isaacowitz, & Charles, 1999; John & Gross, 2004; Sims, Hogan, Carstensen, 2015). Older adults report greater perceived emotion

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regulation ability (Gross et al., 1997; Phillips, Henry, Hosie, & Milne, 2006) and some experimental studies show that older adults are more effective in using certain strategies to modulate emotion (e.g., Shiota & Levenson, 2009).However, little research has tested whether older adults differ from younger adults in how they spontaneously regulate their emotions. This knowledge is critical for understanding whether emotion regulation contributes to age-related changes in emotional well-being. Existing research on aging and emotion regulation strategy selection has largely focused on the overall use of only a few strategies (e.g., reappraisal, suppression) and within age-restricted samples (e.g., younger vs. older adults). Thus, in the current paper, we examined how age predicts self-reported habitual and daily use of a broad range of strategies in a sample spanning from young adulthood through late old age. We also examined how age predicts flexibility of strategy use given that flexibility plays a key role in effective emotion regulation.

Emotion Regulation Strategy Use and Flexibility

Emotion regulation refers to the ways people manage how and when they experience and express their emotions (Gross, 1998). The process model of emotion regulation (Gross, 1998) posits that strategies are *antecedent-focused*, occurring before a full emotional response has been elicited, or *response-focused*, occurring after a full emotional response has been elicited. Common antecedent-focused strategies include situation selection, situation modification, distraction, and cognitive reappraisal, while a common response-focused strategy is expressive suppression. Situation selection involves entering or avoiding situations based on the emotions they are expected to elicit. Situation modification involves changing aspects of a situation to influence emotions. Distraction involves shifting attention away from emotionally salient aspects of a stimulus. Cognitive reappraisal involves changing the meaning of a stimulus. Expressive suppression involves inhibiting the behavioral expression of an emotion. As an example of how these strategies can be used, consider a social gathering. One could attend the gathering because they expect to have a good time (situation selection). If an argument takes place, they could tell a joke to ease the tension (situation modification), focus on how good the food is instead of thinking about the argument (distraction), perceive the arguing friend as having a bad day instead of being a rude person (reappraisal), or not express their anger towards the arguing friend (suppression).

Several studies have found that antecedent-focused strategies are often associated with greater emotional well-being, while response-focused strategies are often associated with lower emotional well-being (e.g., Brans, Koval, Verduyn, Lim, & Kuppens, 2013; Gross & John, 2003; Schirda, Valentine, Aldao, & Prakash, 2016; Webb, Miles, & Sheeran, 2012). Therefore, antecedent-focused strategies are typically considered adaptive, while response-focused strategies are typically considered maladaptive. Nonetheless, researchers have begun to move away from viewing strategies as inherently adaptive or maladaptive, and instead consider the benefits of *emotion regulation flexibility*, which involves adjusting one's strategy use to meet changing demands in the environment (Aldao, Sheppes, & Gross, 2015).

The situations people are in typically vary somewhat from day to day. Effective regulators vary their tactics to accommodate these fluctuations. Two important components of emotion regulation flexibility to consider are *categorical variability* and *temporal variability*. Categorical variability refers to the extent to which people use a broad range of strategies (Bonanno & Burton, 2013). For instance, within a given day, Person A might use distraction, suppression, and reappraisal, while Person B might only use suppression. Person A would have more categorical variability than Person B since they use a broader range of strategies. Temporal variability refers to the extent to which people vary in their emotion regulation over time (Aldao et al., 2015; Bonanno & Burton, 2013). For instance, Person A might use suppression a lot on some days and not at all on other days, while Person B might use suppression a lot on most days. Given that Person A fluctuates more in their suppression use, they would have greater temporal variability than Person B. It is possible to examine temporal variability not only for the level at which a strategy is used (e.g., temporal variability of suppression), but also at the breadth of strategies used (i.e., temporal variability of repertoire). For example, Person A might sometimes use several strategies and other times only rely on one strategy, whereas Person B might more consistently use several strategies. Person A would have greater temporal variability of their repertoire than Person B.

Greater categorical and temporal variability are thought to indicate greater emotion regulation flexibility (Bonanno & Burton, 2013). Consistent with the idea that emotion regulation flexibility is beneficial, studies of younger adults have found that greater categorical variability and temporal variability of strategies are associated with better adjustment (e.g., Bonanno Papa, Lalande, Westphal, & Coifman, 2004; Bonanno, Pat-Horenczyk, & Noll, 2011; De France & Hollenstein, 2017; Lougheed & Hollenstein, 2012).

Mechanisms Influencing Emotion Regulation Across Adulthood

There are many reasons to expect that emotion regulation patterns change across adulthood, including shifts in physiological reactivity, life experience, motivation, and resources. As people age, they become less physiologically reactive, which could lead to experiencing emotions less intensely (Cacioppo, Berntson, Bechara, Tranel, & Hawkley, 2011). As a result, it may be easier for older adults to regulate their emotions. However, studies have shown that emotions are typically experienced at a similar level of intensity across adulthood (Carstensen et al., 2011). Thus, while biological changes might contribute to improvements in emotion regulation, there are likely other key mechanisms. For instance, as people live longer, they gain experience using strategies and learn which ones are most effective (Blanchard-Fields, 2007; English & Carstensen, 2013).According to socioemotional selectivity theory, older adults also prioritize emotional goals more than younger adults (Carstensen et al., 1999).Given that people are motivated to engage in behaviors that facilitate their goals (Heckhausen, Wrosch, & Schulz, 2010),older adults might rely more on antecedent-focused strategies (which are typically more effective; Webb et al., 2012) and regulate more flexibly to maximize their emotional well-being.

The Strength and Vulnerability Integration (SAVI; Charles, 2010) and Selection, Optimization, and Compensation with Emotion Regulation (SOC-ER; Urry & Gross, 2010) models provide more nuanced perspectives about when and why emotion regulation may change with age. These models highlight the importance of considering age-related changes in resources necessary for effective emotion regulation, such as knowledge, social support, and cognition. For instance, compared to younger adults, older adults are better at predicting how they will feel in situations (Nielsen, Knutson, & Carstensen, 2008; Scheibe, Mata, & Carstensen, 2011) and know more about the most efficient ways to change them (Blanchard-Fields, 2007). Older adults also typically have strong social networks (English & Carstensen, 2014), which can provide greater encouragement to enter positive situations and support in changing negative situations. Thus, older adults might be more inclined to use antecedent-focused strategies like situation selection and situation modification, which capitalize on their existing knowledge and social resources.

The decline in fluid cognitive resources across adulthood (Cabeza & Dennis, 2012) also suggests that older adults will especially prefer *early* antecedent-focused strategies (i.e., situation selection, situation modification, or distraction) given that they are less cognitively demanding (Sheppes & Gross, 2011).A growing body of evidence has shown that different types of antecedent-focused strategies vary in their cognitive demands. For instance, reappraisal may require more fluid cognitive ability than distraction (e.g., Opitz, Lee, Gross, & Urry, 2014; Tucker, Feuerstein, Mende-Siedlecki, Ochsner, & Stern, 2012).Notably, cognitive functioning is also relevant for suppression ability (e.g., Gyurak et al., 2009; Richards & Gross, 2000; Schmeichel, Volokhov, & Demaree, 2008), but research suggests suppression is not as cognitively costly for older adults (Emery & Hess, 2011). Accordingly, suppression ability seems to be spared in older adults (Kunzmann, Kupperbusch, & Levenson, 2005).

Past Findings on Emotion Regulation Strategy Use Across Adulthood

While there is substantive theoretical work suggesting that people will exhibit a more adaptive and flexible pattern of emotion regulation as they age, the empirical evidence on this topic is largely sparse or mixed. Some studies support the idea that older adults regulate more adaptively by using certain antecedent-focused strategies. Indirect evidence for age-related increases in situation selection comes from work showing that older adults prune their social networks to mainly consist of close social partners, which can in turn elicit positive emotions (English & Carstensen, 2014; Fredrickson & Carstensen, 1990; Lang & Carstensen, 1994). Older adults also tend to avoid negative-emotion inducing situations, such as social conflicts (Birditt, Fingerman, & Almeida, 2005; Charles, Piazza, Luong, & Almeida, 2009; Stawski, Almeida, Sliwinski, & Smyth, 2008).In experimental approaches conceptualizing situation selection as choosing to view certain stimuli, older adults show a greater preference for viewing positive and neutral stimuli over negative stimuli (Livingstone & Isaacowitz, 2015; Sands & Isaacowitz, 2016). These findings suggest older adults have a greater tendency to use situation selection, but it is not entirely clear whether these behaviors were done for the sake of regulating their emotions. In terms of situation modification, older adults show a greater preference to disengage from negative-emotion inducing situations (Carstensen, Gottman, & Levenson, 1995; Coats & Blanchard-Fields, 2008; Lefkowitz & Fingerman, 2003). A study that measured situation modification as skipping videos (vs. just viewing them) found that older adults were more likely than younger adults to disengage from negative emotion-inducing stimuli by skipping negative (but not positive) videos

(Livingstone & Isaacowitz, 2015). Older adults also show a stronger preference to use distraction over reappraisal when down-regulating negative emotions compared to younger adults (Scheibe, Sheppes, & Staudinger, 2015). However, no study has directly examined whether older adults are more likely than younger adults to use these early antecedent-focused strategies in daily life.

Age differences in reappraisal have received the most attention in the literature relative to other strategies. However, some studies find an age-related increase in habitual reappraisal use (John & Gross, 2004; Matsumoto et al., 2016), while others find no age differences in habitual (Brummer, Stopa, & Bucks, 2014) or daily use of reappraisal (Schirda et al., 2016). Sampling characteristics (e.g., age, cognitive ability) might provide one explanation for these mixed findings. For instance, one study that found an age-related increase in reappraisal examined women in their 60s whose cognitive abilities might still be intact (John & Gross, 2004), whereas studies that find no age difference extend to later adulthood when cognitive abilities have likely started to decline (i.e., 70s and 80s; Schirda et al.,2016). There maybe a non-linear effect of age, such that reappraisal initially increases in late middle age, then levels off or decreases when it becomes too cognitively demanding to use. Distinguishing between reappraisal tactics might also help elucidate the complex way in which reappraisal may change with age. Two reappraisal tactics that are especially pertinent to consider are detached reappraisal (i.e., thinking about non-emotional aspects of a stimulus) and positive reappraisal (i.e., thinking about positive aspects of a stimulus). An experimental study found that older adults are better at using positive reappraisal than younger adults, but worse at using detached reappraisal (Shiota & Levenson, 2009). The authors proposed that these age differences are due to positive reappraisal being less cognitively demanding than detached reappraisal and easier for older adults to use given their increased bias towards positive information (Mather & Carstensen, 2003). Thus, older adults may use positive reappraisal more and detached reappraisal less than younger adults.

There is even less support for the idea that people decrease in their use of response-focused strategies as they age. Some studies suggest that habitual suppression use decreases with age (John & Gross, 2004; Schirda et al., 2016), some suggest it increases (Brummer et al., 2014; Nolen-Hoeksema & Aldao, 2011), and others have found no age differences (Matsumoto et al., 2016). Cohort effects may play a role in explaining why certain studies find an age-related increase in suppression because older generations were often discouraged from expressing their emotions (Tabert et al., 2001). As with reappraisal, these mixed findings could alsobe due to differences in the specific portion of old age being examined. Given suppression's affective and social costs (e.g., English, Srivastava, John, & Gross, 2012; Srivastava, Tamir, McGonigal, John, & Gross, 2009), people may initially decrease in their suppression as they grow older. However, they might become motivated to use suppression later in life to avoid engaging with intense stressors (e.g., poor health; Charles, 2010). Some indirect evidence for this hypothesis comes from a study where adults 85 years and older reported regulating their emotions in more passive ways (e.g., suppressing one's emotions, avoiding the problem)than adults ages 65-84 (Etxeberia, Etxebarria, Urdaneta, & Yanguas, 2015).Thus, people may only decrease in their suppression up until early old age then increase in late old age.

In terms of emotion regulation flexibility, the few studies that exist have been conducted with young adults. Research on flexibility in other domains, however, suggests that people become more flexible as they age. For instance, the dual-process theory of coping proposes that older adults are more likely to adjust their goals in response to environmental demands than younger adults (Brandtstädter, 2009; Brandtstädter& Rothermund, 2002).Flexible goal adjustment also predicts greater life satisfaction in old age (Bailly, Gana, Hervé, Joulain, & Alaphilippe, 2014). Prior research suggests that goals motivate emotion regulation strategy use, as people use different strategies to accomplish different types of goals (English, Lee, Gross, & John, 2017; Sheppes et al., 2014). Thus, as older adults work to achieve their goals, they may respond by being more flexible in their strategy use. Specifically, we expect older adults will rely on a broader range of strategies (i.e., more categorical variability) and adjust their strategy use more across days (i.e., greater temporal variability) compared to younger adults.

The Present Research

Emotion regulation has been proposed as an important mechanism underlying enhanced emotional well-being in older adulthood. However, only a handful of studies have examined age differences in emotion regulation strategy use and their findings are mixed. Few of these studies have examined age differences in emotion regulation strategy use in both men and women across a wide age range, or examined strategies besides suppression and reappraisal. Little is also known about whether there are age differences in how flexibly emotion regulation strategies are used. We addressed these gaps in the literature using trait-level and daily measures of emotion regulation strategy use in a sample of male and female adults aged 23-85 years.

As a replication of prior studies we examined how age predicts the self-reported habitual use of two strategies: reappraisal and suppression. We extended this work by also examining whether age predicts the self-reported daily use of a wider range of strategies, which capture the five families of the process model of emotion regulation (Gross, 1998): situation selection, situation modification, distraction, reappraisal (detached, positive), and suppression. The examination of emotion regulation using daily methods has received growing interest in recent years (e.g., Brans et al., 2013; Heiy & Cheavens, 2014). Daily measures can provide a naturalistic assessment of how emotion regulation processes spontaneously unfold in everyday life. They may also elicit different responses from participants than trait-level measures (Robinson & Clore, 2002a, 2002b). By tapping into different memory representations, trait-level measures capture beliefs about one's behavior, whereas daily measures can better capture actual behavior. Furthermore, daily measures' repeated nature makes them ideal for examining various indices of emotion regulation flexibility (Aldao et al., 2015). However, few studies have examined daily emotion regulation strategy use with older adults (Schirda et al., 2016) and to our knowledge, no studies have examined emotion regulation flexibility in older adults.

To summarize, we expected that older adults would use early antecedent-focused strategies (situation selection, situation modification, and distraction) more than younger adults. Our prediction for reappraisal differed depending on whether specific tactics were distinguished.

When examining overall habitual use of reappraisal, we expected it would be used *most* by those in early old age (e.g., 60s). When distinguishing between reappraisal tactics, we hypothesized that older adults would use positive reappraisal more than younger adults, but detached reappraisal less. We expected a nonlinear effect of age on suppression, such that it would be used the *least* by those in early old age. Meanwhile, we expected older adults to be more flexible in their emotion regulation by exhibiting greater categorical variability and temporal variability.

As exploratory aims, we also tested cognitive functioning and gender as moderators of the effects of age on emotion regulation. We did so to address the possibility that effects of age on emotion regulation may vary across samples with differing levels of cognitive functioning (e.g., older adults with particularly low fluid cognitive resources; Urry & Gross, 2010) or gender distributions (e.g., women only; John & Gross, 2004).

Method

Participants

The total sample consisted of 136 married couples (N = 272), ages 23-85 years (M = 53.24, SD = 18.24). Participants were recruited as part of a larger study on emotion regulation in adulthood and social relationships, which was approved by the Institutional Review Board at Washington University in St. Louis. Using flyers, advertisements, and research registries. We recruited an equal number of couples from each 10-year age interval to ensure adequate representation across a broad age range. Eligibility criteria included being in a married or civil union with a partner who was within ten years of one's age, and having internet access to complete daily surveys. We also screened participants above the age of 60 for dementia using a phone version of the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975). There were 134 heterosexual couples and two homosexual couples. Relationship length ranged from 1 to 63 years (M = 22.09, SD = 19.02). In terms of ethnicity, 83.6% were White, 9.3% were African American, 1.9% were Hispanic or Latin American, and 5.2% identified as “other” or interracial. We did not conduct an a priori power analysis to determine our sample size. However, a sensitivity analysis in GPower Version 3 revealed that at 80% power, we could detect two-tailed correlations of at least r = .17 with our sample size. Notably, this effect size falls within the range of effect sizes (r = .11-.20) for prior studies of associations between age and emotion regulation strategy use (e.g., Brummer et al., 2014; Nolen-Hoeksema & Aldao, 2011; John & Gross, 2004).

Procedure

In the first part of the study, participants completed a survey packet with a self-report measure of their habitual emotion regulation as well as various cognitive tasks. Other measures that were collected included questionnaires on relationship quality, physical health, and psychological functioning. In the second part of the study, participants completed 5-min daily diary surveys online the following week. These surveys were completed at the end of the day for 9 consecutive evenings and included measures of self-reported emotion regulation. Other measures obtained that are not relevant to the current study included emotional experience and social functioning. There was a total of 2289 daily measures across all participants. On average, 95% of participants (*N* = 261) completed at least 4 daily surveys (*M* = 4.89, *SD* = 2.59). As compensation, each participant received $10 for completing the first part of the study and $20 for completing the second part of the study. There was an additional lab component with a marital conflict discussion that involved a manipulation, but this occurred after these parts of the study.

Measures

Habitual emotion regulation strategies—Participants completed the 6-item reappraisal (e.g., "I control my emotions by changing the way I think about the situations I'm in") and 4-item suppression (e.g., "I control my emotions by not expressing them) subscales of the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). All items were rated on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*).We computed McDonald's omega as our reliability coefficient. It is interpreted in the same way as Cronbach's alpha (Cronbach, Schoneman, & McKie, 1965), but provides a better reliability estimate because it does not assume that all items have equal factor loadings and it allows error variances to correlate (McDonald, 1999; Revelle & Zinbarg, 2009). Across the entire sample, omegas were .86 for reappraisal and .75 for suppression. Although we measured age continuously, we also broke the sample into three groups – younger adults (ages 23-44), middle-aged adults (ages 45-64), and older adults (ages 65-85) – to examine how omega varies across age. For reappraisal, younger =.93, middle-aged = .94, and older = .87, and for suppression, younger and middle-aged = .83, and older = .74.

Daily emotion regulation strategies—Participants reported the extent with which they used six emotion regulation strategies on a given day: situation selection ("seeking out people or situations that I expected to put me in a good mood"), situation modification ("trying to change something in my current situation to change how I was feeling"), distraction ("trying to think about something else to change how I was feeling (i.e., distract myself)"), positive reappraisal ("trying to think about something more positively"), detached reappraisal ("trying to think about something more objectively"), and suppression ("trying to not let my feelings show"). They rated all items on a 7-point scale (1 = *not at all*; 7 = *a great deal*).

Cognitive functioning—In order to gather a broad assessment of fluid cognitive functioning, we measured multiple processes that have been consistently found to decline with age, including alerting and executive control, interference, and verbal fluency (Salthouse, 2009). Alerting describes paying attention to a stimulus, while executive control describes selectively attending to and then switching between various sources of information (Fan et al., 2002). Interference is the ability to inhibit one's responses (Hasher & Zacks, 1988) and verbal fluency is the ability to retrieve information from memory (Patterson, 2011). We measured alerting and executive control using the Attention Networking Task (Fan et al., 2002), which involves spatially and temporally cueing target flankers, interference with the reaction time during color-word incongruent trials from the Stroop Color and Word Test (Golden, 1978), and verbal fluency using the Animal Naming Task (Lindenberger & Baltes, 1995) where participants name as many animals as they can in 60 seconds. These tasks are widely used and highly reliable in detecting individual differences in fluid cognitive resources (Kane & Engle, 2002; Tombaugh, Kozak, & Ress, 1999). Additional information regarding the details of these tasks can be found in the Online Supplementary Materials.

Results

We performed our analyses in R Version 3.4.3.We did not exclude any participants.

Flexibility Indices

We computed the two indices of emotion regulation flexibility: categorical variability and temporal variability. For *categorical variability*, we first recoded the data to indicate whether someone used a strategy each day. A rating of 1 (“not at all”) was recoded as not having used the strategy (0), while ratings of 2 or above were coded as having used the strategy (1). We then summed the total number of strategies used each day. A larger score on this categorical variability index indicates the use of a broader range of strategies within a given day. Categorical variability ranged from 0 to 6, with people reporting the use of four strategies per day on average ($M = 4.04$, $SD = 1.42$).

For temporal variability, we calculated the standard deviation for use of each emotion regulation strategy (i.e., *temporal variability of strategies*) and for the number of strategies used (i.e., *temporal variability of repertoire*) across days. This method has often been used to calculate variability in other emotion-related constructs, such as emotional experience (Gruber, Kogan, Quoidbach, & Mauss, 2013; Kuppens et al., 2008; Oosterwegel, Field, Hart, & Anderson, 2001). A larger standard deviation indicates greater temporal variability in strategy use (i.e., more within-person fluctuation in mean-level use of a given strategy across days) or in the range of strategies used (i.e., more within-person fluctuation in the number of strategies used across days). Temporal variability of strategies ranged from 0 to 4.24 (*Ms* = 1.18-1.35, *SDs* = .61-.66) and temporal variability of repertoire ranged from 0 to 2.64 ($M =$ 1.06, $SD =$.55).

Preliminary Analyses

We calculated intraclass correlations (ICCs) as an index of between-person variance across days for all day-level variables (i.e., daily strategy use and categorical variability).We compared the relative use of different strategies and their temporal variability using an approach proposed by Brans et al. (2013). We predicted habitual strategy use level from a dummy variable coded as 0 = Suppression and 1 = Reappraisal. We predicted average daily strategy use and temporal variability of strategies from five dummy variables representing five of the six daily strategies (each strategy served as the reference group once).

Table 1 shows descriptives, ICCs, and correlations among study variables. Half of the variance was due to between-person differences for self-reported daily strategy use (ICCs = .45-.51) and categorical variability (ICC = .56).

Relative use and temporal variability of strategies—At the trait-level, reappraisal was reported as being used more than suppression, $\gamma = 1.43$, SE= .09, $p < .001$; semi-partial $R^2 = .27$.At the daily-level, detached reappraisal and positive reappraisal were reported more than suppression and every other strategy, γ= .36 to .77, SE= .06, *ps* <.001; semi-partial R^2 = .02 to .10. Meanwhile, situation selection was reported as being used less often than every other strategy, γ= .33 to .80, SE= .06, *ps* < .001; semi-partial R^2 = .03-.11.

Situation selection also had lower temporal variability than every strategy, γ= -.03 to -.18, SEs= .01, *ps* < .03; semi-partial R^2 = <.001 to .010, while suppression had higher temporal variability than every strategy, γ= .08 to .18, SE= .01, *ps* < .001; semi-partial R^2 = .002 to .010.

Correlations between strategies and flexibility indices—Habitual reappraisal and suppression were uncorrelated. However, daily reports of these and other emotion regulation strategies were moderately or highly positively associated (see Table 1). The daily emotion regulation flexibility indices were also moderately correlated. Categorical variability was associated with greater temporal variability for most strategies, but lower temporal variability of repertoire.

Habitual reappraisal was uncorrelated with daily detached and positive reappraisal, and habitual suppression was uncorrelated with daily suppression. However, there were links between habitual strategy use and daily flexibility. People higher in habitual reappraisal had greater categorical variability and temporal variability for all strategies except suppression. People higher in habitual suppression had lower temporal variability of repertoire. Habitual suppression was largely unrelated to temporal variability of strategies. However, when there were associations, they were negative. Thus, people higher in habitual reappraisal showed greater emotion regulation flexibility, whereas people higher in habitual suppression use did not.

Main Analyses

We conducted multi-level models to test how age predicts emotion regulation strategy use and flexibility. When predicting habitual emotion regulation strategy use and temporal variability, we conducted two-level models, with persons (Level 1) nested within couples (Level 2) to account for potential dependency between partners[1]. When predicting daily emotion regulation strategy use and categorical variability, we conducted three-level models with days (Level 1) nested within persons (Level 2) nested within couples (Level 3).

For each outcome, we ran two models, treating age as a continuous variable. The first model included age and age squared (grand-mean-centered) as predictors. When predicting temporal variability, we controlled for the mean-level of the outcome since means are often correlated with standard deviations (Baird, Le, & Lucas, 2006; Koval, Pe, Meers, & Kuppens, 2013). In the second model, we added an index of cognitive functioning to control for individual differences in fluid cognitive resources. Although sub-processes of cognitive functioning can be distinguished, they can still be difficult to tease apart (Miyake et al.,

[1]Couples' self-reports of habitual suppression were slightly negatively correlated (*r* = -.17, *p* < .01). However, there were no significant correlations between couples in habitual reappraisal or in daily self-reports of any emotion regulation strategy. There were also no significant correlations between couples in categorical variability within days or across days, or in the temporal variability of any strategy. Thus, there was almost no evidence for similarity in self-reported emotion regulation strategy use or in emotion regulation flexibility between couples.

2000). Thus, we used structural equation modeling to extract a single latent cognitive functioning variable by using scores on the four measures of cognitive functioning. The model fit the data well, $\chi^2(2, N = 272) = 3.66$, $p = .16$, RMSEA = .05, 90% CI[.00, .14], CFI = .91, SRMR = .031. We extracted each participant's latent cognitive score to use as a predictor in our models. Age was moderately correlated with cognitive functioning ($r = -.56$, $p < .001$).

To calculate effect sizes, we computed semi-partial R^2 values, as recommended for multi-level modeling (Edwards et al., 2008).The interpretation of semi-partial R^2 is akin to R^2; it represents the proportion of variance accounted for by a predictor: a small effect=.02, medium effect =.13, and large effect= .26. We also report Bayes factors (BF) to determine the meaningfulness of our effects, especially those that are null (Kass & Raftery, 1995). Null effects can indicate support for the null hypothesis, but they can also indicate that the data are not sensitive enough to determine whether there is a true effect (Dienes, 2008). BF is a ratio that uses model fit to determine the degree of support for a hypothesis based on the data (Wagenmakers et al., 2017). BFs are to be interpreted as continuous values. For example, a BF of 4 would mean that the observed data are 4 times more likely to support the alternative hypothesis than the null, while a BF of .40 would mean that the observed data are only .40 times more likely to support the alternative. However, current conventions suggest that BFs >3 indicate strong support of the alternative relative to the null (i.e., age *predicts* emotion regulation), BFs ranging from 1/3 to 3 indicate that the data are ambiguous and may support the null hypothesis or the alternative hypothesis (i.e., age *may or may not* predict emotion regulation), and BFs< 1/3 indicate strong support of the null (i.e., age *does not* predict emotion regulation).

Does age predict emotion regulation strategy use?—Results from multi-level modeling analyses predicting strategy use at the trait- and daily-levels and the Bayes factors (BF) for each predictor are in Table 2. The BFs we report are specific to each predictor and thus, are equivalent across Models 1 and 2. Figure 1 shows the association between age and strategy use.

Trait-level: There was no significant effect of age on habitual reappraisal and the BF for reappraisal lends strong support for the null hypothesis. However, older adults reported habitually using suppression more than relatively younger adults. This effect remained significant after controlling for cognitive functioning, but the BF did not strongly support the alternative hypothesis (i.e., that strategy use varies by age). There were no nonlinear effects of age.

Daily-level: As with habitual reappraisal, age was not associated with self-reported daily reappraisal for either tactic. Unlike habitual reports, age did not predict daily use of suppression. In fact, age was not related to any of the strategies we measured at the daily level, including situation selection, situation modification, and distraction. The BFs for the effects of age on daily strategies suggest a lack of strong support for the alternative hypothesis.

Does age predict emotion regulation flexibility?—Results from multi-level modeling analyses predicting categorical variability and temporal variability and the Bayes Factors for each predictor are in Table 3. Figure 2 shows the associations between age and temporal variability.

Categorical variability: Contrary to what we expected, age did not predict categorical variability within days. That is, older adults did not use a broader range of strategies each day than did relatively younger adults. As with daily strategies, the BF for the effect of age on categorical variability provided minimal evidence for the alternative relative to the null.

Temporal variability: Older adults also did not show greater temporal variability in their use of strategies across days. Instead, they showed *less* temporal variability than relatively younger adults for all emotion regulation strategies. After controlling for cognitive functioning, these effects of age were no longer significant though. Meanwhile, there was a nonlinear effect of age on temporal variability of repertoire, such that middle-aged adults were the least likely to change in the range of strategies they used across different days. As with temporal variability of strategies, this effect became non-significant after controlling for cognitive functioning. According to the BFs, there was not strong support for age differences in the variability of strategy use or repertoire across days.

Ancillary Analyses

To test our exploratory aims about cognition and gender as moderators, we added the following terms as predictors in additional MLM models: gender (0 = Men, 1 = Women) and four interactions, including age by gender, age squared by gender, age by cognitive functioning, and age squared by cognitive functioning.

Do cognitive functioning or gender moderate effects of age on emotion regulation?

Emotion regulation strategy use: There was a significant interaction between age and cognitive functioning for habitual suppression (γ = -.186, SE = .07, p= .01).Greater cognitive functioning predicted more suppression in younger adults (γ = .145, SE = .06, p = .03), but not in middle-aged (γ = -.078, SE = .09,p = .42) or older adults (γ = -.092, SE = .06, p = .18).However, cognitive functioning did not significantly interact with age or age squared to predict habitual reappraisal(γ = <.001-.019, SE = .07, p> .17)or any daily emotion regulation strategies(γ = .058-.226, SE = .12-.15, *ps*> .14). There were two significant interactions between age and gender: one for habitual suppression (γ = .303, SE = .14, p = .03) and one for daily situation selection (γ = -.611, SE = .24, p= .01). Older women reported more habitual suppression than relatively younger women (γ = .015, SE = .01, p < .01), but age did not predict suppression in men (γ = .002, SE = .01, p = .61). Meanwhile, older men reported more daily situation selection than younger men (γ = .001, SE <.001, p = .01), but age did not predict situation selection in women (γ <-.001, SE < .001, p = .21). Gender did not moderate the effects of age or age squared on habitual reappraisal (γ = -.325-.143, SE = .23-.25, *ps*> .20) or other daily emotion regulation strategies (γ = .024-.163, SE = .13, *ps*> .13).

Emotion regulation flexibility: There was a significant interaction between cognitive functioning and categorical variability (γ = .266, SE = .12, p = .04). Cognitive functioning predicted less categorical variability in younger adults (γ = -.183, SE = .09, p = .05), but not in middle-aged (γ = -.013, SE = .11, p = .91) or older adults (γ = .127, SE = .12, p = .32). However, cognitive functioning did not moderate the effects of age or age squared on temporal variability for any strategies (γ = -.061-.036, SE = .04-.07, *ps*> .10) or repertoire (γ = -.017-.038, SE = .03-.04, *ps*> .27). Gender also did not moderate effects of age or age squared on categorical variability (γ = .003-022, SE = .20, *ps*> .91), or temporal variability of strategies (γ =-.004-.117, SE = .03-.08; *ps* > .14) or repertoire (γ = -.040-.101, SE = .03-.06, *ps*> .13).

Discussion

Emotion regulation is proposed to be an important mechanism that contributes to age-related improvements in emotional well-being. However, little research has examined age differences in the use of a wide range of emotion regulation strategies or flexibility of strategy use, a central component of effective emotion regulation. In the current paper, we investigated these questions using self-reported measures of habitual and daily emotion regulation.

Compared to relatively younger adults, older adults did not report using more antecedent-focused strategies, even the less cognitively demanding ones (e.g., distraction). Instead, older adults reported habitually relying more on a typically maladaptive, response-focused strategy (i.e., suppression); they did not report more daily suppression than younger adults though. Age did not predict categorical variability (i.e., breadth of daily strategies reported), an aspect of flexibility that captures fluctuations in the types of strategies used. Meanwhile, older adults were unexpectedly less variable in their self-reported use of all strategies across days. Moreover, middle-aged adults were the least variable in their breadth of strategies reported across days. Overall, our findings seem to run contrary to the common notion that later adulthood is characterized by the use of more typically adaptive strategies (Sims et al., 2015) or less cognitively demanding strategies (Urry & Gross, 2010). However, they do not necessarily contradict existing theories on emotion regulation and aging. Instead, they suggest that a more nuanced perspective on emotion regulation effectiveness may be required to understand the interactions between individuals, their resources, and features of their regulation context. Age-related improvements in emotion regulation might be better captured in the ability to choose the proper strategy based on the context, as opposed to overall mean-level differences in strategy use. In other words, the way emotion regulatory processes change with age may be more complex than previously expected.

Emotion Regulation Strategy Use

Overall, our findings suggest there are few age differences in the extent to which individuals use specific emotion regulation strategies. We used Bayes factors (BF; Dienes, 2008;Kass & Raftery, 1995; Wagenmakers et al., 2017) to help interpret our results. There was strong support for the lack of age differences in habitual reappraisal and more moderate support when examining daily use of strategies. Null findings such as these are important for theory testing and understanding how psychological processes operate (Greenwald, 1975).Additional research is needed, however, to replicate these novel results. Experience sampling methods may be particularly useful for examining how age predicts strategy use within specific daily contexts.

At the same time, the likelihood of detecting effects of age on habitual or daily strategy use might depend on sampling characteristics, such as gender distribution and age range. For instance, we found that gender moderated the effect of age on habitual suppression, such that the age-related increase in use of this strategy was only found among women. Notably, this finding contrasts with John and Gross (2004) who found less habitual suppression use among older women in their sixties compared to undergraduates (as well as greater habitual reappraisal use). However, our findings generally replicate studies with similar sample characteristics, that is, both men and women spanning a wide age range (e.g., Brummer et al., 2014).

We would also like to highlight a few findings more broadly relevant to understanding emotion regulation. First, individual differences in fluid cognitive functioning did not predict habitual or daily strategy use. Thus, although age and cognitive functioning seem to play a role in the ability to use strategies (e.g., Opitz et al., 2014; Shiota & Levenson, 2009), these factors appear to be less relevant for spontaneous strategy choices. This discrepancy aligns with arguments proposed by some researchers, such as McRae (2013), that it is important to distinguish between emotion regulation frequency (i.e., how often people rely on a strategy) and emotion regulation success (i.e., the ability to use a strategy). Other resources besides cognitive functioning, such as social support and physical health (Urry & Gross, 2010), might also be more important for explaining strategy selection in daily life. For instance, poor health might restrict one's control over their environment and reduce their use of situation selection. Second, we found that relative to other strategies, people infrequently reported using situation selection. One possibility is that this strategy is more difficult to detect and thus, report on accurately. Experience sampling with more frequent assessments and event-based designs that capture emotion regulation closer to when it occurs may be better suited for isolating these kinds of rare tactics. On a related note, our situation selection item focused on entering desirable situations, so it is unclear how often people use this strategy to avoid undesirable situations or whether there are age differences in that tactic. Notably, we did examine specific tactics for one particular strategy– reappraisal – to reconcile mixed findings. However, self-reported use of detached reappraisal and positive reappraisal were highly correlated. Thus, it may be difficult to tease apart predictors of distinct tactics for certain strategies in daily life. It is worth noting that we used broad wording for the reappraisal items (e.g., “trying to think about something more positively”) to capture use of this strategy in a range of situations. The use of more precise wording, however, might aid in distinguishing between lower-level, nuanced processes.

Emotion Regulation Flexibility

In addition to examining mean-level differences in strategy use, we took a dynamic approach to examine how emotion regulation may vary by age. We considered two important indices of flexibility that have been proposed in the literature (Bonnano & Burton, 2013) and studied in young adults (Bonnano et al., 2004): categorical variability and temporal variability. Drawing on prior conceptualizations of flexibility in younger adults, we predicted an age-related increase in the breadth of strategies deployed (i.e., categorical variability) and fluctuation in use of strategies over time (i.e., temporal variability). However, older adults were not higher on either index of emotion regulation flexibility. In fact, their temporal variability was somewhat lower compared to relatively young adults; although the evidence for this age difference was not particularly strong based on Bayes factors. Nonetheless these findings hold critical implications for how to conceptualize emotion regulation flexibility across adulthood.

One interpretation of our results is that they suggest emotion regulation flexibility does not increase later in adulthood and therefore flexibility cannot explain the age-related improvements in emotional well-being. However, this perspective only holds if one endorses the common conception that frequently adjusting one's regulation tactics is beneficial (e.g., Bonnano et al., 2004; De France & Hollenstein, 2017).Some researchers have recently argued that flexibility is only adaptive when it is necessary (Aldao et al., 2015).For instance, it could be maladaptive to fluctuate in one's strategy use when there are few changes in the environment or when strategies are deployed in a random and haphazard manner. Accordingly, if older adults are lower in temporal variability, this might not necessarily be a bad thing given that they typically have less variability in their daily lives than younger adults (e.g., Almeida & Horn, 2004; Rosenkoetter, Garris, & Engdahl, 2001). That is, older adults might not need to change their emotion regulation tactics as often if their environment is relatively stable. To the extent that this is the case, it would be particularly important to take into account features of the regulation context when comparing flexibility at different stages of adulthood. In other words, even though there was little evidence of age predicting variability in strategy use, the meaning of variability might differ across age groups. For instance, variability in younger adults may reflect a struggle to find the proper way to regulate their emotions effectively. On the other hand, older adults might vary in their strategy use because they are drawing on prior knowledge to optimize regulation efforts across contexts. Thus, older adults may be better at effectively deploying the right strategy in the right context, which is the most adaptive way of being flexible.

As with overall strategy use, we would also like to highlight other key findings relevant to emotion regulation flexibility more generally. First, we found substantial variation in the number of strategies people tended to report using on a given day (i.e., categorical variability). This suggests that it is common for individuals to take a variety of approaches to regulating their emotions in daily life, rather than only relying on one favored strategy. Regulators also fluctuated in their use of specific strategies and their strategy repertoire across days (i.e., temporal variability). That is, individuals seemed to tailor their emotion regulation patterns to the unique affordances and constraints present each day. Second, we found that some strategies were more variable than others. This relative difference in variability between strategies opens up new and interesting questions, such as why certain strategies may be used more flexibly. It is possible that this distinction is a function of adaptiveness, such that the strategies used more consistently across contexts (e.g., reappraisal) are typically more adaptive, than those that are used less consistently (e.g., suppression). Third, self-reported habitual strategy use correlated with emotion regulation flexibility: individuals higher in reappraisal were generally more flexible, whereas individuals higher in suppression were less flexible. This knowledge can be used to identify underlying mechanisms that may facilitate or hinder emotion regulation flexibility. For instance, people higher in habitual reappraisal might be more flexible because they tend to believe that emotions are more malleable and under their control (Tamir, John, Srivastava, & Gross, 2007).

Future Directions and Limitations

Our study was one of the first to examine how age predicts emotion regulation strategy use and flexibility across a wide age range and for a broad range of strategies. As with any studies, however, there are some limitations.

First, we used a cross-sectional design. To better understand how emotion regulation processes unfold across the lifespan, longitudinal work will be imperative. A longitudinal approach can identify when, how, and why emotion regulation may change across the lifespan. Importantly, this kind of design can clarify whether any age differences in strategy use are due to developmental changes as opposed to cohort effects. For instance, the age-related increase in habitual suppression may be due to generational differences in attitudes towards emotional expression (Tabert et al., 2001).

Second, it will be critical for future research to consider the role of context. Although we found that age rarely predicted overall strategy use, there may be age differences in how strategies are used across contexts. For instance, Schirda et al. (2016) found that relative to younger adults, older adults were less likely to use typically maladaptive strategies in anxiety- and sadness-eliciting situations. Similarly, while strategies such as suppression are typically socially and affectively costly (e.g., Srivastava et al., 2009; Webb et al., 2012), older adults may have learned to use them in more adaptive or less costly ways (Scheibe & Blanchard-Fields, 2009; Emery & Hess, 2011). Although there has been a growing interest in strategy selection (e.g., Martins, Sheppes, Gross, & Mather, 2016)and emotion regulation flexibility (e.g., Bonnano et al., 2004),most of this research remains focused on younger adults, a small subset of strategies (e.g., distraction, reappraisal, suppression), and few contexts (e.g., low versus high emotional intensity). More studies are needed to expand this work, including testing implications of different forms of emotion regulation flexibility on well-being across the life-span.

Conclusion

Emotion regulation is believed to be a mechanism that drives enhanced emotional well-being across adulthood. Older adults have greater emotion regulation self-efficacy (e.g., Gross et al., 1997) and ability to effectively use certain emotion regulation strategies (e.g., Emery & Hess, 2011; Shiota & Levenson, 2009).The present research suggests, however, that they do not necessarily use more typically adaptive strategies or exhibit greater fluctuations in their daily regulation tactics. Thus, age-related improvements in well-being do not seem to be due to broad changes in the selection of emotion regulation strategies. Instead, the emotional advantages in old age may more likely be found in how strategies are deployed in specific daily contexts.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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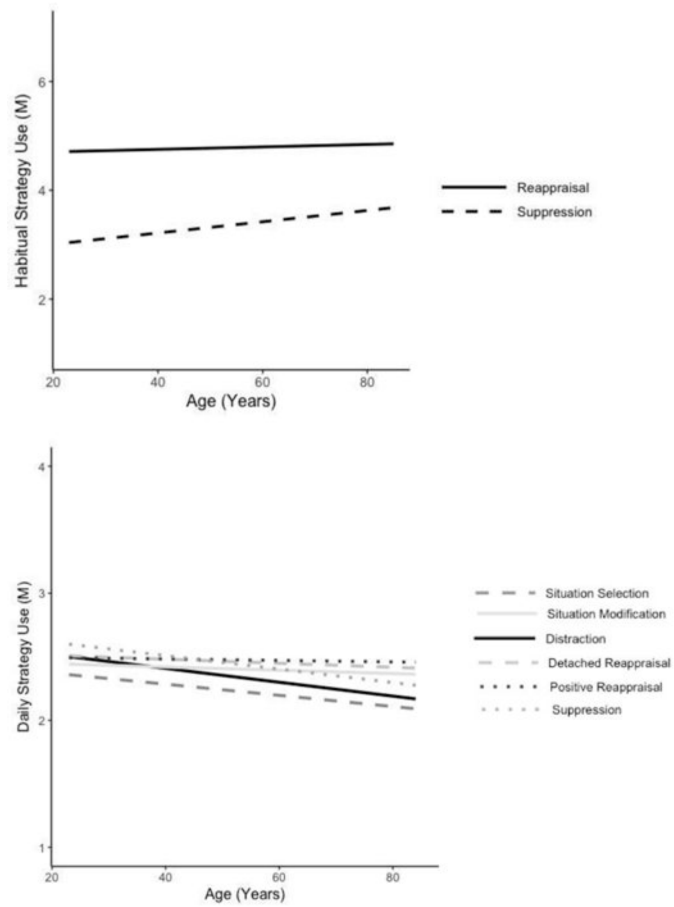

Figure 1.

Each graph represents age (23-85 years) predicting self-reported habitual (top panel) and daily (bottom panel) emotion regulation strategy use. (M) = mean. The scale values for habitual strategies were1 = *strongly disagree* to 7 = *strongly agree* and the scale values for daily strategies ranged from 1 = *not at all* to 7 = *a great deal*.

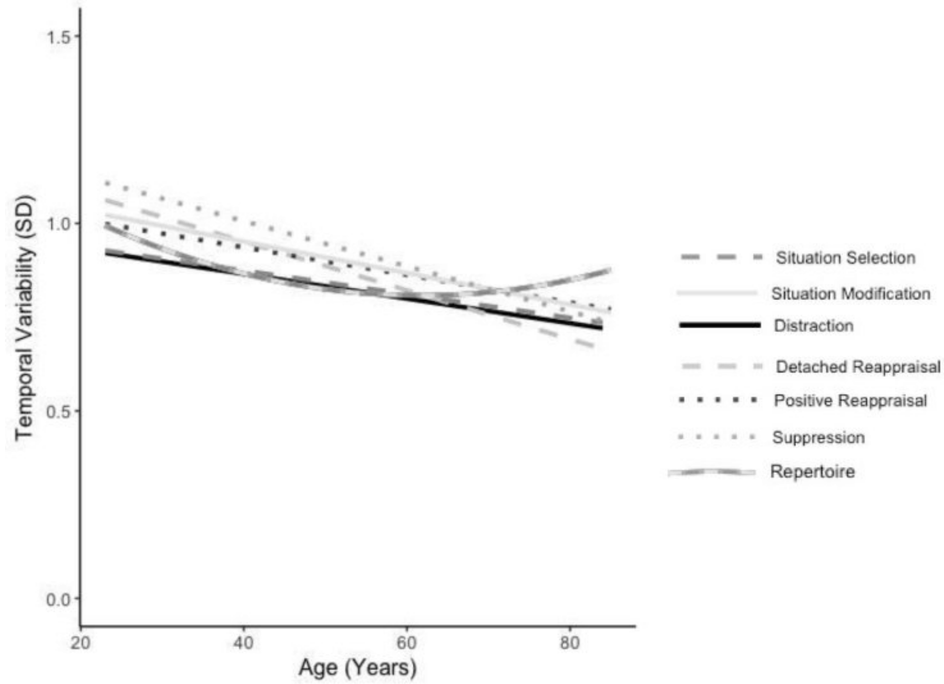

Figure 2.

This graph represents age (23-85 years) predicting daily temporal variability of strategies and repertoire. (SD) = standard deviation.

Table 1

Descriptives, Intra-Class Correlation Coefficients, and Inter-Correlations Between Study Variables

Variable	*M* (*SD*)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Age	53.24(18.24)	1																
2. Cognitive functioning	.00(.10)	-.29*	1															
3. Habitual reappraisal	4.78(1.12)	.03	-.00	1														
4. Habitual suppression	3.35(1.20)	.15*	-.01	-.02	1													
5. Daily situation selection	2.68(1.32)	-.08	.07	.09	.01	.45	.52*	.34*	.29*	.28*	.23*	.51*						
6. Daily situation modification	3.08(1.37)	-.12*	.04	.10	-.01	.86*	.47	.33*	.40*	.38*	.29*	.55*						
7. Daily distraction	3.02(1.39)	-.11	.08	.10	.01	.74*	.71*	.45	.36*	.42*	.32*	.61*						
8. Daily detached reappraisal	3.48(1.50)	-.04	.07	.02	-.02	.75*	.79*	.71*	.50	.70*	.33*	.50*						
9. Daily positive reappraisal	3.45(1.50)	-.03	.04	.01	-.01	.76*	.80*	.75*	.92*	.51	.33*	.55*						
10. Daily suppression	3.08(1.36)	-.02	-.02	.04	.01	.64*	.69*	.64*	.65*	.65*	.40	.56*						
11. Categorical variability	4.04(1.42)	-.09	.03	.18*	.00	.04	.06	.05	.04	.03	-.02	.56						
Temporal variability																		
12. Situation selection	1.18(.67)	-.14*	.08	.22*	-.16*	.05	.04	.02	.05	.08	.01	.38*	1					
13. Situation modification	1.21(.61)	-.11	.07	.18*	-.10	.05	.04	.01	.00	.04	.02	.25*	.60*	1				
14. Distraction	1.25(.66)	-.10	.08	.16*	-.15*	.05	.03	.02	.04	.07	-.01	.22*	.55*	.62*	1			
15. Detached reappraisal	1.21(.64)	-.14*	.14*	.13*	-.09	-.05	.02	-.05	-.06	-.03	-.06	.00	.39*	.53*	.50*	1		
16. Positive reappraisal	1.26(.64)	-.09	.10	.16*	-.09	-.08	-.07	-.08	-.09	-.05	-.10	-.01	.40*	.58*	.63*	.78*	1	
17. Suppression	1.35(.63)	-.09	-.03	.07	.02	-.02	.03	-.02	-.06	-.05	-.07	.14*	.41*	.50*	.47*	.46*	.47*	1
18. Repertoire	1.06(.55)	-.03	.01	-.02	-.12*	-.11	-.08	-.13*	-.08	-.09	-.07	-.33*	.24*	.41*	.49*	.51*	.57*	.35*

Note. Between-person correlations are listed below the diagonal and within-person-centered correlations are listed above the diagonal. Intra-class correlation coefficients (ICCs) for daily emotion regulation variables are listed on the diagonal. Cognitive functioning = fluid cognitive functioning latent score.

* $p < .05$.

Table 2

Multi-level Modeling Analyses for Predicting Overall Habitual and Daily Emotion Regulation

		Model 1				Model 2								
		Age		Age^2		Age			Age^2			Cognitive functioning		
Parameter	**Intercept**	**γ(SE)**	**R^2**	**γ(SE)**	**R^2**	**γ(SE)**	**R^2**	**BF**	**γ(SE)**	**R^2**	**BF**	**γ(SE)**	**R^2**	**BF**
Habitual emotion regulation														
Reappraisal	4.93(.11)	.001(.003)	.001	<-.001(<.001)	.017	-.001(.003)	.001	.15	<-.001(.001)	.017	.46	<-.001(.04)	<.001	.13
Suppression	3.36(.11)	.010(.004)*	.024	<-.001(<.001)	<.001	.010(.004)*	.024	2.30	<-.001(<.001)	<.001	.15	-.013(.04)	<.001	.19
Daily emotion regulation														
Situation selection	2.74(.12)	.001(.004)	.001	<-.001(<.001)	.001	-.009(.006)	.001	.65	<.001(<.001)	.001	.83	.007(.04)	<.001	.49
Situation modification	3.10(.13)	-.007(.004)	.017	<-.001(<.001)	<.001	-.010(.006)	.010	.70	<-.001(<.001)	.002	.72	.023(.07)	<.001	.46
Distraction	3.07(.13)	-.007(.004)	.017	<-.001(<.001)	.001	-.007(.006)	.004	.49	-.001(<.001)*	.017	.67	-.024(.07)	<.001	.46
Detached reappraisal	3.58(.15)	-.001(.01)	<.001	-.003(<.001)	.006	-.006(.01)	.005	.57	-.001(<.001)*	.029	.57	.070(.07)	.003	.52
Positive reappraisal	3.59(.14)	<-.001(.01)	<.001	<-.001(<.001)	.003	-.006(.01)	.005	.55	-.001(<.001)*	.040	.60	.019(.07)	<.001	.51
Suppression	3.07(.13)	.003(.004)	.002	<.001(<.001)	<.001	.002(.006)	<.001	.47	<.001(<.001)	<.001	.52	-.005(.07)	<.001	.48

Note. γ(SE) = unstandardized fixed effect estimates with standard errors in parentheses. R^2 = semi-partial R^2 effect size. BF = Bayes factors. Cognitive functioning = fluid cognitive functioning latent score.

* $p < .05$.

Table 3

Multi-level Modeling Analyses Predicting Daily Emotion Regulation Flexibility

		Model 1				Model 2								
		Age		Age^2		Age			Age^2			Cognitive functioning		
Parameter	Intercept	γ(SE)	R^2	γ(SE)	R^2	γ(SE)	R^2	BF	γ(SE)	R^2	BF	γ(SE)	R^2	BF
Categorical variability	4.14(.13)	-.007(.004)	.008	<-.001(<.001)	.003	-.009(.005)	.016	.47	<-.001(<.001)	.022	.73	-.028(.06)	<.001	.57
Temporal variability														
Situation selection		-.008(.001)*	.109	<.001(<.001)	<.001	-.003(.002)	.009	.68	<.001(<.001)	.006	1.10	.024(.02)	.004	1.30
Situation modification	.911(.05)	-.006(.001)*	.062	<-.001(<.001)	<.001	-.002(.002)	.013	.80	<.001(<.001)	.006	1.40	-.013(.02)	.001	.98
Distraction	1.04(.05)	-.006(.001)*	.056	<.001(<.001)	<.001	-.002(<.001)	.010	.73	<.001(<.001)	.015	.86	.013(.02)	.001	.89
Detached reappraisal	1.13(.05)	-.007(.001)*	.068	<-.001(<.001)	<.001	-.004(.002)	.014	.66	<.001(<.001)	<.001	1.40	.034(.02)	.008	.94
Positive reappraisal	1.25(.05)	-.006(.001)*	.055	-.001(<.001)	.004	-.003(.002)	.007	.92	<-.001(<.001)	<.001	.77	.020(.02)	.002	1.10
Suppression	1.26(.05)	-.009(.001)*	.101	<-.001(<.001)	.003	-.003(.002)	.014	.89	<.001(<.001)	.006	.61	.023(.02)	.004	1.50
Repertoire	1.17(.05)	<-.001(.002)	<.001	<.001(<.001)*	.024	-.001(.002)	.003	.63	<-.001(<.001)	<.001	.96	-.011(.01)	.001	1.10

Note. γ(SE) = unstandardized fixed effect estimates with standard errors in parentheses. R^2 = semi-partial R^2 effect size. BF = Bayes factors. Cognitive functioning = fluid cognitive functioning latent score. We also controlled for the mean-level of outcome (i.e., strategy use or repertoire) when predicting temporal variability.

* $p < .05$.