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## Being present and enjoying it: Dispositional mindfulness and savoring the moment are distinct, interactive predictors of positive emotions and psychological health

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### Abstract

Mindfulness and savoring the moment both involve presently occurring experiences. However, these scientific constructs are distinct and may play complementary roles when predicting day-to-day positive emotions. Therefore, we examined the unique and interactive roles of dispositional mindfulness and perceived ability to savor the moment for predicting daily positive emotions as well as related psychological health benefits. Participants completed a nine-week longitudinal field study. At baseline, dispositional mindfulness and perceived ability to savor the moment were assessed, along with three indicators of psychological health: depressive symptoms, psychological well-being, and life satisfaction. Each day for the subsequent nine weeks, participants reported on their emotions. At the end of the study, participants again completed the three psychological health measures. Results showed that baseline dispositional mindfulness and perceived ability to savor the moment interacted to predict mean positive emotion levels over the reporting period and, in turn, residualized changes in psychological health. Specifically, the relation between perceived ability to savor the moment and positive emotions and, in turn, residualized change in psychological health indicators, was amplified at greater levels of mindfulness and fell to non-significance at lower levels of mindfulness. Dispositional mindfulness only predicted positive emotions and, in turn, residualized changes in psychological health, for those very high in perceived ability to savor the moment. This research provides preliminary evidence that dispositional mindfulness and perceived ability to savor the moment, though related constructs, may serve unique and synergistic roles in predicting benefits for and through positive emotions.

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Compliance with Ethical Standards

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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## Keywords

Mindfulness; savoring; positive; emotion; health

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## Introduction

Being mindful and savoring the moment might seem to go hand-in-hand. At first blush, some might even equate the two. In practice, they may be taught together (e.g., Garland, 2013; Hanh & Cheung, 2011). Scientifically, however, these concepts are distinct. Here, we note these distinctions and examine the potential complementary roles of dispositional mindfulness and the ability to savor the moment for predicting day-to-day positive emotions and future psychological health.

The concept of mindfulness generally has been conceptualized in the scientific literature as fundamentally involving a highly receptive, nonjudgmental awareness of and attention to whatever is present in the moment – whether pleasant, unpleasant, or neutral (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003; Kabat-Zinn, 1990). In addition to lay and scholarly interest in mindfulness as a style or target mental state of discrete meditation sessions (e.g., Lau et al., 2006), considerable interest also pertains to the characterological tendency to be mindful in daily life. Although some debate exists about conceptualizations of mindfulness as a trait (Grossman & Van Dam, 2011), substantial empirical evidence demonstrates value in examining the construct termed and assessed as *dispositional mindfulness* (Baer, 2011; Quaglia, Braun, Freeman, McDaniel, & Brown, 2016). Research using samples from various populations suggests that individuals generally differ in their tendency to be mindful in daily life and that higher levels of dispositional mindfulness predict less distress and greater well-being (Keng, Smoski, & Robins, 2011). Dispositional mindfulness may be boosted through repeated practice of mindfulness meditation over time (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015); however, in the absence of mindfulness training this tendency appears to be stable and trait-like (e.g., Baer, Smith, & Allen, 2004; Brown & Ryan, 2003).

Savoring the moment overlaps conceptually with mindfulness mainly in that it involves presently occurring experiences, and it requires some awareness of a pleasant experience occurring that could be savored (Bryant & Smith, 2015; Bryant & Veroff, 2007). This modest conceptual overlap is consistent with evidence that dispositional mindfulness, at least or especially its core components involving receptive attention and awareness, is associated with perceived ability to savor the moment (see Bryant & Smith, 2015). However, the observed correlations between these two constructs are moderate in magnitude, which is also consistent with their marked conceptual distinctions (e.g., Beaumont, 2011; Ritchie & Bryant, 2012; also see Bryant & Smith, 2015). Savoring differs from mindfulness first in that it is narrower, restricted to only pleasant aspects of experiences (Bryant & Veroff, 2007). Moreover, savoring also differs from dispositional mindfulness in that it involves responding to positive experiences with thoughts and behaviors intended to increase and potentially prolong enjoyment – i.e., strategies that up-regulate positive emotions (Bryant & Smith, 2015; Bryant & Veroff, 2007). Examples of such cognitive and behavioral savoring

strategies include thinking repeatedly about how pleasurable an experience is or how grateful one is for it; smiling or expressing positive emotions in other non-verbal ways; and sharing the positive event or experience with a friend (Bryant & Veroff, 2007; Gable, Reis, Impett, & Asher, 2004; Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Individuals also vary in their perceived capacity to savor the moment, and such perceived ability to savor the moment has been found to associate positively with happiness and inversely with depressive symptoms (Bryant, 2003).

To further elucidate the distinction between mindfulness and savoring the moment, consider this potential clarification offered by Ritchie and Bryant (2012): "...just because one is mindfully aware of an ongoing positive experience does not guarantee that one will savor it" (p.153). Likewise, experimental evidence suggests that when mindful, individuals may down-regulate positive emotions in response to normatively pleasant stimuli (Lalot, Delplanque, & Sander, 2014). This finding makes sense when one considers that mindfulness is a nonjudgmental way of using attention and awareness that is associated with greater nonattachment (i.e., a flexible, balanced way of relating to one's experiences without clinging to or suppressing them; Sahdra, Ciarrochi & Parker, 2016; Sahdra, Shaver, & Brown, 2010). Whereas savoring inherently up-regulates positive emotions, mindfulness does not. Therefore, an individual conceivably could be high in dispositional mindfulness and receptively notice pleasant experiences, but not necessarily possess much additional ability (e.g., not use savoring strategies) to up-regulate positive emotions. Consistent with this distinction, evidence on the relation between dispositional mindfulness and positive affect is mixed, with some studies reporting positive associations yet others reporting no relation (Jislin-Goldberg, Tanay, & Bernstein, 2012). Conceivably, savoring ability is one moderator of this relation, such that mindfulness is associated with positive emotions for individuals who can also employ strategies to extract greater positive emotions from pleasant experiences.

Similarly, dispositional mindfulness may plausibly moderate the relation between savoring ability and positive emotions in daily life, such that the extent to which the ability to savor the moment predicts daily positive emotions depends on the extent of receptive present-moment awareness provided by dispositional mindfulness. That is, dispositional mindfulness may help individuals to notice and value pleasant aspects of everyday experience, providing more opportunities to use one's ability to savor the moment. As Salzberg (2011, p. 123) notes: "If we stop to notice moments of pleasure – a flower poking up through the sidewalk, a puppy experiencing snow for the first time, a child's hug – we have a resource for more joy." Consistent with this proposition, experimental studies of mindfulness meditation have found that extensive training improves perceptual discrimination and sensitivity (compared to wait-list controls; MacLean et al., 2010), and even one mindfulness meditation session may temporarily help individuals to ascertain the valence of positive stimuli equally as well as negative stimuli, correcting the well-documented negativity bias (compared to active controls; Kiken & Shook, 2011). Altogether then, dispositional mindfulness and ability to savor the moment may interact to predict positive emotions in daily life.

Positive emotions in daily life are important, with benefits beyond their direct hedonic value in the moment (Diener & Larsen, 1993). The broaden-and-build theory (Fredrickson, 1998,

2001), which has now received ample empirical support, explains how positive emotions function independently from negative emotions to contribute to various aspects of health and well-being (see Fredrickson, 2013). Temporary experiences of positive emotions promote broadened mindsets which, especially as they accrue over time, enable individuals to build a variety of durable personal resources (e.g., optimism, resilience, social connections; see Fredrickson, 2013). Amidst the vicissitudes of life, these resources appear to protect and promote future psychological and even physical health, protecting against depressive symptoms and contributing to greater psychological well-being, life satisfaction, and heart rate variability (e.g., Fredrickson, Coffey, Cohn, Pek, & Finkel, 2008; Kok et al., 2013). In this way, positive emotions not only signal hedonic well-being in the moment but stimulate processes that beget more eudaimonic well-being and psychological health in the future. Therefore, if dispositional mindfulness and the ability to savor the moment interact to predict positive emotions, this should in turn benefit broader aspects of psychological health over time.

The current research offers a preliminary examination of the unique and interactive roles of dispositional mindfulness and perceived ability to savor the moment in predicting daily positive emotions, as well as ensuing benefits over time for psychological health. We analyzed archival data from a nine-week longitudinal field study (see Fredrickson et al., 2008). The study included measures of dispositional mindfulness and perceived ability to savor the moment at baseline, daily reports of positive emotions for nine weeks, and measures of psychological health at both baseline and the end of the study period. We tested three hypotheses. First, to replicate previous findings, we tested the hypothesis that dispositional mindfulness and perceived ability to savor the moment are moderately correlated. Second, we tested the hypothesis that dispositional mindfulness and perceived ability to savor the moment interact to predict subsequent daily positive emotions. Third, we tested the hypothesis that the interaction between dispositional mindfulness and perceived ability to savor the moment, through daily positive emotions, indirectly predicts changes over time in broader psychological health.

## Method

### Participants

Participants were those in the waitlist control group from a larger randomized study (Fredrickson et al., 2008). In the broader study, other participants were randomly assigned to a loving-kindness meditation intervention that increased positive emotions over time. These participants were excluded from the present research to avoid confounds. All participants were recruited from a large, Midwestern technology company via email invitations sent to all full-time employees (approximately 1,800 individuals) and containing a link to an informational website. The study was described as a scientific investigation of “the benefits of meditation ... [to] reduce stress.” To help minimize detailed expectancy and demand effects, specific information on meditation styles, mindfulness, savoring, or positive emotions was not shared with participants. Interested employees attended an orientation session where they provided informed consent. In the waitlist control group, one hundred participants completed consent and baseline measures. Of those, 89 completed at least some

daily reports and the Time 2 assessments. All reported results are for those 89 completers, though the pattern of results and their statistical significance do not change appreciably using all data. Participants tended to be White (73.56%), non-Hispanic (98.85%), well-educated (73.56% completed a bachelor's degree or higher), mid-life ( $M_{\text{age}} = 42.10$ ,  $SD_{\text{age}} = 9.93$ , range = 26–64), and female (59.09%). Participants received compensation for each survey completed, plus a bonus for completing at least 40 daily reports, up to a total of \$101.

## Procedure

All measures were completed online via a secure website. Participants completed Time 1 measures within the week following orientation. At Time 1, we measured dispositional mindfulness, perceived ability to savor the moment, and three indicators of psychological health: depression symptoms, psychological well-being, and life satisfaction. Daily emotion reports began one week after orientation and continued for approximately nine weeks. Time 2 measures, including the three psychological health indicators, were gathered at the end of the nine weeks. Automated e-mail reminders were sent to participants if they did not complete more than three consecutive daily reports or the Time 2 survey. No other contact was made with participants during the data collection period.

## Measures

**Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003); Time 1**—The MAAS is a 15-item scale that is widely used to assess core characteristics of dispositional mindfulness. Specifically, the MAAS is a unidimensional measure indicative of the tendency to be receptively aware of and attend to present-moment experiences in daily life. The measure appears to tap the accepting, nonjudgmental quality of mindfulness as an inherent part of being fully present (Brown & Ryan, 2003). The 15 items (e.g., “I could be experiencing some emotion and not be conscious of it until some time later”) are rated on a scale from 1 (*almost always*) to 6 (*almost never*). Although these negatively worded items have raised some concerns about face validity (e.g., Grossman, 2011), a large evidence base suggests that the measure demonstrates several other types of validity (convergent, discriminant, concurrent, predictive, and incremental) and is indicative of core qualities of general dispositional mindfulness (Brown, Ryan, Loverich, Biegel, & West, 2011; Quaglia et al., 2016), the focus of our research. Higher mean scores indicate higher mindfulness ( $\alpha = .89$ ).

**Savoring Beliefs Inventory (SBI; Bryant, 2003); Time 1**—The SBI assesses perceived ability to derive enjoyment from pleasant events. The present research used only the subscale pertaining to savoring the moment. This subscale consists of eight items (e.g., “When something good happens, I can make my enjoyment of it last longer by thinking or doing certain things”), with which participants rated their agreement on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher mean scores indicate greater perceived ability to savor the moment ( $\alpha = .88$ ).

**Modified Differential Emotions Scale (mDES; Fredrickson, 2013; Fredrickson, Tugade, Waugh, & Larkin, 2003); daily for nine weeks**—The mDES assessed the intensity of 10 positive emotions (amusement, awe, compassion, contentment, gratitude,

hope, joy, interest, love, pride) and 8 negative emotions (anger, contempt, disgust, embarrassment, guilt, sadness, shame, and fear). The composite positive emotions subscale was our focus because of its centrality to distinctions between mindfulness and savoring and the unique functions of positive emotions in broader psychological health. However, we also used the composite negative emotions subscale as a covariate. Each day for nine weeks, participants were asked to recall the past 24 hours and rate their strongest experience of each emotion on a scale from 0 (*not at all*) to 4 (*extremely*). The average number of daily reports provided was 38.0 (range: 17 to 57), with 75% of the 89 completers providing at least 32 daily reports. Higher scores indicate greater daily positive or negative emotions (positive emotions  $M_a = .90$ ; negative emotions  $M_a = .81$ ).

**Center for Epidemiological Studies – Depression Measure (CES-D; Radloff, 1977); Time 1 and Time 2**—The CES-D is a commonly used measure of depressive symptoms. Twenty items (e.g., “I felt that I could not shake off the blues even with help from my family or friends”) were rated on a scale from 1 (*never*) to 4 (*most of the time*). To minimize conceptual overlap with positive emotions, we excluded the four positively worded items (Fredrickson et al., 2008; Moskowitz, 2003; Ostir, Markides, Black, & Goodwin, 2000). (Nevertheless, the pattern of results was similar for all analyses when the full CES-D scale was used, with a larger conditional indirect effect.) Higher mean scores indicate greater depressive symptoms ( $\alpha_{T1} = .86$ ;  $\alpha_{T2} = .89$ ).

**Psychological Well-Being Scales (PWB; Ryff, 1989); Time 1 and Time 2**—The PWB scales used here contained 43 items assessing six dimensions of eudaimonic well-being: personal growth (e.g. “For me, life has been a continuous process of learning, changing, and growth”), environmental mastery (e.g., “I often feel overwhelmed by my responsibilities;” reverse-scored), autonomy (e.g., “I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people”), self-acceptance (e.g., “I like most parts of my personality”), purpose in life (e.g., “My daily activities often seem trivial and unimportant to me;” reverse scored), and positive relations with others (e.g., “I know that I can trust my friends, and they know they can trust me”). Participants rated each item on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*). In developing the PWB, Ryff and Keyes (1995) found that the six subscales load on one higher order factor representing overall eudaimonic or psychological well-being, which represents our interest in the current research. Higher mean scores represent greater psychological well-being ( $\alpha_{T1} = .92$ ;  $\alpha_{T2} = .90$ ).

**Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985); Time 1 and Time 2**—The SWLS is used widely to assess evaluations of overall life satisfaction. The scale consists of five items (e.g., “So far I have gotten the important things I want in life”) rated on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher mean scores indicate greater life satisfaction ( $\alpha_{T1} = .88$ ;  $\alpha_{T2} = .91$ ).

## Data Analysis

To evaluate Hypothesis 1—the relationship between mindfulness and savoring—we first examined the simple correlation between individual mean scores on the two measures. To



complement and further evaluate this relationship, we also conducted a set of confirmatory factor analyses (CFAs) using raw scores on the fifteen MAAS and eight SBI items. These analyses were conducted using Mplus (Version 7.4; Muthén & Muthén, 2015) and a maximum likelihood estimator.

To account for potential intra-individual variability in the daily emotion reports along with inter-individual variability in the measures of mindfulness, savoring, and psychological health, we employed multi-level models when testing Hypotheses 2 and 3. Model specifications were as follows.

**Hypothesis 2**—In order to observe the unique and interactive associations of mindfulness and savoring the moment with positive emotions, multilevel regression models were specified with multiple daily observations (Level 1, denoted by the subscript  $i$ ) nested within people (Level 2, denoted by the subscript  $j$ ) and estimated using the “mixed” procedure and restricted (residual) maximum likelihood (REML) estimator available in SAS version 9.2. This procedure does not use listwise deletion or require that all participants complete all daily reports, but rather analyzes all data present under the assumption that they are missing at random. Mindfulness, savoring, and their interaction were included as predictors, as specified by the following two basic equations:

$$\begin{aligned} \text{Level 1 (day-level):} \quad & y_{ij} = \beta_{0j} + r_{ij} \\ \text{Level 2 (person-level):} \quad & \beta_{0j} = \gamma_{00} + \gamma_{01} \text{ mindful}_j + \gamma_{02} \text{ savor}_j + \gamma_{03} \text{ mindful} * \text{ savor}_j + u_{0j} \end{aligned}$$

Analyses were run both with and without daily negative emotions as a covariate. Because negative emotions were measured daily, it is possible to estimate both the *within-person effect* of negative emotions on positive emotions (i.e., the extent to which Person A’s positive emotions scores on two different days differ when her negative emotions scores on those two days differ by 1 unit) and the *between-person effect* of negative emotions on positive emotions (e.g., the extent to which Person A and Person B’s average positive emotions scores differ when their average negative emotions scores differ by 1 unit). However, because savoring and mindfulness are both necessarily predicting between-person differences in positive emotions (i.e., because they are Level 2 variables measured at a single time point), it is only the inclusion of the between-person effect of negative emotions (estimated by including the average score for a person across all daily reports; see Raudenbush & Bryk, 2002) that could alter the estimated relationships between savoring, mindfulness, and positive emotions. Therefore, only this average score was included as a predictor in the statistical model evaluating Hypothesis 2, and the within-person effect of negative emotions on positive emotions is not discussed further.

Mindfulness, savoring, and person means of positive emotions were all grand-mean centered such that 0 represented the average person in the sample. The interaction term was created by multiplying the two mean-centered mindfulness and savoring scores together (Aiken & West, 1991). To obtain an estimate of the conditional variability across participants in levels of positive emotions, a random effects component was included for the intercept. It was assumed that the within-person residuals ( $r_{ij}$ ) were independent and that both the residuals

and the random effect ( $u_{0j}$ ) were normally distributed with means of 0 and variances of  $\sigma^2$  and  $\tau_{00}$ , respectively.

**Hypothesis 3**—To test whether mindfulness and savoring the moment, through their relations with positive emotions, indirectly predicted residualized change over time in psychological health, moderated mediation models were specified by combining the multilevel regression model for positive emotions with a path analysis using a multilevel structural equation modeling framework (see Preacher, Zhang, & Zyphur, 2011; Preacher, Zyphur, & Zhang, 2010). These models were estimated in Mplus version 7.3 using maximum likelihood estimation with robust standard errors. All previous specifications for the multilevel regression model (e.g., a random effects component for the positive emotions intercept, requiring correlations between the four exogenous predictors, etc.) were carried forward to these analyses.

The basic model (depicted in Figure 1) was the same for each of the three psychological health measures (depression, psychological well-being, and life satisfaction). For each outcome measure, both daily positive emotions and the Time 2 value of psychological health were regressed on mindfulness, savoring the moment, and their interaction term, as well as the Time 1 value of psychological health. Simultaneously, the Time 2 value of psychological health was regressed on daily positive emotions. The same specifications made in the previous multilevel analyses were also incorporated here (e.g., a random effects component for the intercept of daily positive emotions). Alternative versions of these models were also estimated in which daily negative emotions was included as a simultaneous mediator.

All models (testing Hypotheses 2 and 3) run with daily negative emotions as a covariate or simultaneous mediator showed negligible differences in the hypothesized relationships between savoring, mindfulness, positive emotions, and psychological health. Therefore, the results presented here do not control for negative emotions. See online supplemental materials for full results with and without negative emotions included as an additional predictor.

For all reported analyses, statistical and graphical investigations indicated no egregious violations of assumptions underlying the specified models and no undue influence from outliers. Exclusion of more extreme scores (e.g., those with greater depression symptoms) did not appreciably change the results, and we did not exclude any participants on this basis.

## Results

Descriptive statistics and inter-correlations for all measures are shown in Table 1. Nearly all variables showed significant bivariate correlations in expected directions.

We did not anticipate that our sample, as a waitlist control group, would experience significant changes in positive emotions over nine weeks. Likewise, our preliminary analyses found no average change in positive emotions over time ( $p = 0.97$ ) and that this null effect did not differ across levels of mindfulness, savoring the moment, or their interaction ( $p$ s  $> 0.25$ ; full results are in online supplemental materials). Additionally, we did not find significant evidence that day-to-day variability in positive emotions (as indexed by the



standard deviation of each participant's daily emotion reports) was uniquely predicted by mindfulness, savoring the moment, or their interaction, including when controlling for mean positive emotions ( $\rho_s = 0.05\text{--}0.84$ ).

### Were Savoring the Moment and Mindfulness Correlated?

Savoring the moment and mindfulness were correlated at  $r(87) = 0.27, p = 0.01$ . This result supports the hypothesis that these constructs are moderately associated, replicating previous findings.

We also subjected raw scores on the fifteen MAAS and eight SBI items to a series of three CFAs: a one-factor model, a two-factor model in which the mindfulness and savoring latent variables were constrained to be uncorrelated, and a two-factor model in which they were allowed to correlate. The full results of these CFAs are available in the online supplemental materials. Briefly, the best fitting model was the correlated two-factor model, consistent with the hypothesis that dispositional mindfulness and perceived ability to savor the moment are related but distinct constructs. Critically, the estimated correlation between the savoring and mindfulness latent factors derived from this two-factor correlated model estimation was 0.29 ( $p = 0.01$ ), approximately equivalent to what was observed when we conducted the simple correlation using mean scores.

### Did Savoring the Moment and Mindfulness Interact to Predict Daily Positive Emotions?

First, we examined the unique roles of savoring the moment and mindfulness in predicting positive emotions. Accounting for its shared variance with mindfulness, savoring the moment significantly predicted mean levels of positive emotions over the reporting period ( $B = 0.19, SE = 0.05, p < 0.001, 95\% \text{ CI: } [0.08, 0.29]$ ), uniquely explaining approximately 12% of the between-person variance in these daily reports. Mindfulness, however, did not uniquely predict mean positive emotions over the reporting period ( $B = 0.09, SE = 0.08, p = 0.26, 95\% \text{ CI: } [-0.07, 0.24]$ ).

Next, we examined whether savoring the moment and mindfulness interacted to predict mean positive emotions over the reporting period. As hypothesized, this interaction was significant, uniquely explaining approximately 4% of the between-person variance in positive emotions, above and beyond the individual roles of these variables ( $B = 0.15, SE = 0.07, p = 0.03, 95\% \text{ CI: } [0.01, 0.28]$ ).

This significant interaction was probed using guidelines and online computational tools from Preacher, Curran, and Bauer (2006). As shown in Figure 2, savoring the moment predicted mean positive emotions only for individuals at moderate ( $b = 0.19, SE = 0.05, p < 0.001$ ) to high ( $b = 0.30, SE = 0.07, p < 0.001$ ), but not low ( $b = 0.07, SE = 0.07, p = 0.36$ ), levels of mindfulness, with the greatest levels of positive emotions among those high in both mindfulness and savoring the moment (see Panel A). The Johnson-Neyman technique for estimating regions of significance (see Preacher, Curran, & Bauer, 2006) showed that savoring the moment was significantly positively associated with mean positive emotions at values of mindfulness greater than approximately one-half standard deviation below the mean (74.16% of the sample scored above this value). Equivalently, dispositional mindfulness predicted mean positive emotions only when individuals also were high ( $b =$

0.25,  $SE = 0.11$ ,  $p = 0.02$ ) in savoring the moment, but not when they were moderate ( $b = 0.08$ ,  $SE = 0.08$ ,  $p = 0.33$ ) to low ( $b = -0.10$ ,  $SE = 0.12$ ,  $p = 0.39$ ) in savoring the moment (see Panel B). The Johnson-Neyman technique revealed that mindfulness was significantly positively associated with mean positive emotions only at values of savoring the moment greater than approximately one-half standard deviation above the mean (31.46% of the sample scored above this value).

### **Does the Interaction between Savoring the Moment and Mindfulness, through Daily Positive Emotions, Predict Changes in Broader Psychological Health?**

First, we examined the unique unconditional indirect associations of savoring and mindfulness (i.e., excluding the savoring-X-mindfulness interaction term) with residualized change in each of the three psychological health indicators. As shown in Table 2, we found significant unconditional indirect associations of savoring the moment, through daily positive emotions, with psychological well-being and depressive symptoms, as well as a marginal indirect association with life satisfaction. However, in those same models, there were no unconditional indirect associations of mindfulness through positive emotions. In other words, only greater perceived ability to savor the moment predicted higher levels of daily positive emotions, which in turn predicted incremental increases in psychological health.

Next, we examined whether (a) indirect associations between savoring and psychological health were contingent on mindfulness, and (b) indirect associations between mindfulness and psychological health were contingent on savoring. Results were as hypothesized (see Table 2). To summarize, for individuals higher in mindfulness, the indirect association between savoring the moment and psychological health was stronger. For example, at moderate and high levels of mindfulness, savoring the moment significantly predicted incremental decreases in depressive symptoms, through higher mean positive emotions, while the indirect association at low levels of mindfulness was non-significant. Comparably, there was a tendency for the indirect association between mindfulness and psychological health to strengthen at higher levels of savoring the moment, though even at values greater than one standard deviation above the mean, these tests failed to reach conventional levels of significance.

### **Alternative Models**

The order of the variables in the model tested here is supported by previous theory and evidence as well as the order of the measurement in our longitudinal design. Tests of two conceivable alternative models were not supported by the data. To summarize, mindfulness and positive emotions did not interact to predict savoring ( $p = .35$ ), and the interaction between savoring and positive emotions to predict mindfulness was marginal ( $p = .06$ ; see online supplemental materials).

### **Discussion**

The present findings suggest that dispositional mindfulness and perceived ability to savor the moment are moderately related constructs (Hypothesis 1) that interact to predict positive

emotions (Hypothesis 2) and, in turn, psychological health (Hypothesis 3). Specifically, we found that the relation between savoring the moment and positive emotions and, in turn, residualized change in psychological health indicators, was amplified at greater levels of mindfulness and fell to non-significance at lower levels of mindfulness. After accounting for perceived ability to savor the moment, dispositional mindfulness only predicted positive emotions and, indirectly through positive emotions, residualized changes in psychological health, for those very high in savoring the moment.

Notably, our results were not altered when accounting for the co-presence of daily negative emotions, highlighting once again the unique contributions of positive emotions to well-being. The present findings add to a substantial and growing evidence base suggesting that wider mental health benefits accrue from positive emotions over time, independent of negative emotions (Fredrickson, 2013).

These results support our proposition that, when predicting positive emotions and their ensuing psychological health benefits, dispositional mindfulness and perceived ability to savor the moment may play complementary roles. We examined this proposition with a focus on more macro-level emotional and psychological health benefits, as a preliminary test. Our data do not speak to the more micro-level, potentially complementary processes during participants' days that might underlie our findings. However, our findings are consistent with the more micro-level explanation that dispositional mindfulness may reveal pleasant aspects of experience in daily life (Hill & Updegraff, 2012; Kiken & Shook, 2011), whereas savoring ability may provide strategies that increase enjoyment of pleasant experiences as they occur (Bryant & Veroff, 2007). Though existing evidence on each construct, individually, suggests these proposed roles, our findings highlight the value of examining the interactive functions of these two unique constructs together. This approach could be used in future research with additional daily measures to assess more micro-level processes (e.g., noticing pleasant stimuli and emotions; using specific savoring strategies) that are potentially predicted by dispositional mindfulness and perceived ability to savor the moment.

Our findings, though preliminary, also raise questions and may have implications for well-being interventions. As noted by other researchers (Lyubomirsky, Sheldon, & Schkade, 2005; Seear & Vella-Brodrick, 2013), individual differences such as dispositional mindfulness may be important predictors of the degree of benefit from specific positive psychology interventions. Based on the present research, it is possible that individuals who are low in perceived ability to savor the moment but moderate to high (vs. low) in dispositional mindfulness may be positioned to benefit more from interventions that target the ability to savor the moment (e.g., Hurley and Kwon, 2011). Similarly, individuals who are relatively high in ability to savor the moment but low in dispositional mindfulness may experience greater benefits for and through positive emotions if they participate in mindfulness-based interventions that increase dispositional mindfulness (e.g., Mindfulness-Based Stress Reduction, Kabat-Zinn, 1990; see Keng et al., 2011). More broadly, interventions that include substantial training in both mindfulness and savoring the moment (e.g., Garland, 2013), to the extent that they alter these abilities, may be particularly suited to release the broader psychological health benefits of daily positive emotions.

Relatedly, the present research is also relevant to the proposition that mindfulness-based interventions and dispositional mindfulness produce psychological health benefits partly through positive emotions (e.g., Geschwind, Peeters, Drukker, van Os, & Wichers, 2011). Our findings do not support the conclusion that dispositional mindfulness *uniquely* predicts daily positive emotions, beyond its shared variance with savoring ability. Other studies have produced mixed evidence as to whether an association between dispositional mindfulness and positive emotions exists, especially within samples that lack experience with meditation (Jislin-Goldberg et al., 2012). Placing our results in this larger context, it is important to consider that correlates of mindfulness such as ability to savor the moment, and conceivably other aspects of meditative practices or mindfulness-based interventions (e.g., cognitive reappraisal), may moderate whether dispositional mindfulness relates to daily positive emotions (or trait-like positive affect). Further, it is vital to note that mindfulness may benefit health and well-being through means other than positive emotions. For example, previous research suggests that dispositional mindfulness is associated positively with nonattachment and inversely with negative affect, variables that may also mediate relations between mindfulness and indices of well-being (Keng et al., 2011; Sahdra, Ciarrochi & Parker, 2016; also see our supplemental analyses that include negative emotions).

Our findings should be interpreted with potential limitations in mind. Causal conclusions cannot be drawn from observational studies. That said, our longitudinal design was useful for examining the predictive value of dispositional mindfulness and perceived ability to savor the moment over approximately two subsequent months. Our data do not reveal longer trajectories of psychological health, although the observed fortifications to psychological health as positive emotions accrued over time are consistent with broaden-and-build theory (Fredrickson, 2013). Additionally, our sample size was sufficient to detect medium and large but not small effects, and estimates of regions of significance would be more precise with larger samples. Further, results from this largely middle-aged, well-educated, nonclinical sample may not generalize to other populations. At the same time, field studies have relatively high ecological validity. We also employed self-reports, which are subject to some biases, although using daily reports of emotions mitigates memory biases to a degree.

Another measurement consideration is that other operationalizations of mindfulness might reveal different results. For example, future research with multifaceted measures (typically with two to five components – e.g., Baer et al., 2006; Coffey, Hartman, & Fredrickson, 2010) might reveal that only particular aspects of mindfulness interact with savoring to predict positive emotions. In addition, the present research focused on positive emotions because they are central to distinctions between mindfulness and savoring, yet additional variables may moderate or mediate relations between mindfulness or savoring and psychological health. On this note, the wider benefits of positive emotions for psychological health rely on building personal and social resources (Fredrickson et al., 2008; Fredrickson, 2013). Therefore, the extent or type of resources cultivated from positive emotions may be important for understanding relations between savoring ability and some aspects of psychological health (e.g., life satisfaction, for which the unconditional indirect relation was nonsignificant in the present research). Altogether, replication studies with different and larger samples, as well as experimental designs to examine causality, are warranted. Future research also should examine more micro-level processes, such as the detection of positive

stimuli and use of savoring strategies, to illuminate specifically how dispositional mindfulness and savoring the moment may synergize to produce daily positive emotions and their broader benefits.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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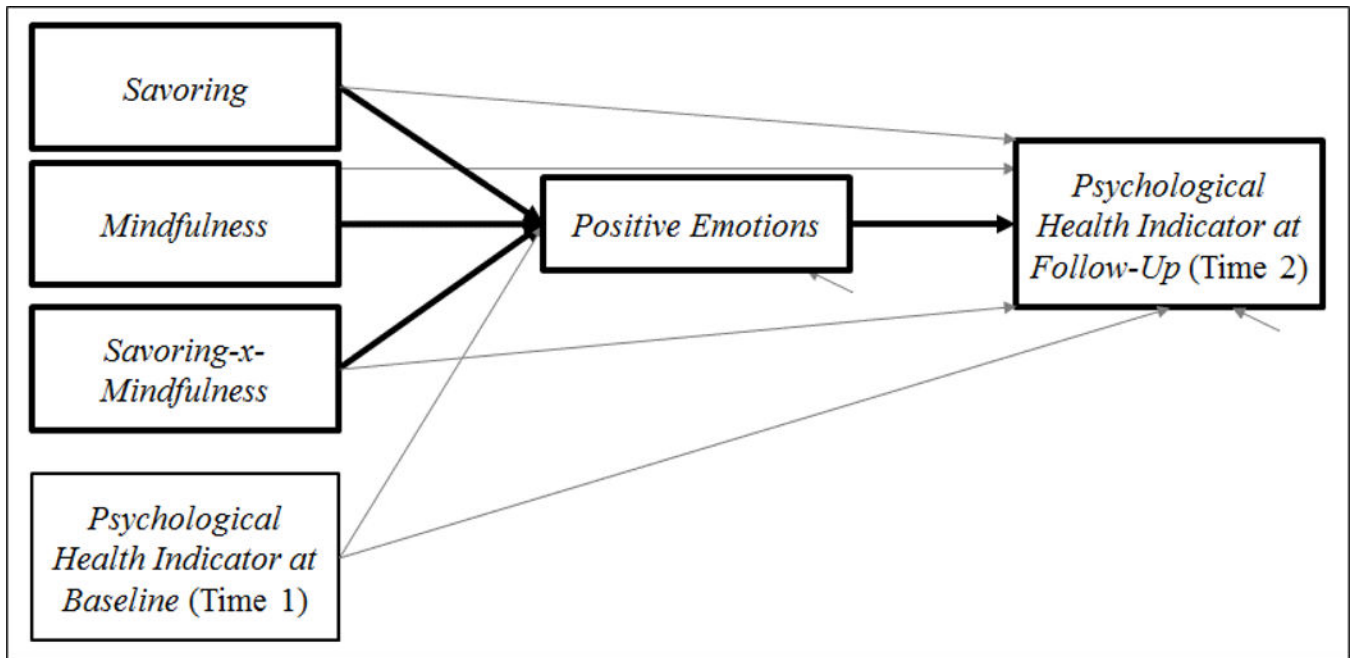
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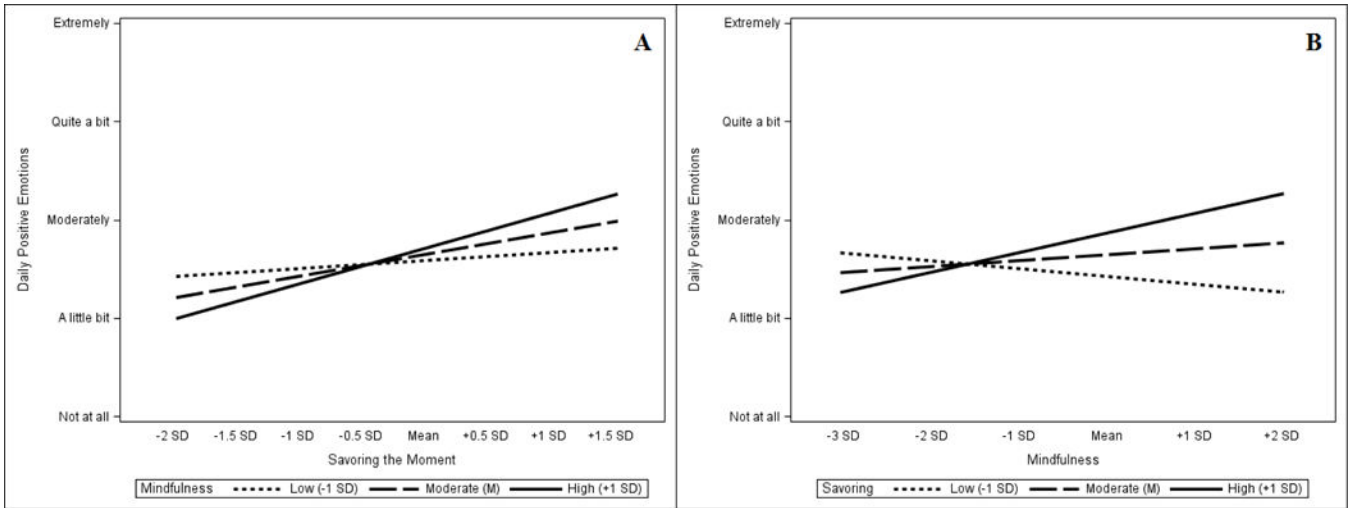


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**Figure 1.**

The moderated mediation model, which was the same for each of the three psychological health measures (depression, psychological well-being, and life satisfaction). The small arrows pointing to the endogenous variables (e.g., positive emotions) represent residual (unexplained) variance in the outcome measure. All exogenous variables (e.g., savoring) were allowed to covary.



**Figure 2.** Conditional simple slopes illustrating the model-implied relationship between savoring the moment and mindfulness in predicting daily positive emotions. Panel A depicts the model-implied relationship between positive emotions and savoring the moment at high (+1 SD), moderate (M), and low (-1 SD) levels of mindfulness. Savoring the moment was significantly positively predictive of positive emotions at high and moderate, but not low, levels of mindfulness. Panel B depicts the model-implied relationship between positive emotions and mindfulness at high (+1 SD), moderate (M), and low (-1 SD) levels of savoring the moment. Mindfulness was significantly positively predictive of positive emotions at high, but not moderate or low, levels of savoring the moment.

**Table 1**

Descriptive statistics for the primary variables of interest.

	PEs	NEs	Mindful.	Savoring	Time 1 CES-D	Time 2 CES-D	Time 1 PWB	Time 2 PWB	Time 1 SWLS	Time 2 SWLS
PEs	<b>2.68 (0.61)</b>									
NEs	-0.02 <i>ns</i>	<b>1.54 (0.37)</b>								
Mindful.	0.21 *	-0.26 *	<b>3.84 (0.79)</b>							
Savoring	0.39 **	-0.21 †	0.27 *	<b>4.99 (1.19)</b>						
Time 1 CES-D	-0.31 **	0.39 **	-0.58 ***	-0.58 ***	<b>14.74 (8.75)</b>					
Time 2 CES-D	-0.45 ***	0.41 ***	-0.35 **	-0.33 **	0.55 ***	<b>13.24 (9.25)</b>				
Time 1 PWB	0.32 **	-0.191	0.53 ***	0.60 ***	-0.63 ***	-0.40 **	<b>4.45 (0.69)</b>			
Time 2 PWB	0.45 ***	-0.27 **	0.49 ***	0.59 ***	-0.55 ***	-0.54 ***	0.84 ***	<b>4.53 (0.60)</b>		
Time 1 SWLS	0.39 **	-0.14 <i>ns</i>	0.31 **	0.32 **	-0.49 ***	-0.52 ***	0.55 ***	0.48 ***	<b>4.11 (1.36)</b>	
Time 2 SWLS	0.45 ***	-0.22 *	0.31 **	0.26 *	-0.42 ***	-0.64 ***	0.40 ***	0.50 ***	0.79 ***	<b>4.37 (1.39)</b>

PEs and NEs = The individual's mean levels of positive and negative emotions reported across approximately nine weeks of daily reports. *Mindful.* = Dispositional mindfulness. *Savoring* = Perceived ability to savor the moment. *CES-D* = Depressive symptoms. *PWB* = Psychological well-being. *SWLS* = Life satisfaction. Means and standard deviations (in parentheses) appear in bold along the diagonal. *N* = 89.

\*\*\* *p* < .0001,

\*\* *p* < .01,

\* *p* < .05,

† *p* < .10,

*ns* = not significant

**Table 2**

Selected results from models estimating the indirect and conditional indirect associations of savoring and mindfulness with changes in psychological health via daily positive emotions.

Unconditional Indirect Associations Mindfulness & Savoring as Predictors of Positive Emotions and, In Turn, Residualized Change Psychological Health						
	Satisfaction with life		Psychological well-being		Depressive symptoms	
	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI
Positive emotions residual	<b>0.30*</b> (0.12)	[0.06, 0.54]	<b>0.30*</b> (0.10)	[0.10, 0.49]	<b>-0.54*</b> (0.15)	[-0.84, -0.25]
Unconditional indirect association of savoring	0.04 <sup>†</sup> (0.02)	[0.00, 0.09]	<b>0.05*</b> (0.02)	[0.003, 0.09]	<b>-0.09*</b> (0.04)	[-0.17, -0.02]
Unconditional indirect association of mindfulness	0.01 (0.03)	[-0.04, 0.06]	0.02 (0.03)	[-0.04, 0.08]	-0.03 (0.05)	[-0.14, 0.07]
Direct association of savoring	-0.05 (0.06)	[-0.17, 0.07]	0.07 (0.07)	[-0.07, 0.20]	0.07 (0.09)	[-0.10, 0.24]
Direct association of mindfulness	0.08 (0.08)	[-0.07, 0.22]	0.07 (0.08)	[-0.09, 0.23]	-0.03 (0.12)	[-0.26, 0.21]
Proportion of variance explained	65.62%		74.12%		39.33%	
Conditional Indirect Associations Mindfulness, Savoring, and their Interaction as Predictors of Positive Emotions and, In Turn, Residualized Change in Psychological Health						
	Satisfaction with life		Psychological well-being		Depressive symptoms	
	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI
Positive emotions residual	<b>0.35*</b> (0.12)	[0.11, 0.60]	<b>0.28*</b> (0.10)	[0.09, 0.48]	<b>-0.59*</b> (0.17)	[-0.92, -0.26]
Conditional indirect association of savoring						
At low mindfulness (-1 SD)	0.01 (0.03)	[-0.04, 0.06]	0.01 (0.02)	[-0.03, 0.05]	-0.03 (0.04)	[-0.12, 0.05]
At average mindfulness (mean)	<b>0.05*</b> (0.03)	[0.004, 0.10]	<b>0.04*</b> (0.02)	[0.002, 0.09]	<b>-0.10*</b> (0.04)	[-0.18, -0.02]
At high mindfulness (+1 SD)	<b>0.10*</b> (0.04)	[0.02, 0.17]	<b>0.08*</b> (0.03)	[0.01, 0.15]	<b>-0.17*</b> (0.07)	[-0.30, -0.04]
Conditional indirect association of mindfulness						
At low savoring (-1 SD)	-0.06 (0.04)	[-0.14, 0.03]	-0.04 (0.03)	[-0.11, 0.03]	0.07 (0.07)	[-0.06, 0.20]
At average savoring (mean)	0.01 (0.03)	[-0.05, 0.07]	0.01 (0.03)	[-0.04, 0.06]	-0.03 (0.06)	[-0.14, 0.08]
At high savoring (+1 SD)	0.07 <sup>†</sup> (0.04)	[-0.01, 0.16]	0.06 (0.04)	[-0.02, 0.15]	-0.14 (0.09)	[-0.31, 0.04]
Direct association of savoring	-0.06 (0.06)	[-0.18, 0.06]	0.07 (0.07)	[-0.06, 0.20]	0.08 (0.09)	[-0.09, 0.25]
Direct association of mindfulness	0.09 (0.07)	[-0.05, 0.23]	0.07 (0.08)	[-0.09, 0.22]	-0.03 (0.12)	[-0.26, 0.20]
Direct association of savoring-x-mindfulness	<b>-0.14*</b> (0.06)	[-0.26, -0.02]	0.04 (0.07)	[-0.10, 0.17]	0.14 (0.09)	[-0.05, 0.32]

Unconditional Indirect Associations Mindfulness & Savoring as Predictors of Positive Emotions and, In Turn, Residualized Change Psychological Health						
	Satisfaction with life		Psychological well-being		Depressive symptoms	
	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI
Proportion of variance explained	66.94%		74.22%		40.55%	

Note: *Positive emotions residual* refers to the relationship between daily positive emotions and the psychological health indicator at Time 2 when controlling for savoring, mindfulness (and their interaction, as appropriate), and Time 1 scores for the psychological health indicator. *Unconditional indirect association* refers to the indirect relationship between savoring (mindfulness) and residualized change in the psychological health indicator via daily positive emotions when controlling for mindfulness (savoring). *Direct association* refers to the direct relationship between a predictor variable and the psychological health indicator at Time 2 when controlling for all other variables. *Conditional indirect association* refers to the indirect relationship between savoring (mindfulness) and residualized change in the psychological health indicator via daily positive emotions at low, moderate, and high levels of mindfulness (savoring). *Proportion of variance explained* refers to the reduction in variance for the outcome variable (e.g., T2 life satisfaction) when the full set of predictors is included. The Time 1 and 2 scores for the psychological health indicators have been standardized as z-scores to facilitate comparisons across models, but all other variables remain in their raw metric.

\*  $p < .05$ ,

$\dagger p < 0.10$