STOP AND THINK ABOUT SMELLING THE ROSES: AN EXAMINATION OF AFFECT, SAVORING, AND HEALTH ACROSS THE ADULT LIFESPAN

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ABSTRACT

Savoring abilities are proposed to enhance the experience of positive affect yet there is a paucity of research exploring the moderating role of savoring in the association of positive affect and health outcomes. The primary aim of this study was to examine savoring as a cross-sectional moderator of the associations of affect and self-rated global, physical, and mental health in an adult sample. A secondary aim was to explore whether the proposed savoring-moderated association varied by age. A total of 216 adults aged 20-80 years-old completed a series of questionnaires including the Positive and Negative Affect Schedule (PANAS; used to calculate an affect balance score), the Savoring Beliefs Inventory, and the PROMIS 10-item measure of global self-rated health (used to derive global, physical, and mental health ratings). Study materials were completed online, at a single-time point. Greater affect balance scores were uniquely positively associated with global, physical, and mental health. Further, savoring ability was positively associated with global and mental health. Our data did not support the proposed savoring–moderated associations of affect and self-rated global, physical, and mental health or the proposed age-moderated association of affect, savoring, and self-rated health outcomes. Despite the nonsignificant conditional models, this study sheds light on the unique relations of affect and savoring ability with several aspects of subjective health. Additionally, our findings highlight the need to promote positive affective experiences and the processes related to their regulation and enhancement, as these experiences seem to be positively associated with subjective health experiences.
DEDICATION

This dissertation is dedicated to my family, friends, mentors, and colleagues whose support made this project possible. And to the older adults with whom I’ve had the pleasure of working with, who have reminded me that sometimes in all of life’s busyness we ought to just stop and be.
LIST OF ABBREVIATIONS AND SYMBOLS

\( M \)  Mean: the sum of a set of measurements divided by the number of measurements in the set

\( SD \)  Standard deviation: the square root of the variance of the sample

\( N \)  Total number in a sample

\( p \)  Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value

\( r \)  Pearson correlation

\( df \)  Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data

\( F \)  Fisher’s F ratio: A ratio of two variances

\( f^2 \)  Cohen’s method of effect size

\( X^2 \)  Chi Square statistic: test statistic to evaluate how likely it is that any observed difference between the sets arose by chance

\( \alpha \)  Cronbach’s alpha: a coefficient of internal consistency

\( t \)  Computed value of t test

\( R^2 \)  The square of the sample correlation; coefficient of determination

\( B \)  Unstandardized beta weight associated with a variable

\( \beta \)  Standardized beta weight associated with a variable

\(<\)  Less than

\( >\)  Greater than

\( =\)  Equal to
ACKNOWLEDGMENTS

I extend my sincerest appreciation to my graduate mentor, Dr. Natalie Dautovich, for her unwavering support, nonjudgmental patience, and gentle guidance throughout my graduate studies. I feel so lucky to have worked closely with someone who I wholeheartedly respect as a professional, a mentor, and a person. I also want to express my profound gratitude for my “adopted” graduate mentor, Dr. Rebecca Allen, who welcomed me into her research family without hesitation. I admire Dr. Allen’s strength and her contagious passion for leaving the world better than we found it.

To my dissertation committee members—Dr. Sheila Black, Dr. Michelle Hilgeman, and Dr. Patricia Parmelee—I am grateful for your thoughtful feedback, stimulation of critical thinking, and your knowledge and experience that contributed to the development and implementation of this project. I also offer my gratitude to the American Psychological Association. The research described in this paper was supported in part by a grant from the American Psychological Association.

I express thanks to my Mom, the anticipatory savorer, who has pushed me to enjoy life to the fullest and provided me with so many experiences to be grateful for; to my Dad, the ultimate savorer, who first taught me the value of slowing down to appreciate life’s beautiful experiences; and to my sister, whose sensibility and wit helps to put things in perspective and remind me of what matters most. Finally, I am grateful to have had the support of my partner, Chris, who has patiently stood beside me through triumphs and trials, and the support of some of my dearest friends—Natalie Nelson, Rachel Dietrich, Tara Thomas, Bianka Barraza, Morgan and Bryan Eichorst, Nicole Mechin, and Michelle Jones—who keep me centered.
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1. INTRODUCTION

Though much existing research focuses on the regulation of negative emotions, positive emotions can also be regulated. As with negative emotion regulation, effective positive emotion regulation may be associated with beneficial outcomes in emotional and affective domains, and beyond. Savoring is one specific form of positive emotion regulation in which attending to positive experiences and feelings results in the “generation, maintenance, or enhancement” of positive affect (Bryant, Chadwick, & Kluwe, 2011, p. 108). Notably, positive affect itself predicts various aspects of physical and mental health (Lyubomirsky, King, & Diener, 2005; Pressman & Cohen, 2005; Steptoe, Deaton, & Stone, 2015). Considering the known association of positive affect with health outcomes and the role of savoring in maintaining and enhancing positive affect, it follows that savoring abilities may influence how affect relates to broader health experiences. Therefore, the overarching aim of this study was to investigate the enhancing or buffering effects of savoring on affective experiences and self-rated global, physical, and mental health across adult ages.

Savoring

Savoring is defined as the capacity “to attend to, appreciate, and enhance” past, present, and future positive affective experiences (Bryant & Veroff, 2007, p. 2). Savoring has been identified as a correlate of the experience of positive affect (e.g., Carl, Fairholme, Gallagher, Thompson-Hollands, & Barlow, 2014; Hou et al., 2016; Hurley & Kwon, 2013) and related mental health outcomes such as subjective well-being (Ramsey & Gentzler, 2014) and psychological well-being (Smith & Hollinger-Smith, 2015). Fewer studies have explored savoring in relation to physical health outcomes but those that have suggest a positive correlation such
that increased savoring abilities are associated with increased subjective physical health ratings (Segerstrom, Roach, Evans, & Schipper, 2010; Smith & Bryant, 2015).

**Savoring as a Moderator**

In addition to being studied as a correlate of positive affect, savoring has also been examined as a moderator in relation to affect. Hurley & Kwon (2013) investigated the association of daily uplifts, savoring beliefs, and change in positive affect across a two-week period. In their work, Hurley and Kwon (2013) identified that having a greater capacity to savor offset the experience of less positive affect for individuals who had experienced low levels of daily uplifts. Of relevance to the present study, these findings support the study of savoring as modulating the experience of positive affect. Notably, however, there is a lack of literature investigating how savoring might interact with positive affect to influence other known correlates of positive affect. In the present study, savoring is examined as a moderator of the association of affect and self-rated global, physical, and mental health.

**Affect, Savoring, Self-rated Health**

Mounting evidence suggests that positive affect is positively associated with self-rated health outcomes across the adult lifespan (for reviews see Pressman & Cohen, 2005 and Lyubomirsky et al., 2005). Self-rated health is commonly investigated as an indicator of objective health and predicts significant health outcomes (e.g., mortality; Idler & Benyamini, 1997). However, self-rated health is a measure based on individuals’ own perceptions and, as such, also involves a cognitive component (Layes, Asada, & Kephart, 2012).

Layes and colleagues (2012) propose a conceptual model in which self-rated health is influenced proximally by both latent health status and reporting behaviors, and distally by sociodemographic and behavioral factors (see Figure 1). In accordance with Layes and colleagues’ (2012) model of self-rated health, conceptual models derived from syntheses of the affect–health literature suggest that affect, and positive affect more specifically, relates to health directly via physiological mechanisms and indirectly through complex mechanisms likely
involving psychological, physical, and social components (for reviews see DeSteno, Gross, & Kubzansky, 2013 and Pressman & Cohen, 2005). Considered in the context of Layes and colleagues’ (2012) conceptualization of self-rated health, these findings suggest that the role of positive affect in self-rated health may be similar to that of the sociodemographic and behavioral factors that contribute to latent health and reporting behaviors. It is beyond the scope of the present study to explore the specific mechanisms through which positive affect relates to self-rated health. However, affective experiences, by nature, can be brief and so one’s ability to enhance the intensity of or even prolong positive experiences (i.e., savor) may play some role in precipitating the aforementioned biopsychosocial (i.e., latent health) and cognitive (i.e., reporting behaviors) mechanisms, thereby strengthening the association that positive affect has with self-rated health outcomes.

![Diagram](image)

**Figure 1.** Layes et al. (2012) conceptualization of self-rated health adapted to include positive affect (adaptation indicated by bold and italic font-type).

With regards to the latent health component of a subjective health rating, increased positive affect has been related to the alleviation of disease onset and progression directly through biological (i.e., autonomic nervous system and hypothalamic–pituitary–adrenal axis activity) and behavioral (i.e., health practices, social ties) pathways (Pressman & Cohen, 2005).
From an emotion-regulation perspective, the enhancement of positive affect may contribute to more positive objective health outcomes. Savoring involves a series of cognitive and behavioral actions aimed at attending to positive feelings and is characterized as attentional deployment, a form of emotion regulation (Bryant, 2003; Gross, 1998; Quoidbach, Mikolajczak, & Gross, 2015). Importantly, a recent review of positive interventions identified strong evidence for the effectiveness of attentional deployment strategies, which include savoring, at maintaining short- and long-term increases in positive emotions (Quoidbach et al., 2015). Said increases in positive emotions may, therefore, play a role in enhancing processes linking positive affect and latent, and therefore self-rated, health. From this work suggesting that attentional deployment strategies maintain and prolong increases in positive affect, and research identifying the link between positive affect and both objective and subjective health (Pressman & Cohen, 2005 and Lyubomirsky et al., 2005), we derive additional support for the hypothesis that savoring abilities will enhance the positive association of affect and self-rated health outcomes.

In addition to enhancing the association of positive affect and self-rated health from an emotion regulation perspective, savoring may also play a role in the association of positive affect and self-rated health from a cognitive, or reporting behavior, standpoint. The act of savoring itself is a cognitive process and has been classified as a form of repetitive thought, characterized by “thinking attentively, repetitively, or frequently about oneself or one’s world” (Segerstrom et al., 2003, p. 909). Within this framework, savoring is considered to be a form of repetitive thought that is positively valenced with its purpose characterized by certainty, as opposed to uncertainty and searching (Segerstrom et al., 2010). Accordingly, savoring, like self-rated health measures, involves cognitive appraisals. Based on the conceptualization of savoring as a form of positive repetitive thought and the tendency for self-rated health to be influenced by reporting behaviors (Layes et al., 2012), we propose that the positive repetitive nature of savoring may positively influence the reporting behaviors associated with subjective health ratings. Put differently, individuals with a greater inclination to savor are presumed to be
engaging in more positive thinking habits (e.g., attending to positive stimuli and experiences) and may be more positively cognitively oriented in general; this positivity may also manifest in reporting biased towards better self-evaluations of health. As such, individuals who are attending more frequently and intently to some level of positive affect would be expected to view their health as being better than those attending less frequently and intently to the same level of positive affect.

**Age and the Association of Affect, Savoring, and Self-rated Health**

Age may also play a role in the tendency for savoring to moderate the affect–self-rated health associations. Like other developmental theories of emotion (i.e., strength and vulnerability integration; SAVI; Charles, 2010) and motivation (i.e., socioemotional selectivity theory; SST; Carstensen, Isaacowitz, & Charles, 1999), savoring tendencies are proposed to change across the lifespan. Specifically, savoring is proposed to increase with age, as a function of future time perspective (Bryant & Veroff, 2007). In older adulthood, when individuals presumably have a more limited future time perspective, there may be enhanced motivation to attend to and appreciate positive experiences (Bryant & Veroff, 2007). The SAVI model of emotion (Charles, 2010) complements SST-derived inferences about savoring by proposing that older adults exhibit enhanced attentional strategies and are more successful in the application of behaviors that regulate emotional experiences (Charles, 2010). Such enhanced abilities are evident in phenomena such as the positivity effect, which is the age-related tendency to more frequently attend to positive, relative to negative, stimuli (Carstensen & Mikels, 2005).

The positivity bias evidenced in older adults’ attentional tendencies may also be evident in their health perceptions. Layes and colleagues (2012) specifically posit that age directly influences latent health and indirectly influences reporting behavior through mechanisms such as knowledge about one’s health, social expectations surrounding illness, acceptability of illness, and adaptability of illness (Layes et al., 2012). As such, in their population-based study of Canadian adults’ self-rated health, Layes and colleagues (2012) noted that older individuals
(80+ years) rated their health the most optimistically relative to other age groups, with some variability based on income, unemployment, and physical activity. Similar trends have been demonstrated in additional studies (e.g., Leinonen, Heikkinen, & Jylhä, 2001), such that older adults tend to perceive their health as better than would be expected based on objective health indicators.

Beyond this potential positivity bias in perceptions of health, other studies have illustrated that older adults’ subjective health ratings may be impacted by different factors than younger adults’ subjective health ratings. Of relevance to the present study, Pinquart (2001) reviewed the subjective health literature and highlighted that relative to young-old adults, old-old adults’ subjective health ratings correlated more strongly with their mental health and less strongly with their physical and functional health. These findings suggest that older adults’ perceptions of health may be increasingly vulnerable to positive cognitive and attentional biases evident in savoring processes. They further suggest that psychological processes and correlates of mental health (e.g., savoring) may be more relevant to older adults’ perceptions of health.

To summarize, older adults may savor more frequently (Carstensen et al., 1999) and skillfully (Charles, 2010), and their subjective health may be more susceptible to cognitive and psychological biases (Layes et al., 2012; Pinquart, 2001). Based on these notions, it is anticipated that age will influence the affect, savoring, and self-rated health models proposed in the present study. That is, the tendency for savoring to moderate the affect–self-rated health association will be stronger at older ages than at younger ages.

The Present Study

The literature on savoring is burgeoning, yet there remain significant areas of inquiry that warrant investigation. Specifically, despite the proposition that savoring enhances or prolongs positive affective experiences, there are few studies exploring how this enhancing tendency manifests in the associations of positive affect with known correlates of positive affect. Notably,
there are no studies that have specifically studied savoring as moderating the association of affect and self-rated health outcomes. Therefore, the present study contributes to the existing literature by exploring the interaction of affect and savoring in relation to self-rated global, mental, and physical health outcomes (see Figure 2). The wide age-range of adults in the present sample further permits the cross-sectional study of age as a secondary moderator in these affect, savoring, and self-rated health associations (see Figure 3).

**Figure 2.** Savoring as a moderator of the association of affect and global health (aim 1), physical health (aim 2), and mental health (aim 3).

**Figure 3.** Age as a secondary moderator of the savoring-moderated association of affect and global health (aim 1a), physical health (aim 2a), and mental health (aim 3a).
In the present study, affect is examined as affect balance, or the difference between experienced positive and negative affect. Positive and negative affect have each been identified as predictors of self-rated health (Benyamini, Idler, Leventhal, & Leventhal, 2000; Gallo & Matthews, 2003; Pressman & Cohen, 2005; Steptoe et al., 2015). However, the orthogonality of positive and negative affect is somewhat equivocal (e.g., Green & Salovey, 1999). Though they may function independently, measures of positive and negative affect are often moderately correlated, precipitating a need to concomitantly consider positive and negative affect.

The primary outcomes of interest in the present study are a global measure of subjective health (representative of physical, mental, and social health) and component measures of subjective physical and mental health. Subjective measures of health can range from assessments of specific domains of functioning (e.g., pain or sleep) to single-item questions inquiring about how individuals rate their “health in general.” This variability in measurement, in part, may result from the wide variety of definitions and conceptualizations of health. Originally proposed by Engel (1977), the biopsychosocial model posits that biological, psychological, and social processes all interact to influence human health and functioning; this interaction is thought by some to be “inextricable” (Suls & Rothman, 2004). Assuming the inextricability of these processes, useful information about health may be missed if health in one of these domains is studied without consideration of the others. Consistent with the biopsychosocial model, the Patient Reported Outcomes Measurement Information System (PROMIS) measure of global health produces a global health score that represents aspects of physical, mental, and social health and further produces component physical and mental health scores. As such, and also because of its psychometric strengths (Fries, Bruce, & Cella, 2005), the PROMIS measure of global health was used to assess subjective health in the present study.

**Study aims and hypotheses**

In sum, the overall objective of the present study was to examine how savoring, a cognitive process and method of positive emotion regulation, influences the association of affect
and several aspects of self-rated health across the adult lifespan. The specific aims of the study were to examine:

1) savoring as a moderator of affect and global health (Figure 2)
   
   1a) age as a moderator of the affect, savoring, and global health association (Figure 3),

2) savoring as a moderator of affect and physical health (Figure 2),
   
   2a) age as a moderator of the affect, savoring, and physical health association (Figure 3),

3) savoring as a moderator of affect and mental health (Figure 2),
   
   3a) age as a moderator of the affect, savoring and mental health association (Figure 3).

Based on the reviewed literature, we hypothesized that savoring would moderate the association of affect with global health (aim 1), physical health (aim 2), and mental health (aim 3). More specifically, we anticipated that higher levels of savoring would enhance the positive association of affect balance scores with global, physical, and mental health, respectively. Additionally, we hypothesized that the influence of savoring on the affect-health (global, physical, and mental) associations would be conditional on age (aims 1a, 2a, and 3a). That is, we anticipated that the association of affect and each of the health outcomes would be positive, but the difference in the effect at varying levels of savoring would be larger for older individuals.
2. METHOD

Participants

To be included in the current study, participants were required to be at least 18 years of age, reside in the United States, and have computer and internet access. For their data to be included in the primary analyses, participants also had to correctly respond to two items assessing attention to study materials.

The final sample consisted of 216 participants. Participants ranged in age from 20 to 80 years old (M = 44.9 years, SD = 15.6 years; see Figure 4 for histogram of frequency and distribution of participants’ ages). The majority of participants self-identified as female (57.7%). Approximately 82.1% of the sample identified their race as White. Participants reported an average of 15.4 years of education. The average number of physical health conditions endorsed was .79. See Table 1 for further details on participant demographics and characteristics.

Figure 4. Frequency and distribution of participants’ ages.
As previously mentioned, to be included in the present study, participants were required to respond correctly to two items assessing attention. The first item contained a four sentence block of text followed by a question prompting individuals to indicate the year. The block of text consisted of a three sentence introduction to the study, followed by one sentence instructing participants to ignore the question and, rather, select the response option “2012.” Participants who responded incorrectly to this first attention item (presented prior to other study materials) were immediately excluded from the study. The second attention item was embedded within the Savoring Beliefs Inventory and consisted of an item prompting participants to “indicate the response choice furthest to the left, the strongly disagree option.” Because it was embedded within a study measure, this attention item was presented later in study materials than the first attention item; this permitted descriptive analysis of non-attending participant characteristics. These participants’ data were, however, excluded from analyses testing study aims. There were 23 participants who did not respond correctly to the second of the two items assessing attention. Of note, non-attenders ($M = 38.4$ years, $SD = 14.0$ years) were significantly younger than attenders ($M = 45.5$ years, $SD = 15.5$ years), $t(225) = 2.11, p = .04$ and were also more likely to be male, $X^2(1, N = 227) = 4.65, p = .03$. Non-attenders did not differ from attenders in terms of race, $X^2(5, N = 227) = .71, p = .98$, or income adequacy, $t(225) = -1.38, p = .17$.

**Measures**

**Demographics.** Participants self-reported demographic characteristics via a demographics questionnaire. The demographics questionnaire assessed variables such as age, sex, race, and income adequacy. Age was of interest for inclusion as a moderator and potential covariate. Sex, race, and income adequacy were of interest as potential demographic covariates. Because race was being explored as a potential covariate and was not a primary variable of interest, it was dichotomized (non-Hispanic White or not) for statistical analyses. A modified version of a physical health measure developed by Lichstein, Durrence, Riedel, Taylor,
and Bush (2013) was also included to measure the presence and duration of a variety of physical health conditions (e.g., heart disease, cancer, diabetes).

Table 1

Participants Demographics and Characteristics

<table>
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<tr>
<th>Variable</th>
<th>Percentage</th>
</tr>
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<td>Gender, % female</td>
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<tr>
<td>Race, %</td>
<td></td>
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<td>White or non-Hispanic</td>
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<td>Hispanic or Latino</td>
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<td>Asian or Pacific Islander</td>
<td>4.4</td>
</tr>
<tr>
<td>Native American or American Indian</td>
<td>.5</td>
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<tr>
<td>Other</td>
<td>1.9</td>
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<tr>
<td>Age (years)</td>
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<tr>
<td>Years of education</td>
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</tr>
<tr>
<td>Income adequacy a</td>
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</tr>
<tr>
<td>Number of Physical Conditions</td>
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<tr>
<td>Global health b. c</td>
<td>16 - 50</td>
</tr>
<tr>
<td>Physical health c</td>
<td>4 - 20</td>
</tr>
<tr>
<td>Mental health c</td>
<td>7 - 20</td>
</tr>
<tr>
<td>Affect balance</td>
<td>-27 - 40</td>
</tr>
<tr>
<td>Savoring beliefs</td>
<td>2.04 - 7</td>
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</table>

<table>
<thead>
<tr>
<th>Variable</th>
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<th>M (SD)</th>
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<tr>
<td>Years of education</td>
<td>4 - 23</td>
<td>15.4 (2.4)</td>
</tr>
<tr>
<td>Income adequacy a</td>
<td>1 - 5</td>
<td>1.98 (1.0)</td>
</tr>
<tr>
<td>Number of Physical Conditions</td>
<td>0 - 6</td>
<td>.8 (1.2)</td>
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<tr>
<td>Global health b. c</td>
<td>16 - 50</td>
<td>37.6 (8.2)</td>
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<td>Physical health c</td>
<td>4 - 20</td>
<td>16.2 (2.9)</td>
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<td>Mental health c</td>
<td>7 - 20</td>
<td>14.2 (4.2)</td>
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<tr>
<td>Affect balance</td>
<td>-27 - 40</td>
<td>17.6 (13.7)</td>
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<tr>
<td>Savoring beliefs</td>
<td>2.04 - 7</td>
<td>5.3 (1.2)</td>
</tr>
</tbody>
</table>

*Higher scores are indicative of lower income adequacy

*Composite of self-rated physical, mental, and social health ratings

*Higher scores indicate better health ratings

**Affect.** Affect was measured using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS contains 20 items. The positive affect scale
consists of 10 items (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, active) and the negative affect scale consists of 10 items (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, afraid). Respondents indicated on a 5-point Likert-type scale (1 = very slightly or not at all, 5 = extremely) the extent to which they felt each item during the past week. Respondents also had the option of selecting a “not familiar with this word” option. This response option was included to prevent missing data potentially relating to unfamiliarity with item definitions. In the present sample, the “not familiar with this word” option was endorsed a total of 13 times (out of 4225 total affect items endorsed) across 10 affect words (interested, excited, upset, guilty, proud, alert, determined, attentive, active, afraid).

The psychometric properties of the PANAS have been established with the “past week” temporal instructions in a population-based sample of adults ranging in age from 18 to 91 years (M = 42.9 years, SD = 15.7 years; Crawford & Henry, 2004). The positive affect (Cronbach’s α = .89, 95% CI = .88 -.90) and negative affect (Cronbach’s α = .85, 95% CI = .84 -.87) scales were adequately reliable when using the “past week” set of instructions (Crawford & Henry, 2004). The convergent and discriminant validity of the PANAS has also been established through comparison with other measures of mood (Watson et al., 1988). In the present sample, the positive (Cronbach’s α = .93) and negative affect (Cronbach’s α = .94) scales demonstrated good reliability.

For the current study, affect was examined using an affect balance score. Consistent with Bradburn’s approach (1969), affect balance was calculated by subtracting the sum of negative affect item responses from the sum of positive affect item responses. Affect balance scores were only calculated if the participant responded to all affect items. Affect balance scores may range from -50 to +50, where greater affect balance scores are indicative of better affective outcomes.

Of note, the positivity ratio was explored as a possible representation of individuals’ affect. The positivity ratio is arguably more nuanced in that it accounts for response biases by
dividing the count of positive affect items endorsed above a certain threshold by the count of negative affect items endorsed above a certain threshold. Based on this formula, however, it is possible for individuals with low levels of negative affect to have an undefined positivity ratio (e.g., if no negative affect item is endorsed above the minimum threshold, the denominator of the positivity ratio would be zero). The affect balance calculation simply requires the subtraction of summed negative affect items from summed positive affect items and, as such, does not result in undefined values for individuals with low negative affect. For this reason, we elected to utilize the affect balance approach in the current study.

**Savoring.** The Savoring Beliefs Inventory (SBI; Bryant, 2003) was used to measure participants’ beliefs about their ability to savor positive experiences (see Appendix A). Savoring beliefs are proposed to be representative of an individual’s capacity to savor, as well as his or her engagement in savoring (Bryant & Veroff, 2007). Participants indicated on a 7-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*) the extent to which they agree with 24 statements such as, “I enjoy looking back on happy times from my past” and “I know how to make the most of a good time.” To calculate the SBI total score, negatively-anchored items were reverse-scored and summed with the positively-anchored items. The sum of the items was then divided by the number of scale items, yielding an average score ranging from 1 to 7. Higher scores indicate stronger beliefs about one’s own ability to “regulate…manipulate…and sustain” pleasure (i.e., savor; Bryant, 2003, p. 176).

The SBI total score demonstrated good internal reliability in a previous sample of college students and older adults (Cronbach’s α ranging from .84 to .94; Bryant, 2003). The internal reliability was similarly high in the present sample (Cronbach’s α = .95).

**Health.** Self-rated global, physical, and mental health (herein referred to as global, physical, and mental health) were assessed using the Patient Reported Outcomes Measurement Information System (PROMIS) global health measure (see Appendix B). The PROMIS global health measure contains 10 items that assess physical, mental, and social
health domains. Respondents are prompted to rate their health, physical health, mental health, and quality of life “in general” (responses range from 1 = *poor* to 5 = *excellent*). The measure also more specifically assesses ratings of physical function, fatigue, pain, emotional distress. Of note, items assessing pain, fatigue and emotional distress are written such that participants are prompted to consider their experiences over the past week. Finally, there are two questions regarding social participation and satisfaction with social activities and relationships.

Consistent with the biopsychosocial model of health, a global health score was calculated by summing the responses across all 10 items (including mental, physical, and social domains); items were reverse scored as necessary. Though the 10-item global health measure was developed to produce three component scores of health (mental, physical, and social), previous factor analyses (e.g., Hays, Bjorner, Revicki, Spritzer, & Cella, 2009) have identified a two-factor model representing physical and mental health. As such, the physical and mental health domains, but not the social domain, were analyzed in the present study. Consistent with Hays and colleagues’ (2009) findings, physical and mental health summary scores were derived by summing the responses on four physical health items (assessing physical function, physical health, pain, and fatigue) and four mental health items (assessing quality of life, mental health, satisfaction with discretionary social activities, and emotional problems; as indicated in Appendix B); items were reverse-scored as necessary.

The construct validity of the PROMIS global health measure is satisfactory, as evidenced by a moderate correlation with EuroQual-5D scores of health (Hays et al., 2009). The PROMIS global health measure exhibits strong internal reliability (Cronbach’s α = .92); the mental and physical health scales also demonstrate adequate internal reliability (Cronbach’s α = .81 and .86, respectively; Hays et al., 2009). The internal reliability of the PROMIS global health scale was also high in the present sample (Cronbach’s α = .92). The internal reliabilities of the mental health and physical health scales were somewhat lower than that of the global health
Additional variables of interest. The following variables were measured based on their potential associations with self-rated health and savoring.

Mindfulness. Mindfulness was measured using the Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmuller, Kleinknect, & Schmidt, 2006). The FMI contains 14 items that participants rate on a 4-point Likert scale (1 = rarely, 7 = almost always). Sample items include, “I am open to the experience of the present moment” and “I accept unpleasant experiences”. To score the FMI, a single item was reverse scored. This item and the remaining FMI items were then summed. Greater scores are indicative of greater dispositional mindfulness. The FMI exhibited adequate validity and internal reliability (Cronbach’s alpha = .79) in a community-dwelling sample (Walach et al., 2006). The internal reliability of the FMI was also satisfactory in the present study (Cronbach’s alpha = .91).

Life orientation. The Life Orientation Test - Revised (LOT-R; Scheier, Carver, & Bridges, 1994) was used to measure dispositional optimism. Optimism was considered as a potential covariate as it has been previously identified as a correlate of self-rated health (Rasmussen, Scheier, & Greenhouse, 2009). On the LOT-R, respondents indicate on a 5-point Likert-type scale (0 = strongly disagree, 4 = strongly agree) the extent to which they agree with 12 statements such as “in uncertain times, I usually expect the best.” The LOT-R was scored by reverse coding negatively-valenced items and then summing responses on the six items intended to measure life orientation. Higher overall scores indicate greater trait optimism. The LOT-R demonstrates an acceptable level of internal reliability (Cronbach’s α = .78), as well as divergent and discriminant validity (Scheier et al., 1994). The internal reliability of the LOT-R was also adequate in the present sample (Cronbach’s α = .93).

Future time perspective. Future time perspective was measured using the Future Time Perspective Scale-Short Form developed by Brothers, Chui, and Diehl (2014). This scale
consists of 12 statements related to time orientation and prompts respondents to indicate on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree) the extent to which they agree with each statement. Sample statements include, “I have the sense that time is running out” and “Increasingly I feel like time is against me”. The 12 statements are representative of three subscales (future as open, future as limited, and future as ambiguous; 4 items each). Subscale scores were computed by summing the future as limited subscale items. For the present analyses, it was of interest to include the Future as Limited subscale as a potential covariate, as this subscale may be associated with enhanced or hindered savoring abilities. The internal reliability for this subscale has previously been demonstrated (Cronbach’s α = .71; Brothers et al., 2014) and was corroborated in the present study (Cronbach’s α = .87).

**Rumination.** The Ruminative Thought Style questionnaire (RTS; Brinker & Dozois, 2009) was used to assess trait rumination. The RTS questionnaire requires respondents to indicate on a 1 to 7 scale (1 = not at all, 7 = very well) the extent to which 20 items describe them. Sample items include, “I find that my mind goes over things again and again” and “When I have a problem, it will gnaw on my mind for a long time”. Responses on the 20 items are summed for a total score, where higher scores are indicative of greater trait ruminative thought style. The RTS exhibits strong internal reliability (Cronbach’s α = .92), as well as convergent and divergent validity, as evidenced by positive correlations with existing measures of repetitive thought (Brinker & Dozois, 2009). In the present study, the internal reliability of the RTS was also strong (Cronbach’s α = .97).

**Procedure**

Study materials were completed online through Amazon MTurk, at a single time point. Individuals who reside in the United States and expressed interest in participating in the study behaviorally indicated consent by selecting an “I agree” response after reading the study information sheet. Participants were then prompted to complete the study materials via a Qualtrics survey. The ordering of measures was randomized, except for the demographics
questionnaire which was presented at the conclusion of the survey. Participants were provided with modest compensation (75 cents) for study participation. Data collection occurred over the course of approximately 4 months. Survey materials were released for completion in MTurk in batches, across all seven days of the week and different time frames (e.g., morning, afternoon, and evening). Recruitment of an age-diverse sample was achieved by including in the MTurk study description requests for individuals of specific age groups to participate.

There is evidence to suggest that data collected via MTurk is reliable (Goodman, Cryder, & Cheema, 2013; Ramsey & Gentzler, 2014). Nevertheless, several safeguards were included to insure reliability. First, to promote truthfulness regarding the reporting of age, participants were required to input their age and birth month and year at two different points during the survey, allowing the researchers to ascertain consistency between these two age indicators. Further, per recommendations by Goodman et al. (2013), the survey contained two previously mentioned items to assess attention.

Summary of Analyses

Preliminary analyses were run and the assumptions of the proposed statistical analyses were met. Missing data was minimal (< 4% for predictor variables, 1.9% for outcome variables) and missing at random (Little’s MCAR test Chi square = 55.59, p = .08). Missing values were left missing. The listwise deletion function was used for all analyses. Power analyses were conducted using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007).

Three separate, multi-tiered regression analyses using the product term analysis method were used to test whether savoring moderated the association of affect and global health (aim 1), physical health (aim 2), and mental health (aim 3), respectively. For each set of analyses, potential covariate variables (age, race, income adequacy, mindfulness, rumination, future time perspective, and optimism) were entered in the first step. Average number of physical health conditions was also entered in the analyses for aim 3, where mental health was the outcome variable. The standardized predictor variables, affect and savoring, were entered in the second
step. In the final step, the product term reflecting the interaction of the standardized affect and savoring variables was added. To enhance model fit, the proposed regression models were initially run with all potential covariates entered. Potential covariate variables that were nonsignificant in the overall model were then removed and the final analyses were run with only significant covariates. As such, the analyses reported in the results section represent the analyses run with only significant covariates. Of note, the one-tailed Pearson correlations of all potential covariates and predictor variables are reported in Table 2.

The PROCESS program in SPSS (Hayes, 2013) was used to test the moderated-moderation models proposed in aims 1a, 2a, and 3a. Three separate models were run to test each of these aims. To test aim 1a, covariate variables were entered as covariates, affect was entered as the primary predictor, savoring was entered as a primary moderator, and age was entered as a secondary moderator; global health was entered as the dependent variable. To test aims 2a and 3a, the covariates, predictor, and moderators were entered as just described except that physical health and mental health were entered as dependent variables for models testing aims 2a and 3a, respectively.
Table 2

*One-tailed Pearson Correlations among Potential Covariates and Predictor Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<tbody>
<tr>
<td>1. Age</td>
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<td>3. Income adequacy</td>
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<td>4. Mindfulness</td>
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<td>-.01</td>
<td>-.18*</td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>5. Future Time Perspective</td>
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<td>.01</td>
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<td>-.54**</td>
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<td></td>
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<td>6. Optimism</td>
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<td>.64**</td>
<td>-.63**</td>
<td></td>
<td></td>
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<tr>
<td>7. Rumination</td>
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<td>.07</td>
<td>.19*</td>
<td>-.60**</td>
<td>.55**</td>
<td>-.55**</td>
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<td></td>
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<td>8. Affect Balance</td>
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<td>.67**</td>
<td>-.60**</td>
<td>.68**</td>
<td>-.53**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Savoring</td>
<td>.05</td>
<td>.22*</td>
<td>-.17*</td>
<td>.57**</td>
<td>-.54**</td>
<td>.63**</td>
<td>-.34**</td>
<td>.64**</td>
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</tbody>
</table>

*p < .05. **p < .001.
3. RESULTS

Savoring Moderating the Association of Affect and Self-Rated Global Health

The change in $R^2$, unstandardized beta weights, beta weight standard errors, and standardized beta weights for the final model are reported in Table 3. $R$ was significantly different from zero at the end of each step. The entry of covariates (rumination, mindfulness, age, and income adequacy) in step 1 resulted in a significant increment of 53.2% of explained variance in global health, $R^2$ = .53, $F_{inc}$ (4, 191) = 54.27, $p < .001$. The entry of the standardized affect and savoring variables in step 2 explained an additional 6.0% of variance in global health, $R^2$ = .59, $F_{inc}$ (2, 189) = 13.94, $p < .001$. The addition of the affect by savoring interaction term in step 3 did not produce reliable improvements in $R^2$, $p = .17$. In the final model, younger age, $p = .004$, more adequate income, $p < .001$, lower trait rumination, $p = .001$, and greater dispositional mindfulness, $p = .008$, were associated with better global health ratings. Further, higher levels of savoring ability, $p = .03$, and greater affect balance scores, $p < .001$, were associated with better global health ratings. The affect by savoring interaction term was not significant, $p = .17$, suggesting that savoring ability did not moderate the association of affect and global health.

With a sample of 216, our post hoc power of greater than .99 was sufficient to detect the main effects of affect and savoring, $f^2 = .15$. However, our post hoc power of .31 was inadequate to detect the affect by savoring interaction term effect, $f^2 = .01$.

Age Moderating the Association of Affect, Savoring, and Global Health

For the overall model assessing whether age moderates the association of affect, savoring, and global health, $R$ was significantly different from zero, $p < 001$. However, the three-way affect by savoring by age interaction was not significant, $p = .25$. This finding suggests that age did not moderate the association of affect, savoring, and global health in this sample. Again,
with a power of .23 our sample size was underpowered to detect the very small moderated-moderation effect, \( r^2 = .007 \).

Table 3

Product Term Multiple Regression to Assess Savoring as a Moderator of the Affect—Global Self-Rated Health Association

<table>
<thead>
<tr>
<th>Predictor</th>
<th>( \Delta R^2 )</th>
<th>B</th>
<th>SE B</th>
<th>( \beta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 (covariates)</td>
<td>.53**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2 (standardized predictors)</td>
<td>.06**</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Affect</td>
<td>.06**</td>
<td>2.10</td>
<td>.59</td>
<td>.25*</td>
</tr>
<tr>
<td>Savoring</td>
<td>.06**</td>
<td>1.06</td>
<td>.51</td>
<td>.13*</td>
</tr>
<tr>
<td>Step 3</td>
<td>.004</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Rumination</td>
<td>- .05</td>
<td>-.05</td>
<td>.02</td>
<td>-.21*</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>.18</td>
<td>.18</td>
<td>.07</td>
<td>.20*</td>
</tr>
<tr>
<td>Income adequacy</td>
<td>-2.43</td>
<td>-2.43</td>
<td>.38</td>
<td>-.31**</td>
</tr>
<tr>
<td>Age</td>
<td>-.07</td>
<td>-.07</td>
<td>.03</td>
<td>-.14*</td>
</tr>
<tr>
<td>Affect</td>
<td>2.11</td>
<td>2.11</td>
<td>.59</td>
<td>.25**</td>
</tr>
<tr>
<td>Savoring</td>
<td>1.17</td>
<td>1.17</td>
<td>.51</td>
<td>.14*</td>
</tr>
<tr>
<td>Affect x Savoring</td>
<td>.54</td>
<td>.54</td>
<td>.39</td>
<td>.07</td>
</tr>
</tbody>
</table>

Note. \( B = \) unstandardized regression coefficients; \( \beta = \) standardized regression coefficients.

* \( p < .05 \). ** \( p < .001 \).

Savoring Moderating the Association of Affect and Self-Rated Physical Health

The change in \( R^2 \), unstandardized beta weights, beta weight standard errors, and the standardized beta weights for the final model are reported in Table 4. R was significantly different from zero at the end of each step. Covariates (age and income adequacy) entered in step 1 explained 19.8% of the variance in physical health, \( R^2 = .20, F_{inc} (2, 194) = 23.98, p < .001 \). The entry of the standardized affect and savoring variables in step 2 explained an additional 19.5% of variance, \( R^2 = .40, F_{inc} (2, 192) = 30.88, p < .001 \). The addition of the affect
by savoring interaction term in step 3 did not produce reliable improvements in $R^2$, $p = .13$. In the final model, younger age, $p < .001$, and more adequate income, $p < .001$, were associated with better physical health ratings. Greater affect balance scores, $p < .001$, were associated with better physical health ratings. Savoring ability was not significantly associated with physical health, $p = .28$. The affect by savoring interaction term was not significantly associated with physical health, $p = .13$, indicating that savoring ability did not moderate the association of affect and physical health ratings. With a sample of 216, our post hoc power of greater than .99 was sufficient to detect the main effects of affect and savoring, $f^2 = .32$. However, our post hoc power of .35 was inadequate to detect the affect by savoring interaction term effect, $f^2 = .01$.

**Age Moderating the Association of Affect, Savoring, and Physical Health**

For the overall model assessing whether age moderates the association of affect, savoring, and self-rated physical health, $R$ was significantly different from zero, $p < .001$. Yet, the three-way interaction of affect, savoring, and age was not a significant predictor, $p = .35$. This finding suggests that age did not moderate the association of affect, savoring, and physical health ratings in this sample. With a power of .17 our sample size was underpowered to detect the very small moderated-moderation effect, $f^2 = .004$.

**Savoring Moderating the Association of Affect and Self-Rated Mental Health**

The change in $R^2$, unstandardized beta weights, beta weight standard errors, and the standardized beta weights for the final model are reported in Table 5. $R$ was significantly different from zero at the end of each step. The covariates (income adequacy, number of physical health conditions, rumination, and mindfulness) entered in step 1 explained 54.9% of variance in mental health ratings, $R^2 = .55$, $F_{inc} (4, 191) = 58.09$, $p < .001$. The entry of the standardized affect and savoring variables in step 2 explained an additional 5.6% of variance, $R^2 = .61$, $F_{inc} (2, 189) = 13.42$, $p < .001$. The addition of the affect–savoring interaction term in step 3 did not produce reliable improvements in $R^2$, $p = .33$. In the final model, more adequate income, $p < .001$, fewer physical health conditions, $p = .03$, lower levels of trait rumination, $p =$
.001, and higher levels of dispositional mindfulness, \( p = .002 \), were associated with better mental health ratings. Greater affect balance scores, \( p = .01 \), and greater savoring ability, \( p = .01 \), were associated with better mental health ratings. The affect by savoring interaction term was not significant, \( p = .33 \), indicating that savoring ability did not moderate the association of affect and mental health ratings. With a sample of 216, our post hoc power of .18 was not sufficient to detect the very small effect of the affect by savoring interaction term, \( f^2 = .01 \). Our post hoc power of greater than .99, however, was adequate to detect the main effects of affect and savoring, \( f^2 = .14 \).

Table 4

*Product Term Multiple Regression to Assess Savoring as a Moderator of the Affect—Self-Rated Physical Health Association*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>( \Delta R^2 )</th>
<th>( B )</th>
<th>SE B</th>
<th>( \beta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 (covariates)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Step 2 (standardized predictors)</td>
<td>.20**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affect</td>
<td>1.23</td>
<td>.22</td>
<td>.42**</td>
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</tr>
<tr>
<td>Savoring</td>
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<td>.21</td>
<td>.06</td>
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</tr>
<tr>
<td>Step 3</td>
<td>.01</td>
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<tr>
<td>Age</td>
<td>-.04</td>
<td>.01</td>
<td>-.21**</td>
<td></td>
</tr>
<tr>
<td>Income adequacy</td>
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<td>.16</td>
<td>-.29**</td>
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<tr>
<td>Affect</td>
<td>1.26</td>
<td>.22</td>
<td>.43**</td>
<td></td>
</tr>
<tr>
<td>Savoring</td>
<td>.23</td>
<td>.21</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Affect \times Savoring</td>
<td>.24</td>
<td>.15</td>
<td>.09</td>
<td></td>
</tr>
</tbody>
</table>

*Note. B = unstandardized regression coefficients; \( \beta \) = standardized regression coefficients. *

\* \( p < .05 \). ** \( p < .001 \).

**Age Moderating the Association of Affect, Savoring, and Mental Health**

For the overall model assessing whether age moderates the association of affect, savoring, and mental health, \( R \) was significantly different from zero, \( p < .001 \). The three-way
interaction of affect, savoring, and age was not a significant predictor of mental health in the final model, $p = .44$. This finding suggests that age did not moderate the association of affect, savoring, and mental health in this sample. With a power of $.14$ our sample size was underpowered to detect the very small interaction effect, $f^2 = .003$.

Table 5

*Product Term Multiple Regression to Assess Savoring as a Moderator of the Affect—Self-Rated Mental Health Association*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\Delta R^2$</th>
<th>$B$</th>
<th>SE B</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 (covariates)</td>
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<td>Affect</td>
<td>.87</td>
<td>.30</td>
<td>.20*</td>
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<tr>
<td>Savoring</td>
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<tr>
<td>Step 3</td>
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<td>Income adequacy</td>
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<td>.03</td>
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<tr>
<td>Affect</td>
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<td>Affect × Savoring</td>
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<td>.05</td>
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*Note. B = unstandardized regression coefficients; $\beta$ = standardized regression coefficients.*

* $p < .05$. ** $p < .001$. 
4. DISCUSSION

This study examined whether the association of affect and self-rated global, physical, and mental health differed based on savoring abilities, in an adult sample. We also assessed the role of age in the association of affect, savoring, and each of the self-rated health outcomes. Our hypotheses that the associations of affect and global, physical, and mental health would differ based on individuals’ overall levels of savoring ability were not supported. Furthermore, the hypothesized age-modulated associations of the affect, savoring, and global, physical, and mental health were not supported. However, our findings did indicate a significant positive association between individuals’ affect and their global, physical, and mental health ratings. Further, greater savoring ability was associated with better global and mental health ratings. Importantly, the associations of affect, savoring, and the respective health outcomes emerged above and beyond the influence of robust covariates.

Because savoring is defined as the tendency to attend to positive affective experiences, it was anticipated that increased savoring abilities might enhance the positive association of affect and health outcomes. Yet, neither the savoring moderated affect–health associations nor the age-modulated affect, savoring, and health hypotheses were supported by our data. There may be numerous explanations for why these moderated associations were nonsignificant. First, it is possible that these associations truly are nonsignificant. It is also possible, however, that because our sample presented fairly positively and homogeneously with regards to affect, savoring, and health, there was not great enough variability in these variables to detect significant interaction effects. Though this presentation is perhaps to be expected in a normative, community-dwelling sample, it may be that interaction effects would be evident in populations that are more variable with regards to these constructs (e.g., clinical populations).
Finally, there is reason to believe that our sample was not adequately powered to detect the interaction effects. Moderation effect sizes have been posited to generally be smaller than those of main effects (Aguinis, Beaty, Boik, & Pierce, 2005; McClelland & Judd, 1993) and the moderated multiple regression models used to detect interactions have been identified as less efficient and therefore less powerful than standard multiple regression models (Aguinis et al., 2005). The potentially very small interaction effect sizes and the proposed reduced power of moderated multiple regression models, leads us to hypothesize that our sample size compromised our ability to detect the effects of the proposed conditional associations. Therefore, the possibility of a savoring-moderated affect–health association, or even a three-way interaction of affect, age, and savoring, should not be ruled out entirely and may warrant future study in larger and more clinical samples.

Regarding the main effects of affect, greater affect balance scores were associated with better global, physical, and mental health ratings. Because affect balance represents the difference between positive and negative affect experiences, our findings are interpreted to suggest that individuals whose experiences of positive affect are greater than their experiences of negative affect demonstrate better subjective health ratings. Put differently, we would expect individuals who experience greater positive relative to negative affect to rate their health as better than those who experience even amounts of positive and negative affect. Similarly, we would then expect that both of the aforementioned types of individuals would rate their health better than individuals who experience greater negative than positive affect. These findings provide support for previously identified associations of affect and subjective health ratings (Segerstrom, 2014; Winter, Lawton, Langston, Ruckdeschel, & Sando, 2007). The present findings also highlight the importance of considering positive affect as well as negative affect in relation to subjective health ratings, as the associations among affect and health outcomes were significant even when considering positive and negative affect relative to one another.
Notably, greater savoring beliefs were associated with better mental health. Savoring has previously been explored and identified as a correlate of several aspects of mental health, including positive affect (e.g., psychological well-being, positive affect; Hurley & Kwon, 2013; Ramsey & Gentzler, 2014; Smith & Hollinger-Smith, 2015). Our findings offer additional support for the notion that greater savoring abilities are associated with better subjective mental health, as assessed using a person-centered measure (PROMIS) of mental health. In our study, those with a greater inclination toward positive repetitive thought (Segerstrom et al., 2010) characterized by reminiscence about past happy moments, maximization of present pleasant experiences, and the anticipation of pleasant experiences, perceived their mental health as being better. This association remained even when accounting for covariates including trait rumination, a form of negative repetitive thought that is conceptualized as opposite of savoring in terms of valence (Segerstrom et al., 2010). From a clinical perspective, this may suggest the utility of not only attempting to reduce maladaptive ruminative thinking, but also working to enhance savoring as an adaptive thinking pattern and emotion regulation strategy. Of course, experimental and intervention-based research on the subject is warranted before recommending clinical implementation.

In addition to strengthening the empirical support for the association of savoring with mental health, our study is among the first to explore and identify how savoring relates to a global, biopsychosocial measure of health in a sample ranging from younger to older adults. Importantly, better savoring abilities were associated with better global health and these associations held across all adult ages. These findings corroborate the positive association of positively valenced repetitive thought and a single item, subjective health rating previously demonstrated in a sample of older adults (Segerstrom, 2014). They also complement findings from a recent study in which older adults’ savoring ability moderated the association of a biopsychosocial conceptualization of health (RAND 36-Item Health Survey) and satisfaction with
life, such that greater savoring abilities buffered the negative association of low self-rated health and satisfaction with life (Smith & Bryant, 2015).

Due to the cross-sectional nature of our study, we cannot definitively say whether savoring abilities contribute directly to perceptions of global and mental health or vice-versa. However, considered in light of other investigations of savoring and health, our findings contribute to the existing evidence supporting the more general association between savoring and subjective health. Moreover, the cross-sectional associations identified here encourage future research aimed at clarifying the directionality and causality of savoring and health associations. This line of study may be important to pursue for several reasons. There is favorable evidence supporting positive interventions as a mechanism through which positive emotions can be regulated (for a review, see Quoidbach et al., 2015). Whereas objective health outcomes may be more difficult to target and precipitate noticeable change, savoring is a behavior that is amenable to change through behavioral intervention (Hurley & Kwon, 2013). Such changes may thereby produce improvements in perceptions of health. Further contributing to the appeal of exploring savoring as a target of intervention is the notion that savoring is a fairly naturally occurring behavior. Heiy and Cheavens (2014) recently explored emotional experiences and emotion regulation in a sample of university students, finding that of 16 endorsed positive emotion regulation strategies, savoring was the most frequently used strategy (Heiy & Cheavens, 2014). Because individuals seem to already be engaging in savoring behaviors, it may only be necessary to highlight the importance of engaging in these behaviors more frequently or attentively, rather than to teach savoring as an entirely new skill.

Interestingly, despite significant associations with global and mental health, better savoring abilities did not predict physical health ratings. This finding is, however, consistent with results from a previous study that more specifically involved older adults, but suggested that savoring was associated with general health and psychological well-being, but not physical functioning (Smith & Bryant, 2015). Because in the present study both physical and mental
health items contributed to the global self-rated health score, this suggests that the significant association of savoring and self-rated mental health may have driven the significant association between savoring and global self-rated health. Whereas the global and mental health ratings were derived from items that were more representative of perceptions of health, the physical health rating included a question related to participants’ ability to carry out physical activities. This item is potentially more representative of an individual’s latent physical health and may be less susceptible to individual differences in responding or variability in perceptions; this may have contributed to its nonsignificant association with savoring.

As previously alluded to, the main effects of the covariate variables in the present study were robust. In our study, over half of the variance in global health was explained by covariates. The significant covariates were a mix of sociodemographic (i.e., income adequacy and age) and dispositional (i.e., trait rumination and dispositional mindfulness) variables. It, perhaps, is not surprising that both sociodemographic and dispositional characteristics were associated with global health considering that the global self-rated health variable taps multiple aspects of health including physical, mental, and social domains. Like the global self-rated health outcome, over half of variance in self-rated mental health was explained by covariates while nearly a quarter of variance in self-rated physical health was explained by covariates. Notably, income adequacy was the only covariate that was significantly associated with all self-rated health outcomes, supporting the need to consider income adequacy when studying subjective physical, psychological, and social health (Cairney, 2000; Sun, Hilgeman, Durkin, Allen, & Burgio, 2010). Further, though not related to physical health, trait rumination and dispositional mindfulness, each considered forms of repetitive thought, were significant predictors of both global and mental health. The associations of each of these forms of repetitive thought superceded the influence of optimism and future time perspective, both of which may be considered life outlooks or perspectives. This finding suggests the relevance of cognitive and attentional processes for how individuals perceive and rate their global and mental health.
Several limitations of this study warrant acknowledgement and discussion. One limitation relates to the cross-sectional design of the study and subsequent inability to draw causal or directional inferences about the associations of affect, savoring, and health outcomes. Though causal inferences cannot be drawn, the findings at the very least provide support for the established affect–health association and preliminary evidence for associations of savoring with both a global, biopsychosocial conceptualization of health and mental health. As previously indicated, an additional limitation of this study is the possibility that our sample size was too small to detect the hypothesized interaction effects. Finally, we acknowledge that online data collection presents unique limitations. Such limitations include a sampling bias toward individuals with access to technology, as well as an inability to monitor whether study materials are being fully attended to. Though the sample is admittedly biased towards those with access to technological resources, the demographics of our study were fairly diverse with regards to characteristics such as income adequacy and age. We do, however, recognize that this sample was relatively well-educated, healthy, and lacking in racial and ethnic diversity. As such, we propose the need to study these associations in a sample that is more diverse with regards to the aforementioned characteristics. To address potential attentional issues, the study included measures of attention to promote valid and reliable data. Non-attenders were a minority in the present study, but they were found to be younger and more likely to be male than attenders. It is difficult to ascertain the primary reasons for participants’ inattention, though it would be interesting in the future to explore factors such as participants’ motivations for completing the study (e.g., financial gain versus generativity) as well as the extent of multitasking taking place during the completion of study materials. Importantly, more traditional methods of data collection (e.g., mailed surveys, in-person surveys) are similarly limited in their abilities to ensure participants are adequately attending to study materials.

Within the context of these limitations, the present study was the first to explore how affect relates to several aspects of health at different levels of savoring abilities and across
Though the proposed savoring and age moderated associations of affect and self-rated health outcomes were not supported, this study contributes to the empirical literature in several important ways. This study offers additional support for the association of affect and global, physical, and mental health outcomes, provides new evidence of the association of savoring and global and mental health outcomes, and sheds light on psychosocial and demographic correlates of several aspects of self-rated health.

From a clinical perspective, our findings highlight the importance of savoring and positive repetitive thinking, more generally, for how individuals think about their general and mental health. It has previously been identified that positive affect is associated with self-rated health outcomes above and beyond the effects of negative affect (Benyamini et al., 2000), implying the importance of focusing on enhancing individuals’ positive affective experiences independent of their negative affective experiences. Also, it has been indicated that whereas positively valenced repetitive thinking (i.e., savoring) is associated with better subjective health, negative repetitive thinking (i.e., rumination) and total amounts of overall repetitive thinking are associated with poorer subjective physical and psychological health (Segerstrom et al., 2010). In conjunction with the work of Segerstrom and colleagues (2010), our findings lend support for dedicating efforts not only towards minimizing negative thinking patterns that may serve a maladaptive purpose, but also dedicating efforts towards enhancing adaptive, positively valenced ways of thinking, such as savoring. By promoting positively valenced repetitive thought, more positive general and psychological health outcomes may result. Subsequently, the enhancement of general and psychological self-rated health outcomes may not only be associated with greater quality of life, but could also have implications for other health behaviors such as the use of healthcare services (Hansen, Fink, Frydenberg, & Oxhøj, 2002).

Overall, findings from the present study provide a rationale for further investigation of the association of affect, savoring, and health indicators. Knowing that both affect and savoring play a role in how individuals perceive their physical, mental, and overall health, it may be of interest
to explore these constructs in relation to more specific health domains (e.g., pain, sleep). Additionally, knowing the relative importance of cognitive appraisals and perceptions to emotional experience (Smith & Ellsworth, 1985), one might explore our proposed affect, savoring, health associations with affect conceptualized as the difference between actual and ideal affect (Tsai, Knutson, & Fung, 2006). Furthermore, this line of work may be extended to different populations in which levels of affect, savoring, and subjective health might be more variable. For instance, due to the relevance of positive emotionality in clinically significant psychological disorders (Carl, Soskin, Kerns, & Barlow, 2013), one might explore savoring abilities in individuals with psychological disorders characterized by emotion dysregulation or those with physical health conditions that precipitate emotional distress. In the context of aging, a fruitful avenue of research may involve the exploration of positive affect, subjective health, and savoring processes in individuals undergoing major life transitions or adjustments (e.g., moving into a long-term care setting) where positive experiences may be perceived as more limited or infrequent. Finally, longitudinal (e.g., across months to years) and microlongitudinal (e.g., across moments to days) explorations of affect, savoring, and subjective health ratings may yield unique information, as each of these constructs can vary within individuals and on different timescales. In particular, it would be beneficial to explore whether more stable levels of savoring might offset detrimental associations between high levels of affect variability and variability in perceptions of health.
REFERENCES


APPENDIX A
SAVORING BELIEFS INVENTORY

*Instructions:* For each statement listed below, please circle the one number that best indicates how true the particular statement is for you. There are no right or wrong answers. Please be as honest as you can.

1. Before a good thing happens, I look forward to it in ways that give me pleasure in the present.  
   - Strongly Disagree 1 2 3 4 5 6 7

2. It's hard for me to hang onto a good feeling for a very long time.  
   - Strongly Disagree 1 2 3 4 5 6 7

3. I enjoy looking back on happy times from my past.  
   - Strongly Disagree 1 2 3 4 5 6 7

4. I don't like to look forward to good times too much before they happen.  
   - Strongly Disagree 1 2 3 4 5 6 7

5. I know how to make the most of a good time.  
   - Strongly Disagree 1 2 3 4 5 6 7

6. I don't like to look back at good times too much after they've taken place.  
   - Strongly Disagree 1 2 3 4 5 6 7

7. I feel a joy of anticipation when I think about upcoming good things.  
   - Strongly Disagree 1 2 3 4 5 6 7

8. When it comes to enjoying myself, I'm my own "worst enemy."  
   - Strongly Disagree 1 2 3 4 5 6 7

9. I can make myself feel good by remembering pleasant events from my past.  
   - Strongly Disagree 1 2 3 4 5 6 7

10. For me, anticipating what upcoming good events will be like is basically a waste of time.  
    - Strongly Disagree 1 2 3 4 5 6 7

11. When something good happens, I can make my enjoyment of it last longer by thinking or doing certain things.  
    - Strongly Disagree 1 2 3 4 5 6 7

12. When I reminisce about pleasant memories, I often start to feel sad or disappointed.  
    - Strongly Disagree 1 2 3 4 5 6 7

13. I can enjoy pleasant events in my mind before they actually occur.  
    - Strongly Disagree 1 2 3 4 5 6 7

14. I can't seem to capture the joy of happy moments.  
    - Strongly Disagree 1 2 3 4 5 6 7

15. I like to store memories of fun times that I go through so that I can recall them later.  
    - Strongly Disagree 1 2 3 4 5 6 7

16. It's hard for me to get very excited about fun times before they actually take place.  
    - Strongly Disagree 1 2 3 4 5 6 7

17. I feel fully able to appreciate good things that happen to me.  
    - Strongly Disagree 1 2 3 4 5 6 7

18. I find that thinking about good times from the past is basically a waste of time.  
    - Strongly Disagree 1 2 3 4 5 6 7

19. I can make myself feel good by imagining what a happy time that is about to happen will be like.  
    - Strongly Disagree 1 2 3 4 5 6 7

20. I don't enjoy things as much as I should.  
    - Strongly Disagree 1 2 3 4 5 6 7

21. It's easy for me to rekindle the joy from pleasant memories.  
    - Strongly Disagree 1 2 3 4 5 6 7

22. When I think about a pleasant event before it happens, I often start to feel uneasy or uncomfortable.  
    - Strongly Disagree 1 2 3 4 5 6 7

23. It's easy for me to enjoy myself when I want to.  
    - Strongly Disagree 1 2 3 4 5 6 7

24. For me, once a fun time is over and gone, it's best not to think about it.  
    - Strongly Disagree 1 2 3 4 5 6 7
### APPENDIX B
#### PROMIS GLOBAL HEALTH MEASURE

<table>
<thead>
<tr>
<th>Question</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Poor</th>
<th>Fair</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, would you say your health is:</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>In general, would you say your quality of life is (m):</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>In general, how would you rate your physical health? (p)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>In general, how would you rate your mental health, including your mood and your ability to think? (m)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>In general, how would you rate your satisfaction with your social activities and social relationships? (m)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair? (p)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>In the past 7 days...</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often have you been bothered by emotional problems such as feeling anxious, depressed, or irritable? (m)*</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate your fatigue on average? (p)*</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate your pain on average? (p)*</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note: Ranges and categories are for demonstration purposes only and may vary in actual use.*
Appendix C

IRB APPROVAL FOR PRESENT STUDY

August 18, 2015

Caitlan Tighe
Dept of Psychology
College of Arts & Sciences
Box 70348

Re: IRB # 15-OR-247, "Attending to Positively Perceived Experiences Across the Lifespan: The APPEAL Study"

Dear Ms. Tighe:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of written documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on August 17, 2016. If your research will continue beyond this date, please complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, please complete the Modification of an Approved Protocol form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure form.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,

[Signature]

Supplemental Approval
Office for Research Compliance
The University of Alabama