

Aging and Variety Seeking

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The authors examined the influence of age on variety seeking in 3 experiments. When given choices among jellybeans or music, age differences in variety seeking emerged. Younger adults selected similar levels of variety when choosing what to consume immediately and what to consume later. In contrast, older adults consistently chose less variety when making choices to be consumed at a later time than when making choices to be consumed immediately. This pattern may be related to an increased focus on regulating future emotional experience that is associated with age.

Keywords: aging, variety seeking, emotion regulation, music, consumer preferences

Variety may be the spice of life, yet there often is nothing as satisfying as selecting a favorite and well-worn option—whether it be a particular entrée on a menu or song in a music collection. Many choices involve trade-offs between the quest for variety and the desire to experience the most enjoyable option that has already been sampled frequently. Sometimes people choose to switch to a less preferred option even though repeating the more preferred option would lead to greater enjoyment (Ratner, Kahn, & Kahneman, 1999). The degree to which people seek variety or diversification in their choices is influenced by many factors, such as current mood and whether the options will be consumed immediately or later (Kahn & Isen, 1993; Simonson, 1990). In this study, we examined whether there are age differences in variety seeking.

Age Differences That May Influence Variety Seeking

As people age and their time left in life decreases, they become more focused on emotion regulation as opposed to acquiring information (Carstensen, 1992; Mather & Carstensen, 2005). Consistent with this increased focus on regulating emotions, older adults are more likely to ignore or forget negative information and also sometimes relatively more likely to attend to or remember positive information than younger adults are (Charles, Mather, & Carstensen, 2003; Isaacowitz, Wadlinger, Goren, & Wilson, 2006; Kensinger, Garoff-Eaton, & Schacter, 2007; Knight et al., in press; Leigland, Schulz, & Janowsky, 2004; Mather et al., 2004; Mather & Carstensen, 2003; Mather & Knight, 2005; Mather, Knight, & McCaffrey, 2005; Rosler, Mapstone, Hays-Wicklund, Gitelman, & Weintraub, 2005; Thomas & Hasher, 2006; but see Comblain, D'Argembeau, & Van der Linden, 2005; Gruhn, Smith, & Baltes, 2005; Kensinger, Brierley, Medford, Growdon, & Corkin, 2002). Older adults' tendency to forget or ignore negative information more than positive information appears to be a goal-directed

process that requires cognitive resources (Knight et al., in press; Mather & Knight, 2005).

This shift in goals also appears to influence choices (Mather, 2006). For instance, a study asking older adults whether they would rather spend the day with their favorite author, a close family member, or an acquaintance with whom they have much in common showed that older adults were more likely to select the close family member than younger adults were, consistent with older adults' focus on emotionally meaningful goals (Fung, Carstensen, & Lutz, 1999). When examining choice options presented in a decision grid (for instance, a comparison grid of various cars and how they rate on features such as fuel economy), older adults spent more of their time viewing positive features and less of their time viewing negative features than younger adults did (Lockenhoff & Carstensen, 2007; Mather et al., 2005). Older adults' increased focus on regulating emotions may have implications for variety seeking, as they may choose options that promise satisfaction rather than variety (e.g., choosing their favorite option repeatedly rather than sampling less preferred options as well).

However, an opposing prediction about variety seeking can also be made on the basis of related findings about age differences in emotional experience. As might be expected given older adults' increased attention to emotion regulation, people report less negative affect as they get older (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Charles, Reynolds, & Gatz, 2001). Positive affect tends to increase (Mroczek & Kolarz, 1998) or at least remain stable across the lifespan (Carstensen et al., 2000). Variety-seeking research has shown that when an initial experience is pleasant, presumably shaping mood, individuals tend to select more variety throughout the experience (Menon & Kahn, 2002). In addition, other studies have shown that positive affect (especially low arousal positive affect) increases the amount of variety chosen when the choices are pleasant (Kahn & Isen, 1993; Roehm & Roehm, 2005). More generally, positive affect can lead people to pursue a wider range of actions or thoughts than usual and increase cognitive flexibility (e.g., Dreisbach, 2006; Fredrickson & Branigan, 2005). Thus, when looking at older and younger adults' choices, it will be important to account for differences in mood as older adults' better moods may increase their variety seeking.

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Choices for Immediate Consumption and Future Consumption

Another important consideration for making predictions about age and variety seeking is when the choices will be consumed. When seeking variety, choices can be made for immediate consumption or for future consumption. *Real-time choice* is when a choice is made and consumed before moving on to the next choice. For example, when at an amusement park, people often make real-time choices about what snack to purchase and consume. *Predictive choice* is when a series of choices are made at one time and are consumed at a later time. For example, purchasing groceries requires predictive choice. Research on real-time and predictive choice has shown that younger adults often choose more variety when planning future consumption than when making real-time choices (Read, Antonides, van den Ouden, & Trienekens, 2001; Read & Loewenstein, 1995; Read, Loewenstein, & Kalyanaraman, 1999; Simonson, 1990).

Emotion regulation concerns may loom larger for predictive choice than for real-time choice. When choosing an item to consume now, information about current preferences and emotion state is present, however, when making a decision about future consumption, one must anticipate how these things might change. The strategy with the least amount of risk for predictive choice would be to select items that are reliably satisfying, favored items. Older adults' greater focus on emotion regulation (e.g., Mather & Carstensen, 2005) may make them less likely to take the emotional risks associated with variety seeking for future consumption. However, their generally good mood may make them willing to sample variety in the present for real-time choice.

Overview of Experiments

In the current study, we investigated age differences in the amount of variety seeking for real-time and predictive choices. We conducted three experiments in which older and younger adults made real choices about jellybean or music consumption. These experiments included measures of mood, choice option familiarity, and memory for the options in order to examine factors that may contribute to age differences in younger and older adults' choices.

Experiment 1

When making choices, seeking variety sometimes comes at the price of experiencing one's favorite options less frequently. For example, many of us have debated whether to order a favorite and frequently consumed dish at a restaurant or whether to order something less often experienced. It is possible that older and younger adults differ in the amount of variety they select when making these types of choices. In the following experiment, we measured variety in younger and older adults' choices of jellybeans.

Method

Participants. Twenty-one undergraduates aged 17 to 19 years ($M = 18.29$, $SD = 0.56$) participated for course credit. Sixteen older adults aged 67 to 81 years ($M = 72.69$, $SD = 4.76$), recruited from a database of older adult participants from previous psychology studies, received \$10 for their participation. Older adults reported 12 to 20 years of education ($M = 16.07$, $SD = 4.15$),

including grade school, and younger adults reported 12 to 15 years of education ($M = 12.98$, $SD = 0.95$).

Nelson-Denny Vocabulary Test. Participants completed the vocabulary portion of the Nelson-Denny Reading Test (Brown, Fishco, & Hanna, 1993). This measure of verbal intelligence consists of 25 sentence fragments to be completed by one of several multiple-choice word options. The score is the total number correct.

Positive and Negative Affective Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Considering that age differences in mood (Carstensen et al., 2000) might influence variety seeking, we included the PANAS. Participants rated how much they felt each of 10 positive and 10 negative affect words using a scale from 1 = *not at all* to 5 = *very much*. We separately summed the negative and positive word ratings for measures of positive and negative affect.

Snyder's Self-Monitoring Scale (Snyder, 1987). Social pressure can prompt individuals to seek more variety (Ariely & Levav, 2000; Ratner & Kahn, 2002). Although we attempted to minimize social pressure in this experiment, we included Snyder's (1987) Self-Monitoring Scale (18 true/false questions) to statistically control for the influence of social pressure as older adults tend to be less sensitive to social pressure than do younger adults (e.g., Hess, Osowski, & Leclerc, 2005; Snyder, 1987).

Procedure. Participants sat at a computer. Beside the computer we placed a muffin tin displaying 12 differently colored and flavored types of jellybeans. We placed approximately 15 beans of one flavor into each of the 12 compartments. We told participants that the experiment session would last 1 hr and that during the hour we would ask them to eat approximately six jellybeans because we were interested in the effects of sugar on a decision-making task and a memory task. Participants seemed to accept this cover story, and responses on a postexperiment questionnaire confirmed that no one thought we were recording how much variety they were selecting.

After they signed a consent form, we asked participants to select a jellybean. We told them that they could select any flavor they wished and that they should not be concerned about the quantity of each as we had plenty more of each flavor. After each selection, the experimenter covertly recorded the color of the selected jellybean. The participants then completed several unrelated tasks including a memory task and an attention task, interspersed with five additional requests to select and consume one jellybean. We refer to these choices as real-time choices throughout the article. During the hour, participants also completed the mood, vocabulary, and self-monitoring scales described above as well as a short demographic sheet asking for age, level of education, medications, occupation, ethnicity, and self-rated health.

At the end of the session, we asked participants to recall and list the color of the six jellybeans they had eaten in the order they had eaten them. They also rated how much they enjoyed each jellybean on a scale from 1 = *not at all* to 7 = *very much*. We included the recall test as a precaution against memory differences between older and younger adults that might have lead to differences in amount of variety chosen. For instance, if older adults simply forgot the last jellybean they had chosen, they might choose the same flavor again but for different reasons than younger adults who remembered the last choice they made.

Next, we told participants that because they had only six opportunities to sample the jellybeans, we would allow them to take

six home with them. We told them that they were free to select either jellybeans they had already eaten or jellybeans that they had not. We refer to these choices about future consumption as predictive choices throughout the article. The session concluded with a postexperiment questionnaire that asked participants whether they used a specific strategy to select jellybeans, how familiar they were with jellybeans, and why they thought we asked them to select jellybeans.

Results

We included 95% confidence intervals to facilitate comparison among means and partial eta squared as a measure of effect size. Older adults were slightly less able to remember the color of the jellybeans they had eaten than were younger adults (older $M = 5.0 \pm 0.39$; younger $M = 5.67 \pm 0.34$), $t(35) = 2.61$, $p < .05$. Older and younger adults did not significantly differ in their ratings of how much they liked the jellybeans (older $M = 5.48 \pm 0.59$; younger $M = 5.43 \pm 0.84$). Older adults reported a greater amount of positive affect ($M = 39.47 \pm 1.95$) than did younger adults ($M = 26.19 \pm 2.35$), $t(34) = -8.61$, $p < .001$ (1 participant did not complete the mood scale). In addition, older adults also reported less negative affect ($M = 11.07 \pm 0.82$) than did younger adults ($M = 12.91 \pm 1.19$), $t(34) = 2.46$, $p < .05$. Older adults ($M = 6.38 \pm 2.12$) scored lower on Snyder's Self-Monitoring Scale than did younger adults ($M = 8.86 \pm 1.53$), $t(35) = 2.06$, $p < .05$. Older adults scored significantly higher on the vocabulary test ($M = 21.63 \pm 1.05$) than did younger adults ($M = 13.19 \pm 1.51$), $t(35) = 9.00$, $p < .001$.

A repeated-measures analysis of variance (ANOVA) comparing the mean level of variety chosen during the real-time choice session and the mean level of variety chosen during the predictive choice session, with the between-subjects factor of age, showed a significant Age \times Session interaction (variety was computed separately for each session, regardless of overlap in flavor selection between sessions). Older adults selected less variety during the predictive choice session ($M = 4.13 \pm 0.86$) than during the real-time choice session ($M = 5.75 \pm 0.56$), but younger adults selected about the same amount of variety in both the predictive choice session ($M = 4.71 \pm 0.75$) and real-time choice session ($M = 4.95 \pm 0.49$), $F(1, 35) = 6.40$, $p < .05$, $\eta_p^2 = .16$ (see Figure 1). After including negative affect, self-monitoring, and memory of choices as covariates, this relationship remained significant.¹ However, after entering positive affect as a covariate, this interaction was no longer significant, $F(1, 33) = 0.17$, $p = .68$, $\eta_p^2 = .01$ (and there were no other significant effects).

We examined the impact of positive mood separately for real-time and predictive choices. Greater positive affect was associated with greater variety seeking during the real-time choice session ($r = .32$, $p < .06$). However, there was no significant correlation between positive affect and variety seeking in predictive choices ($r = -.14$, $p > .4$). Thus, positive affect predicted increased variety seeking during real-time choice but not during predictive choice.

Discussion

In this experiment, older adults selected more variety when making choices for immediate consumption than when making choices for future consumption, but the amount of variety selected

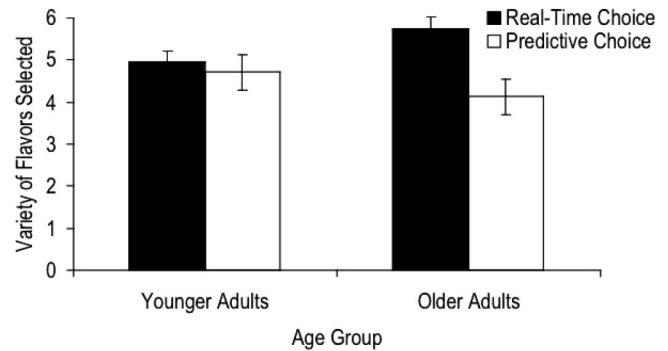


Figure 1. Mean number of jellybean flavors chosen ($\pm SE$) during the real-time choice session and the predictive choice session by older adults ($n = 16$) and younger adults ($n = 21$) in Experiment 1. There was a significant Age \times Session interaction, with older adults selecting less variety for future consumption than for immediate consumption.

by younger adults did not significantly differ for immediate versus future consumption. One possibility is that emotion regulation concerns lead older adults to select reliably satisfying options for future consumption times, but their positive moods lead them to sample variety at the expense of their favorite options in real time. Consistent with this possibility, positive affect was correlated with variety seeking in real-time choice but not for predictive choice.

The fact that the Age \times Session interaction for variety seeking was no longer significant when we included positive mood scores as a covariate also suggests that positive affect may be related to the age differences. However, because of the strong correlation between age and positive affect ($r = .83$, $p < .001$), it is possible that positive mood eliminated the age effect only because it shared so much of the variance with age.

The age differences in the impact of the timing of choice consumption on variety seeking are quite intriguing, but the study had some limitations. Younger adults reported being more familiar with the jellybean flavors than older adults did when answering the third question in the postexperiment questionnaire (we could not include this in the analysis as it was a qualitative questionnaire). Thus, it is possible that older adults were exploring flavors during the real-time session and may have formed preferences by the predictive session reducing the need for variety seeking. Responses to the postexperiment questionnaire question asking about choice strategies participants used did not give us reason to rule this out. Participants generally responded that they used no specific strategy or that they tried to select flavors that they thought they would like. A second limitation was that some older adults re-

¹ When we entered vocabulary scores as a covariate, the interaction was no longer significant, $F(1, 34) = 1.23$, $p = .276$. However, vocabulary scores were highly correlated with age and so may have acted as a secondary predictor of age group (Verhaeghen, 2003). Thus, to further examine vocabulary's influence on variety seeking, we found that a subset of our sample of younger adults was matched for vocabulary scores ($n = 5$, $M = 17.8 \pm 1.41$) with a subset of the older adult sample ($n = 5$, $M = 19.4 \pm 2.02$), $t(8) = 3.2$, $p = .111$. When we compared these matched subsets, we found a significant Age \times Session interaction, $F(1, 8) = 5.76$, $p < .05$. Thus, although vocabulary scores differed notably for the two groups, the same pattern of findings was seen among a subgroup of younger and older adults who had similar vocabulary scores.

ported not being able to taste the difference in the flavors of the jellybeans. A third limitation was that the real-time choice session always preceded the predictive choice session, and so an order effect could have caused the Age \times Session interaction. Experiment 2 was an attempt to replicate the Age \times Session interaction found in this experiment by using a design that eliminated these limitations.

Experiment 2

In Experiment 1, older adults selected less variety for future than for immediate jellybean consumption. However, limitations in the design of the experiment lead to uncertainties in interpreting this result. There were age differences in familiarity and taste discrimination of the jellybean choices in Experiment 1, so to see if this finding would extend to other types of choices, we tested variety seeking in song selection in Experiment 2. Further, the Age \times Session interaction from Experiment 1 was confounded by a potential order effect, so we also counterbalanced the real-time and predictive choice sessions in Experiment 2 to rule out order effects.

Method

Participants. Twenty-one undergraduates aged 18 to 20 years ($M = 18.62$, $SD = 0.60$) received course credit for their participation, and 21 older adults aged 60 to 88 years ($M = 75.53$, $SD = 7.40$) received \$10 for their participation. Older adults reported 12 to 20 years of education ($M = 16.11$, $SD = 2.49$), including grade school, and younger adults reported 12 to 18 years of education ($M = 13.71$, $SD = 1.52$).

Procedure. After signing a consent form, participants completed the Nelson-Denny Vocabulary Test, the PANAS, and a demographic sheet. Then, after participants were shown how to use a Macintosh PowerBook laptop, mouse, and number keys on the keyboard, they were left alone in a room to work through a variety-seeking program designed with Macromedia Director, Version 10.0. The program consisted of three sections: a familiarizing listening session, a real-time choice session, and a predictive choice session.

Music preferences form in young adulthood (Holbrook & Schindler, 1994), and so in order to include songs that would appeal to both age groups, we selected 10 songs that were top Billboard hits between 1955 and 1959 (Whitburn, 2001) and 10 songs that were top Billboard hits between 1999 and 2003 (according to iTunes; www.apple.com/itunes). All songs were clipped to a 30-s length. The program began with the familiarizing listening session during which participants were presented with 20 song clips and asked to rate how familiar they were with each song and how much they liked each song on 7-point scales ranging from 1 = *not at all* to 7 = *very much*.

After this initial listening session, participants were given a list of all 20 songs with their own liking ratings beside the songs to aid their memories in a ranking task. From the list, participants picked six songs that they liked, six songs that they disliked, and six songs that they felt were average. We used these selections to distribute the songs in a way such that the predictive listening session was well matched with the real-time choice session in terms of how much participants liked the songs.

Next, the program moved to either the predictive listening session or the real-time listening session, depending on the coun-

terbalancing condition. During the predictive session, we asked participants to pick a line-up of songs that they would later hear. Three liked, three disliked, and three average-rated songs were listed on the screen along with instructions that they should select any song they desired, they did not have to select every song, and that they could select songs more than once. Participants made 12 choices by typing the numbers corresponding with their selected songs. Even though we gave participants the impression that they would listen to their choices at a later time, we never actually played the song sequences they selected.

During the real-time session, participants had nine other songs available to choose from (again, three liked, three disliked, and three average-rated songs). We asked them to select from these nine songs 12 times. They were informed that they would hear each song immediately after selecting it, that they did not have to choose all nine songs, and that they could select songs more than once. They were presented with a screen displaying nine buttons containing the title and artist of each song choice and were asked to select the button of the song they would like to hear. After pressing the button, the screen showed the artist name and the song title they had selected, and the song played. When the clip was over, a prompt asked participants to rate how much they enjoyed the song on a 7-point scale ranging from 1 = *not at all* to 7 = *very much*. After making all 12 choices, participants were asked for an overall rating of how much they enjoyed the selections on the same 7-point scale. After a participant had completed the first session (either the real-time or predictive listening session, depending upon the counterbalancing condition), the program moved on to the other session.

Results

Older and younger adults gave similar enjoyment ratings for the songs during the initial listening session (older $M = 4.80 \pm 0.32$; younger $M = 5.06 \pm 0.30$). However, older adults liked the older hits ($M = 5.50 \pm 0.32$) more than younger adults did ($M = 4.90 \pm 0.34$), $t(40) = -2.73$, $p < .01$, whereas younger adults liked the newer hits ($M = 5.23 \pm 0.34$) more than older adults did ($M = 4.10 \pm 0.43$), $t(40) = 4.17$, $p < .001$. Older adults were less familiar with the clips than younger adults were (older $M = 3.35 \pm 0.36$; younger $M = 4.09 \pm 0.43$), $t(40) = 2.78$, $p < .01$. Older adults reported more positive affect than did younger adults (older $M = 35.85 \pm 2.64$; younger $M = 28.38 \pm 3.00$), $t(39) = -3.89$, $p < .001$, but the two groups had similar levels of negative affect (older $M = 13.75 \pm 2.92$; younger $M = 16.24 \pm 3.50$). (One older adult did not complete the mood scale.) Older adults scored higher on the vocabulary scale ($M = 20.72 \pm 0.98$) than did younger adults ($M = 13.65 \pm 1.77$), $t(36) = -7.10$, $p < .001$. (One younger adult and three older adults did not complete the vocabulary test.)

A repeated-measures ANOVA comparing variety chosen during real-time and predictive sessions, including the between-subjects factors of age and order, revealed an Age \times Session interaction in which older adults chose less variety during the predictive choice session ($M = 5.65 \pm 0.68$) than they did during the real-time choice session ($M = 8.00 \pm 0.66$), whereas younger adults chose about the same amount of variety in the predictive choice session ($M = 7.01 \pm 0.66$) and the real-time choice session ($M = 7.49 \pm 0.64$), $F(1, 38) = 10.24$, $p < .005$, $\eta_p^2 = .21$ (see Figure 2). This relationship remained significant after including familiarity, enjoy-

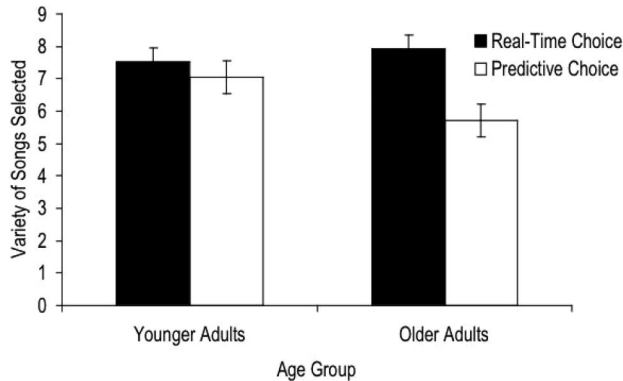


Figure 2. Mean variety of songs chosen ($\pm SE$) during the real-time choice session and the predictive choice session by older adults ($n = 21$) and younger adults ($n = 21$) in Experiment 2. There was a significant Age \times Session interaction, with older adults selecting less variety for future listening than for immediate listening.

ment of real-time session, positive affect, and vocabulary scores as covariates. There was also an Age \times Order interaction in which younger adult choice varied by session order but older adult choice did not (see Table 1 for means).²

Discussion

As in Experiment 1, in this experiment we found Age \times Session interactions in which older adults chose less variety for future consumption than for immediate consumption, but younger adults selected about the same amount of variety in both sessions. Older adults might be willing to sample variety in exchange for their favorites in real time due to their current positive moods but be less willing to jeopardize their future unknown moods by selecting an item for a later time that does not promise satisfaction or might lead to regret. Their focus on emotion regulation may lead them to select items that offer the least amount of future risk. Younger adults, being less focused on emotion regulation and more focused on information gathering, may use the same strategies for selecting items in real time as they use for selecting items for a future time.

Unlike the jellybean experiment, in Experiment 2, with music selections, we did not find that older adults selected more variety in real time than younger adults did. Instead, they chose about the same variety in the real-time session and chose less variety in the predictive session. One possible explanation for this is that we changed the dynamic of the experiment by including disliked song options in the choice set. In Experiment 1, participants reported generally liking all of the jellybeans. In contrast, Experiment 2 had both liked and disliked songs in the choice set. Previous variety-seeking research has indicated that positive affect leads participants to select more variety but only when all the options are attractive (Kahn & Isen, 1993; Menon & Kahn, 1995). We addressed this issue in Experiment 3 by manipulating whether the choice set consisted of liked or disliked songs.

We also found an Age \times Order interaction in which older adults chose the same amount of variety regardless of session order, but younger adults shifted their variety seeking depending on which session was first. Although we are not sure why order would influence the amount of variety that younger adults select, the fact that older adults maintained the same pattern of selection regard-

less of session order indicates that their reduced variety seeking in the predictive session is not an order effect.

Experiment 3

One issue not addressed by the previous experiments was how much participants would enjoy their own predictive choices when consumed later. Thus, in Experiment 3, after making a series of song selections to listen to later, participants listened to the sequence and rated their enjoyment of the songs. This allowed us to examine whether the age differences in variety seeking during predictive choice would be associated with age differences in enjoyment of the options when they were consumed later.

In Experiment 3, we also explored whether there are age differences in memory that lead to the persistent Age \times Session interaction. It is possible that older adults predict that they want less variety than they choose in real time simply because they remember their options less well than younger adults. If older adults do not remember how much they like options, they may be less likely to select them for a later time. When making a real-time choice, they can choose a song they remember poorly and immediately experience it, refreshing their memory. With predictive choices, it is not possible to refresh one's memory to guide later choices.

In addition, we examined the possibility that mood does mediate the relationship between age and variety seeking in real time but only when all of the options are favorable. To do so, we added a song desirability manipulation to Experiment 3. In Experiment 1, older adults selected more variety during the real-time session than did younger adults, which would be consistent with an explanation that their more positive moods were leading them to select more variety but only in real time. In Experiment 2, we found no difference in the amount of variety that younger and older adults chose in real time, but whereas participants generally liked their jellybean options in Experiment 1, we added disliked options to the choice sets in Experiment 2. In Experiment 3, we manipulated the desirability of the song options in order to reconcile these findings.

Method

Participants. Forty-eight undergraduates aged 18 to 29 years ($M = 20.75$, $SD = 2.09$) were given course credit for their participation, and 47 older adults aged 56 to 87 years ($M = 75.37$, $SD = 6.93$) received \$10 for their participation. Older adults reported 10.5 to 23 years of education ($M = 16.06$, $SD = 2.78$), including grade school, and younger adults reported 12 to 17 years of education ($M = 14.57$, $SD = 1.23$).

Procedure. Experiment 3 had the same basic procedures as Experiment 2. Participants first completed the PANAS, the Nelson-Denny Vocabulary Test, and a short demographic sheet

² When older adults completed the real-time session first, they selected a mean amount of variety for both sessions of 6.88 (± 0.82), which is similar to the mean amount of variety for both sessions they selected when they did the predictive session first ($M = 6.77 \pm 0.64$). However, when younger adults completed the real-time session first, they selected more variety for both sessions ($M = 8.05 \pm 0.69$) than when they completed the predictive session first ($M = 6.45 \pm 0.72$), $F(1, 38) = 1.17$, $p < .005$, $\eta_p^2 = .21$. This order effect remained significant after controlling for familiarity, enjoyment of real-time session, positive affect, and vocabulary scores by including these as covariates.

Table 1
Mean Amount of Variety Selected by Condition for Experiment 2

| Age | Real-time session first | | | | Predictive session first | | | |
|----------------|-------------------------|------|------------|------|--------------------------|------|------------|------|
| | Real-time | SE | Predictive | SE | Real-time | SE | Predictive | SE |
| Younger adults | 8.27 | 0.44 | 7.82 | 0.45 | 6.70 | 0.46 | 6.20 | 0.47 |
| Older adults | 8.38 | 0.51 | 5.38 | 0.53 | 7.62 | 0.40 | 5.92 | 0.41 |

Note. Maximum score = 9.00.

and then completed the variety-seeking computer program. The program used the same twenty 30-s song clips as Experiment 2 and began with the same familiarizing session where participants listened to each song and rated enjoyment and familiarity.

Also as before, both the real-time and predictive choice sessions had nine songs available to choose from. However, in the current experiment, the nine song options were not matched between sessions for song attractiveness as they were in Experiment 2. Instead, to test the influence of having disliked options present on variety seeking, one session consisted of six disliked songs and three average songs (negative choice options), whereas the other session consisted of six liked songs and three average songs (positive choice options). We varied between participants whether the predictive session had positive choice options and the real-time session had negative choice options, or the reverse. The order of the sessions was again counterbalanced.

To test whether older adults' poorer memory of how much they liked the songs affected their variety seeking, we placed the initial ratings of song enjoyment (from the familiarizing session) beside the song option labels during both the real-time and predictive choice sessions for half of participants. In addition, we added a prompt before each listening session asking participants to report on a 5-point scale ranging from 1 = *not at all* to 5 = *well* how well they remembered each song option.

To make a choice, participants selected a button representing a song option. The subsequent screen prompted them to rate how much they thought they would enjoy their selection on a 7-point scale ranging from 1 = *not at all* to 7 = *very much*. Then they returned to the choice screen. After making 12 selections for the predictive session, participants listened to their choices. As in the real-time session, as the song played, the screen showed the artist and song name. The subsequent screen prompted participants to rate how much they actually enjoyed listening to the song. Then they listened to the next song in the line-up. The two choice sessions were the same except that in the predictive session (but not in the real-time session) all of the choices were made in advance, and participants made prospective ratings.

Results

In the initial listening session, older and younger adults liked the music clips equally well (older $M = 4.75 \pm 0.22$; younger $M = 4.59 \pm 0.25$). As expected, older adults liked the older hits ($M = 5.65 \pm 0.28$) more than younger adults did ($M = 4.60 \pm 0.30$), $t(93) = -5.24$, $p < .05$, and younger adults liked the newer hits ($M = 4.58 \pm 0.32$) more than the older adults did ($M = 3.87 \pm 0.28$), $t(93) = 3.37$, $p < .05$. Older adults were slightly less familiar with the music clips than younger adults

were (older $M = 3.16 \pm 0.27$; younger $M = 3.80 \pm 0.25$), $t(93) = 3.55$, $p < .005$. Older adults also reported more positive affect than younger adults did (older $M = 36.45 \pm 2.12$; younger $M = 28.65 \pm 2.26$), $t(93) = -5.07$, $p < .001$, and less negative affect than younger adults did (older $M = 11.79 \pm 0.73$; younger $M = 14.56 \pm 1.25$), $t(93) = 3.83$, $p < .001$. The older adults scored from 8 to 24 ($M = 19.91 \pm 0.92$), and younger adults scored from 7 to 22 ($M = 14.60 \pm 1.04$) out of a possible 25 on the vocabulary test, $t(92) = 7.66$, $p < .001$. (One older adult did not complete the vocabulary test.)

Older adults reported remembering their options less well (real-time choices $M = 3.22 \pm 0.27$; predictive choices $M = 3.34 \pm 0.26$) than younger adults did (real-time choices $M = 3.82 \pm 0.21$; predictive choices $M = 3.99 \pm 0.21$) when they rated their song options before the real-time session, $t(93) = 3.92$, $p < .005$, and the predictive session, $t(93) = 4.08$, $p < .001$. Despite these age differences in memory, we did not find that our memory manipulation, adding ratings beside song options for half of participants, could account for age variance in variety seeking as measured by the following analyses.

A repeated-measures ANOVA comparing the mean level of variety chosen in the real-time versus predictive choice session, including the between-subjects factors of age, having ratings present or absent, desirability of songs within a session, and session order, showed a significant Session \times Song Desirability interaction, $F(1, 79) = 25.00$, $p < .001$, $\eta_p^2 = .24$ (see Table 2 for all cell means). Overall, participants chose more variety when they liked the song options; however, disliking options led to selecting even less variety during the predictive session than it did during the real-time choice session. In liked-songs predictive sessions, participants selected on average 7.77 (± 0.40) songs; in disliked-songs predictive sessions, they selected 6.65 (± 0.40) songs. In the liked-songs real-time sessions, participants chose an average of 7.90 (± 0.40) songs; in disliked-songs real-time sessions, they selected 7.27 (± 0.39) songs. This is consistent with previous literature that has shown that people are willing to sample more variety when all of their choices are safe (Menon & Kahn, 2002; Wright & Bower, 1992). However, there was no interaction that would support a hypothesis that age differences in variety seeking depend on the song attractiveness.

As in the previous experiment, there was an Age \times Session interaction that indicated older adults chose less variety in their predictive session ($M = 6.78 \pm 0.41$) than in their real-time session ($M = 7.60 \pm 0.39$), but younger adults chose about the same amount in both the predictive ($M = 7.65 \pm 0.40$) and real-time ($M = 7.56 \pm 0.39$) sessions, $F(1, 79) = 6.80$, $p < .05$, $\eta_p^2 = .08$ (see Figure 3). This relationship was significant even after including familiarity, negative affect, and memory of choices

Table 2
Mean Amount of Variety Selected by Condition for Experiment 3

| Age | Like real-time choices | | | | Like predictive choices | | | |
|--------------------------|------------------------|------------|------------|------------|-------------------------|------------|------------|------------|
| | Ratings | | No ratings | | Ratings | | No ratings | |
| | R | P | R | P | R | P | R | P |
| Online session first | | | | | | | | |
| Younger adults | 8.67(0.55) | 5.83(0.57) | 8.17(0.55) | 6.50(0.57) | 7.67(0.55) | 7.50(0.57) | 6.67(0.55) | 8.17(0.57) |
| Older adults | 8.33(0.55) | 6.67(0.57) | 8.17(0.55) | 6.50(0.57) | 6.83(0.55) | 7.50(0.57) | 6.17(0.55) | 7.33(0.57) |
| Predictive session first | | | | | | | | |
| Younger adults | 7.17(0.55) | 8.17(0.57) | 8.00(0.55) | 8.17(0.57) | 7.17(0.55) | 8.33(0.57) | 7.00(0.55) | 8.50(0.57) |
| Older adults | 6.67(0.55) | 5.00(0.57) | 8.00(0.60) | 6.40(0.63) | 8.33(0.55) | 7.67(0.57) | 8.33(0.55) | 7.17(0.57) |

Note. Maximum score = 9.00. Standard errors are in parentheses. R = real-time; P = predictive.

as covariates in the model.³ However, after controlling for differences between younger and older adults in positive affect, this relationship was no longer significant, $F(1, 78) = 1.45, p = .232, \eta_p^2 = .02$. (We explore this mood effect further in what follows.) There was also an Age \times Order \times Session interaction. Again, as in the previous experiment, older adults consistently selected more variety during the real-time session than during the predictive choice session, but younger adults changed their choice pattern depending on session order.⁴ In addition, there was a significant Order \times Session \times Desirability interaction.⁵

To further explore the effect of mood, we used a median split to categorize participants as having high or low levels of positive affect. This was done across ages so that the dividing line was the same score in both groups. When we included this variable along with the between-subjects factors of age, order, song desirability, and ratings in a repeated-measures test of variety chosen during the real-time and predictive choice sessions, we found a significant Session \times Positive Affect Variable interaction due to participants who were in the best moods selecting more variety in the real-time session ($M = 7.80 \pm 0.45$) than in the predictive session ($M = 6.89 \pm 0.45$). In contrast, participants that were in less good moods chose about the same amount of variety in the real-time session

($M = 7.42 \pm 0.43$) as they did during the predictive session ($M = 7.32 \pm 0.43$), $F(1, 65) = 5.06, p < .05$. Thus, the least amount of variety was chosen during the predictive choice session by participants who were in the best moods. One possible explanation is

³ With vocabulary scores as a covariate, the Age \times Session interaction was no longer significant, $F(1, 77) = 2.71, p = .104$. We did the same type of analysis as in Experiment 2 to examine the influence of vocabulary on variety seeking. We found that a subset of the younger adult sample was matched in terms of vocabulary scores ($n = 28, M = 17.04 \pm 0.86$) with a subset of the older adult sample ($n = 28, M = 18.32 \pm 1.17, t(54) = -1.82, p = .073$). A repeated-measures analysis with these two subsets found no significant Age \times Session interaction. However, the trend in the means remained the same. Younger adults in the subset selected an average of $7.91 (\pm 0.50)$ songs during the real-time session and $7.36 (\pm 0.67)$ songs during the predictive choice session, whereas older adults in the subset selected $7.70 (\pm 0.45)$ songs during the real-time choice session and $6.75 (\pm 0.61)$ songs during the predictive choice session.

⁴ Both when older adults had the real-time and predictive sessions first, they selected more variety during the real-time session than they selected during the predictive session (for real-time first $M = 7.00 \pm 0.57$ vs. $M = 7.38 \pm 0.55$; for predictive first $M = 7.83 \pm 0.56$ vs. $M = 6.56 \pm 0.59$). However, younger adults changed the relative amounts of variety depending on session order. When they had the real-time session first, they selected more variety during the real-time session ($M = 7.79 \pm 0.55$) than they did during the predictive session ($M = 7.00 \pm 0.57$). But, when they had the predictive session first, they selected more variety during the predictive session ($M = 8.29 \pm 0.57$) than they did during the real-time session ($M = 7.33 \pm 0.55$), $F(1, 79) = 14.47, p < .005, \eta_p^2 = .16$. Thus, in both music selection experiments, there was an order effect for younger adults but not for older adults. It appears that younger adults start out weighing variety as important in their choices but that it wanes in importance as they continue making choices.

⁵ This interaction occurred because, when collapsed across age groups, more variety was selected in real-time than predictive sessions in all conditions except when the predictive choice set was liked and presented first. Differences between real-time and predictive sessions were as follows: When real-time choices were attractive and came first (real-time session $M = 8.33 \pm 0.55$; predictive choice session $M = 6.38 \pm 0.57$); when real-time choices were attractive but came second (real-time session $M = 7.49 \pm 0.56$; predictive choice session $M = 6.93 \pm 0.59$); when predictive choices were attractive and came first (real-time session $M = 7.71 \pm 0.55$; predictive session $M = 7.92 \pm 0.57$); when predictive choices were attractive and came second (real-time session $M = 6.83 \pm 0.55$; predictive session $M = 7.63 \pm 0.58$), $F(1, 79) = 8.38, p < .01, \eta_p^2 = .16$.

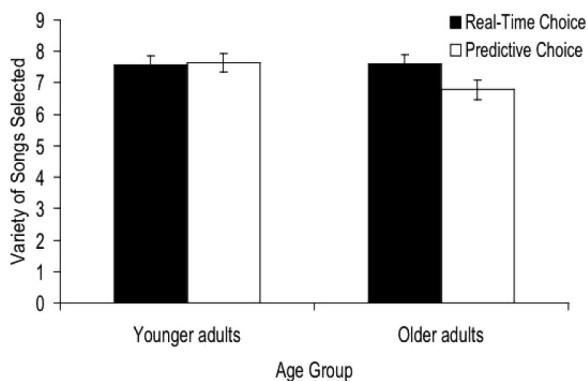


Figure 3. Mean variety of songs chosen ($\pm SE$) during the real-time choice session and the predictive choice session by older adults ($n = 47$) and younger adults ($n = 48$) in Experiment 3. The Age \times Session interaction from the previous experiment was replicated both when choice sets consisted of liked songs and when they consisted of disliked songs.

that people who maintain better moods focus less on variety when planning their future consumption and that this helps them maintain their better moods.

Using the same affect variable, but also including age as a factor, revealed a marginally significant Age \times Session \times Positive Affect Variable interaction, $F(1, 65) = 3.20, p = .078$. Older adults showed less variety seeking in predictive than in real-time sessions regardless of mood (best mood older adults [$n = 31$] real-time $M = 7.50 \pm 0.49$; predictive $M = 6.86 \pm 0.50$; less good mood older adults [$n = 17$] real-time $M = 7.76 \pm 0.71$; predictive $M = 6.67 \pm 0.72$). Younger adults in the best moods ($n = 16$) selected more variety in the real-time session ($M = 8.14 \pm 0.78$) than in the predictive session ($M = 6.93 \pm 0.79$), following the same pattern as older adults. In contrast, those in less good moods ($n = 32$) selected less variety in the real-time session ($M = 7.13 \pm 0.50$) than in the predictive session ($M = 7.89 \pm 0.51$). Thus, although positive mood is associated with decreased variety seeking in predictive sessions for younger adults, older adults show this reduced variety seeking in predictive sessions regardless of mood. It is important to note that the mood measured at the beginning of the experimental session was not experimentally manipulated and so may reflect more enduring dispositions. Thus, one possibility is that older adults in general engage in mood protective strategies such as planning to repeat well-liked options instead of sampling variety, whereas it is only those younger adults who are the happiest (and thus perhaps the most focused on emotion regulation) who focus more on protecting future mood than on other choice strategies, such as variety seeking.

Both younger and older adults underestimated how much they would enjoy the songs they chose during the predictive choice session (predicted enjoyment $M = 5.10 \pm 0.20$; rated enjoyment $M = 5.22 \pm 0.21$), $F(1, 79) = 6.48, p < .05, \eta_p^2 = .08$, and there was no significant age difference in this underestimate. In addition, older adults' actual enjoyment ratings ($M = 5.38 \pm 0.30$) were not significantly different from those of younger adults ($M = 5.06 \pm 0.30$), $F(1, 79) = 2.24, p = .14$.

We also examined how positive mood was related to enjoyment prediction accuracy. Repeated-measures ANOVAs revealed that the low positive affect group did not accurately predict how much they would like their choices in the predictive session (prediction $M = 4.83 \pm 0.35$; actual enjoyment $M = 5.01 \pm 0.34$), $F(1, 47) = 6.52, p < .05$. In contrast, participants with above-median levels of positive affect accurately predicted how much they would enjoy their choices (prediction $M = 5.39 \pm 0.34$; actual enjoyment $M = 5.45 \pm 0.37$), $F(1, 46) = .669, p = .42$. It may be that people who are in the best moods are chronically more focused on regulating their emotions and as a result become more aware of the emotional consequences of their choices.

Discussion

Experiment 3 replicated the Age \times Session interaction that we found in Experiments 1 and 2. When choosing items to be consumed at a later time, older adults selected less variety than when they made choices for immediate consumption. Younger adults selected the same amount of variety regardless of when they consumed their choices. In addition, we again found that younger adults adjusted how much variety they chose depending on order, but older adults maintained the same pattern despite order.

In Experiments 1 and 3, we found that positive affect accounted for some of the variance between our two samples in variety seeking. Given that positive affect did not significantly account for this variance in Experiment 2, it appears that there are other factors leading to the age difference in how much variety participants predict that they want for a later time. It may be that age differences in emotion regulation are more influential than age differences in mood, but because being focused on emotion regulation is correlated with positive mood, mood sometimes appears to be associated with the variety-seeking effects.

In any case, as positive affect accounted for some variance in variety seeking in two of our experiments, it will be an interesting topic to explore in later research. Younger adults' relative amounts of variety chosen between sessions varied depending on positive mood, but older adults maintained the same patterns regardless of positive affect levels. It is possible that being in a good mood is partly the result of making more cautious decisions about future episodes. Interestingly, research with younger adults has suggested that they overestimate how much variety they would like in the future (Read & Loewenstein, 1995). One possibility suggested by our findings is that older adults were not making this erroneous overestimate of how much they would want variety in the future and therefore selected less variety for future consumption.

In Experiment 3, we asked people to predict how much they would like their choices and then to rate how much they actually enjoyed listening to their song choices. We found no age differences in the accuracy of these predictions. However, we did find that participants in the best moods across the two age groups were better at predicting the emotional consequences of their future choices than participants in less good moods. We suspect that people in the best moods focus on making choices that lead to the maintenance of good moods. Given their dedication to this goal, they may become better aware of how choices translate into emotional consequences.

Differences in the familiarity and memory of available options between our older and younger adult samples did not change the significance of the age differences in variety seeking in any of the three experiments when added as covariates. In addition, our manipulation of displaying ratings during the choice session to remind people of how much they liked/disliked particular songs had no influence on the relationship between age and variety seeking. Taken together, these results suggest that how well options are remembered is not a factor in the age differences found in variety seeking.

We also examined the possibility that older and younger adults make different choices depending on whether the options are attractive or not. In the first experiment, in which all of the jellybean options were pleasant, older adults selected more variety in real time than younger adults did. In the second experiment, we did not find that older adults selected more variety in real time than younger adults. We hypothesized that we might have changed the dynamic of the experiment by adding negative choices to the choice sets. In Experiment 3, we tested this by having either all liked or all disliked options. We found no Age \times Song Desirability Within a Session interaction that would support the hypothesis that older adults select more variety than younger adults when all of the choices are positive. However, as expected, we did find that both younger and older adults selected more variety when they liked the available options.

General Discussion

Previous research on aging and variety seeking led us to predict, on the one hand, that older adults might select less variety for future consumption than younger adults due to their increased focus on protecting their future emotional well-being but, on the other hand, that their increased positive affect due to their focus on emotion regulation may lead them to select variety in the moment. This reduced variety seeking when making predictive choices among older adults was confirmed in three experiments examining real consumption choices.

In all three experiments, we found no reliable difference in variety seeking between younger and older adults in their real-time choices. We also conducted an additional experiment not reported here in which participants rated how much they liked hypothetical song sequences that varied in how often they repeated songs. Younger and older adults did not differ in how much they weighted variety in their preferences or in how much they said they prioritized variety in their choices in a postexperiment questionnaire. Thus, older and younger adults seem to have similar beliefs about the importance of variety.

However, despite these similarities among younger and older adults in real-time choice and preferences for variety, we found a consistent pattern across Experiments 1–3 in which older adults selected less variety when planning a future consumption sequence than when consuming items one at a time immediately (see Figures 1–3). In contrast, younger adults selected about the same amount of variety when making both types of choices. Our results suggest that older adults' increased positive affect is associated with the difference between real-time and predictive choice but that mood is not the only mechanism driving this effect and may in fact just be another by-product of emotion regulation processes that underlie the effect.

Limitations of These Studies

We chose jellybeans and music as stimuli for these experiments because they allow real consumption choices to be made in a laboratory setting and because there is a precedent in variety-seeking research for using this type of stimulus (Menon & Kahn, 1995, 2002; Ratner & Kahn, 2002; Ratner et al., 1999; Read et al., 2001). However, it remains to be seen whether these findings generalize to more consequential choices. Future attempts should be made to examine this pattern in more realistic settings.

Another question for future research is why we did not replicate the finding that younger adults select more variety when making predictive choices than when making real-time choices (Read & Loewenstein, 1995; Simonson, 1990). One factor may have been the time that elapsed between making predictive choices and consuming them. In other experiments, participants made choices that were to be consumed from 1 hr to days later (Read & Loewenstein, 1995; Simonson, 1990). In our experiments, participants made choices that were consumed within minutes after making all of the choices. Simonson (1990) proposed that uncertainty of future preferences leads to selection of a greater variety of items (see also Chernov, 2006; Kahn & Lehmann, 1991). Logically, the greater the amount of time that elapses between choice and consumption, the greater the amount of uncertainty as to what preferences will be at the time of consumption. It would be interesting to see if age influences real-time and predictive choice differently as time between choice and consumption change.

Age and Predictive Choice Versus Real-Time Choice

We looked at many factors that might contribute to the finding in all three experiments that older adults chose less variety for future consumption episodes than for immediate consumption episodes. Most of these, including familiarity of stimuli, memory of options, and self-monitoring, did not appear to contribute to the age differences in variety seeking for future consumption. In contrast with the other factors we examined, mood was somewhat influential, as it was a significant covariate in Experiments 1 and 3. However, affect was not a significant covariate for the age difference in predictive-choice variety seeking in Experiment 2, which leads us to believe there are other factors underlying the age difference. In fact, one possibility is that the reason positive mood was a significant covariate in two of the experiments is because it was strongly correlated with age group and, as such, was a proxy for age group. A further indication that mood was not the only factor is that, among the older adults, differences in mood did not lead to a consistent pattern of differences between real-time and predictive choice (see Experiment 3).

Previous research examining the influence of mood on variety seeking has manipulated the affect of the participants by giving them a small gift or varying the choice environment (Menon & Kahn, 1995, 2002). In the current study, we measured the current mood of participants rather than manipulating mood. A mood manipulation may provoke different behavior than that associated with simply being in a good mood. Further, participants with higher levels of positive affect are probably better emotion regulators than participants with lower levels of positive affect. Adept emotion regulators may make different decisions that lead to maintaining better moods.

We found some evidence of this in Experiment 3. People in good moods were more accurate in predicting how much they would enjoy their choices than were people in less good moods. In a separate analysis, we found that people in good moods chose less variety for future consumption than they selected in real time. Taken together, this suggests that people in good moods do make different choices than people in less good moods and that people in good moods make choices knowing their emotional consequences, whereas people in less good moods are not as aware of these consequences.

In summary, we found that older adults did not select less variety than younger adults when making real-time decisions. Perhaps even more intriguing is the consistent finding across the three experiments that older adults selected less variety when making choices about future than immediate consumption, whereas younger adults did not show this difference. Our results indicate that greater levels of positive mood among older adults are sometimes associated with these age differences, but they also suggest that mood is not a critical factor influencing age differences in the relationship between predictive and real-time choices. A greater focus on regulating emotion may lead to the desire to protect future emotions (and therefore select less variety for future consumption episodes) while also increasing positive affect in the present moment.

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