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The choices we make: An examination of situation selection in younger and older adults

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Abstract

The current study examined the effects of age and control beliefs on the use of situation selection. Younger and older adults spent 15 minutes in a room containing multiple affective streams that varied in emotional valence, and were given free choice to engage with whatever they wanted. No significant main effect of age emerged on the number of choices of, or time spent with, material of each valence. However, age and beliefs interacted such that older adults with strong emotion regulation self-efficacy and general control beliefs chose *fewer* negative stimuli, whereas younger adults with strong beliefs chose *more* negative stimuli. Results are discussed from aging and individual differences perspectives.

Older adults report having greater emotional satisfaction, better affect regulation, and more mood stability than younger adults (e.g., Gross, et al., 1997). Recent experimental laboratory studies have investigated age differences in the use and effectiveness of various emotion regulation strategies (see Charles, 2010; Urry & Gross, 2010 for summaries). Drawing on the process model of emotion regulation (Gross, 1998), these studies have focused primarily on the use of reappraisal (i.e., changing the way we think about negative situations) and attentional deployment (i.e., diverting attention away from the negative aspects of situations). However, an even earlier and more proactive strategy is situation selection, which is characterized by "approaching or avoiding certain people, places or objects in order to regulate emotions" (Gross, 1998, p. 283). Conceptual models (see Charles, 2010; Urry & Gross, 2010) speculate that older adults may favor proactive and relatively less effortful emotion regulatory strategies such as situation selection, but there is limited empirical work that supports this point. For example, older adults may avoid anger situations in vignettes (Blanchard-Fields, 2007). The current study marks the first attempt (to our knowledge) to investigate whether age impacts the use of situation selection in emotion regulation through behavioral measures of actual selection.

Aging and Emotion Regulation Strategies

The process model (Gross, 1998) operationalizes several distinct emotion regulation strategies and provides a broad framework for thinking about their effectiveness. Recently, the process model has specifically been extended to consider age-related changes in strategy use and effectiveness (Urry & Gross, 2010). Researchers have found older adults to be better at positive reappraisal, equally good at behavior suppression, and worse at detached reappraisal than young adults (Shiota & Levenson, 2009). Others have similarly concluded

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that the functionality of brain structures underlying successful emotion regulation across age depends on cognitive ability, which tends to either level off or, in most cases, decline with age (Winecoff et al., 2011).

A large related literature has emerged from socioemotional selectivity theory (SST). SST predicts that older adults are more motivated than younger adults to pursue emotion regulatory goals due to limitations in time perspective, and that older adults regulate their emotion more proactively and more effectively (Carstensen, Isaacowitz, & Charles, 1999; Scheibe & Carstensen, 2010). Research on SST demonstrates that older adults remember and attend to more positive emotional information and that these positivity effects in cognition can help older adults maintain positive moods and mitigate negative moods (Isaacowitz, Toner, Goren, & Wilson, 2008; Isaacowitz, Toner, & Neupert, 2009; Mather & Carstensen, 2005). In contrast, younger adults have been shown to attend more to negative stimuli, and sometimes have better moods when they look at negative stimuli relative to positive stimuli (Isaacowitz & Noh, 2011; Isaacowitz, 2012). Thus, positivity effects in visual attention may reflect the use of attentional deployment as a regulatory strategy.

Situation selection involves shaping one's environments to avoid mood-threatening situations, and has not yet been studied behaviorally in the context of aging. Some examples of situation selection include meeting up with a friend one can laugh with after having a bad day (Gross, 1998) or putting on a humorous television show or radio station instead of listening to news about the latest international crisis. When considering situation selection as a regulatory strategy, SST might predict positivity effects in choice behavior related to older adults' regulatory goals. Older adults may also be more likely to use "positive" situation selection and avoid negative stimuli as a regulation strategy, because it is less cognitively taxing, more proactive, and more selective than other emotion regulation strategies (Charles, 2010; Charles, Piazza, Luong, & Almeida, 2009). Thus, investigating age preferences in situation selection may allow for an integration of the "positivity effect" and "process model" approaches to the study of aging and emotion regulation: SST provides the hypotheses and the process model provides the structure for conceptualizing and testing strategy use and effectiveness.

Planning our Affective Futures: Situation Selection and Control Beliefs

Situation selection differs from other emotion regulation strategies in that it involves projecting oneself into the future to identify the affective value of different possible situations and behaviorally approaching the most desired affective experience. Because it can allow an individual to altogether circumvent possibilities for experiencing negative emotions, situation selection is said to be the most proactive strategy in the process model (Gross & Thompson, 2007). In addition, whereas the other strategies are used in reaction to an immediate emotional situation, situation selection operates before the emotional trigger is encountered (see also Aspinwall & Taylor, 1997). Thus, situation selection can be seen as more "voluntary" – it requires more active planning and foresight than other strategies, and may not lead to immediate repercussions if it is not implemented, since a later strategy may be used if the opportunity to use situation selection is missed.

Though older adults may *desire* more positive emotional experiences, they may vary in other individual difference dimensions that influence the extent to which they can proactively anticipate and plan around future negative situations. One family of variables that may contribute to proactive emotion regulation are control beliefs, or beliefs about the extent to which our actions are likely to bring about the intended outcomes (Aspinwall & Taylor, 1997; Côté, Gyurak, & Levenson, 2010; John & Gross, 2007, Tamir, John, Srivastava, & Gross, 2007; Tamir & Mauss, 2011; Urry & Gross, 2010). In a study that provided support

for recent theorizing about the link between control beliefs and proactive regulation, control beliefs in young adults were associated with self-reported cognitive reappraisal, a relatively proactive strategy that can preempt emotional reactions, but were unrelated to expressive suppression, a cognitively taxing strategy that conceals felt emotional responses (Tamir et al., 2007). This work suggests that believing we can control our emotions may be a necessary prerequisite for managing emotions before they can fully develop.

Control beliefs have not yet been studied in the context of situation selection. However, the above research, along with additional work demonstrating that control beliefs promote active planning (Prenda & Lachman, 2001), suggests that such beliefs should also promote the use of situation selection. Since situation selection is considered to be even more proactive than cognitive reappraisal, control beliefs should be at least as helpful in promoting the use of situation selection as it is reappraisal. Believing it is possible to influence the way we feel may motivate us to engage in behaviors that prevent the onset of negative emotions. In contrast, believing that emotions cannot be effectively managed may convey that actively managing emotions is futile. This in turn could lead people to miss early opportunities to avoid negative situations and to instead rely on cues given off by immediate emotional stimuli or physiological reactions to realize the need to initiate regulatory attempts.

However, one could make the alternative prediction that control beliefs allow individuals to approach, rather than avoid, negative emotional situations: Control beliefs might confer a heightened sense of confidence in one's ability to handle negative situations once they arise. Thus, strong control beliefs might either serve as an incentive to preemptively avoid negative situations or signal that we can safely approach negative situations. Put another way, using situation selection to avoid negative (and approach positive) situations requires a sense of control in one sense and can reflect a lack of control in another.

Situation Selection, Control Beliefs, and Aging

Insight from the literature on emotion and aging can be brought to bear on these competing hypotheses. We have so far assumed that people would always want to use situation selection to try to maximize positive emotional experiences, but research demonstrates that this is not always the case. Whereas older adults often have hedonically-oriented emotion regulation goals (Riediger et al., 2009) and a motivation to avoid negative information (Carstensen et al., 1999), younger adults strive to balance emotional goals (which are important for the present) and informational goals (which are important for the future), and are sometimes motivated to engage with negative information (Tamir, 2009). Consistent with theoretical perspectives suggesting that control beliefs help individuals carry out their goals and intentions (e.g., Ajzen, 1991; Bandura, 1977), we hypothesized that older adults with strong control beliefs should be more likely to engage in situation selection because control beliefs would encourage them to behave in line with their goal of avoiding negative information. In contrast, the notion that control beliefs can motivate proactive emotion regulation may still play a role in young adults, but this effect may be balanced by younger adults' additional motivations to gather information objectively and occasionally experience negative emotions. Given these competing goals, and thus the possible competing effects of control beliefs, we did not predict that control beliefs would be clearly related to situation selection in younger adults. In summary, we predicted that older adults would be more likely to engage in situation selection than younger adults (a main effect of age), and that these differences would be even more pronounced at high levels of control beliefs, because older adults with strong control beliefs would use the most situation selection (an interaction between age and control beliefs).

We assessed control beliefs both over life outcomes in general and specifically over emotions. Though the latter construct has been the primary focus in the emotion regulation literature (e.g., Tamir et al., 2007), we were interested in whether the general belief in action-outcome contingency might also influence proactive emotion regulation given the well-established link between a general sense of control and well-being (e.g., Abramson, Seligman, & Teasdale, 1978; Lachman & Weaver, 1998).

A New Paradigm

To test these hypotheses, we created an "affective environment" (AE) in the laboratory, consisting of an enclosed room with multiple information streams (i.e., magazine articles, video clips, websites) that varied in emotional valence. As a measure of situation selection, participants could choose to engage with anything in the room. We predicted that older adults would select more positive and less negative materials than younger adults, and that control beliefs would be positively related to the use of situation selection in older adults but not in younger adults.

Method

Participants

Three participants either did not follow instructions or did not provide complete data, and were excluded from our sample. The final sample consisted of 33 older (M = 74.91, SD = 7.84) and 34 younger adults (M = 19.65, SD = 1.52). The older adults (21 females and 12 males) were recruited from communities in the northeastern United States or from our lab's previous participants' database. Younger adults (19 females and 15 males) were mainly students at Brandeis University. Participants either received course credit or a monetary stipend of $10/hour. Younger and older adults did not significantly differ on self-report measures of optimism (LOT; Scheier & Carver, 1985), depression (CES-D; Radloff, 1977), neuroticism (Neuroticism scale; Bolger, & Schilling, 1991), fluid intelligence (digit-span; Weschler 1981), or mental status (MMSE; Folstein, Folstein, & McHugh, 1975), and no older adults fell below the cutoff score for signs of dementia on the Mini-Mental State Examination (see Table 1). Older adults had completed more years of education than younger adults. Among older adults, 6.1% completed high school, 9.1% completed a technical/vocational/trade school, 12.1% completed two years of college, 6.1% completed three years of college, 21.2% completed four years of college, 39.4% completed a master's degree, and 6.1% completed a MD/JD/PHD. 23.5% of young adults had only completed high school, 26.5% completed one year of college, 23.5% completed two years, 14.7% completed three years, 5.9% completed four years, and 5.9% completed a master's degree.

Affective Environment (AE)

The AE stimuli consisted of television news clips, websites, and hard-copy news articles (see Appendix for list and brief description of stimuli). Television news clips and websites were downloaded from the internet and presented using MediaLab software on 2 computer monitors. The hard-copy news articles were also drawn from the internet, and were printed and bound. Since situation selection relies on the individual having some information to use in deciding whether to approach or avoid a stimulus, thumbnail pictures and titles, representative of the emotional valence and general content of the stimuli were displayed in a grid of options on selection pages for websites and news videos. Once participants decided which stimuli they wanted to view, they merely had to click on the relevant thumbnail to begin viewing it. Each hard-copy article had a cover page displaying a representative image and title, with the article text contained inside the cover. To control for order effects, participants saw 1 of 3 versions of each of the selection screens, with thumbnails displayed

in a different randomized order. The hard-copy news articles were laid out on a desk in a pseudo-random order.

Independent samples of 10 young (M = 20.60, SD = 1.70) and 10 older adults (M = 73.70, SD = 5.42) pilot rated the stimuli to ensure consistency in our stimuli across age. Each website, television news story, hard-copy article and corresponding thumbnail-caption pair was rated on dimensions of valence and age relevance on a 1 (negative valence/low relevance) to 9 (positive valence/high relevance) scale. Across age, negative stimuli were rated significantly lower on valence (M = 2.86, SD = 1.34) than neutral stimuli (M = 5.17, SD = 1.25), which were rated significantly lower on valence than positive stimuli (M = 7.15, SD = 1.08), $F(2, 256) = 531.43$, $p < .001$, $\eta_p^2 = .78$. Considering them further by type, there were no age differences in valence ratings of thumbnail-caption pairs for articles $F = .54$, $p = .46$, $\eta_p^2 = .031$, videos $F = .15$, $p = .71$, $\eta_p^2 = .006$, or websites $F = .06$, $p = .81$, $\eta_p^2 = .003$, or for the actual content ratings of articles, $F = .04$, $p = .85$, $\eta_p^2 = .002$, videos $F = .15$, $p = .70$, $\eta_p^2 = .008$, or websites $F = .47$, $p = .50$, $\eta_p^2 = .025$. There were no age differences in relevance ratings of thumbnail-caption pairs for articles $F = .16$, $p = .69$, $\eta_p^2 = .009$ or videos $F = .10$, $p = .29$, $\eta_p^2 = .112$, or for the content ratings of articles $F = .17$ $p = .68$, $\eta_p^2 = .009$ or videos $F = 1.00$, $p = .39$ $\eta_p^2 = .048$. Older adults, however, rated website thumbnails $F = 6.90$, $p = .02$, $\eta_p^2 = .289$, and website content $F = 5.64$, $p = .03$, $\eta_p^2 = .249$, as less relevant than younger adults. These ratings suggest that older and younger adults thought of the final set of stimuli as equally positive or negative and relevant (except for websites). It is not entirely surprising that older adults rated websites as less relevant given that older adults use computers and the internet less than younger adults and harbor less favorable attitudes, more anxiety, and lower confidence toward using computers (Charness & Boot, 2009, Czaja et al., 2006). It is likely that older adults perceived the medium of presentation, and not necessarily the content of the websites, as less relevant.

The AE contained 5 negative, 2 positive, and 2 neutral stimuli for both news videos and websites, and slightly more hard-copy articles (6 negative, 3 positive, and 3 neutral) in anticipation of potential age-related anxiety surrounding the use of computers (Charness & Boot, 2009; Wagner, Hassanein, & Head, 2010). A greater percentage of negative stimuli were included to allow an adequate amount of material that could be potentially mood-disturbing and to reflect the negativity of the real-world media. It also allowed us to calculate preference scores that operationalize situation selection as negativity avoidance, using a single composite measure (see below).

We created a scale measuring trait tendencies to use situation selection to help assess the validity of our behavioral situation selection measure. An example item was, “I don’t put myself in situations that might lead me to feel negative emotion.” We asked participants to respond to five items on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). Scores ranged from 18 to 35 ($\alpha = .70$). Supporting the AE’s validity, a significant correlation emerged between the scale and choice composite scores (described next) based on behavior in the AE, $r = .27$, $p = .03$.

Measures

Choice and Time Composite Scores—In addition to summing the number of stimuli of each valence chosen and the amount of time spent with stimuli of each valence separately, we operationalized situation selection as a preference for positive and neutral stimuli over negative stimuli (i.e., negativity avoidance). We calculated composite scores for both choices and time spent with stimuli. Choice composite scores were calculated by summing the number of positive and neutral stimuli chosen, and subtracting the number of negative stimuli chosen. Time composite scores were calculated by summing the time spent on positive and neutral materials, and subtracting the time spent on negative materials.

Positive and higher scores indicated a preference for positive and neutral materials over negative materials, while negative scores corresponded to a preference for negative compared to positive and neutral materials.

Emotional Self-Efficacy Scale—We assessed control beliefs specifically about emotions using five items from the "managing own emotions" subscale of the Emotional Self-Efficacy Scale (ESES; Kirk, Schutte, & Hine, 2008), which asks participants to rate their confidence in their abilities to carry out five emotion regulatory functions on a 5-point scale (1 = not at all, 5 = very). Scores ranged from 9 to 25 (α = .78).

Emotional control item—We also assessed emotion-specific control beliefs using a single item ("Overall, how much control would you say you have over your emotions?") which has been used in previous research on emotions and aging (Gross, et al., 1997). Participants answered on a 10-point scale (1 = *no control*, 10 = *complete control*). Scores ranged from 2 to 10.

Perceived Constraints Scale—We assessed control beliefs about outcomes in general using the "perceived constraints" scale of the Sense of Control Scales from the Midlife Development Inventory (Lachman & Weaver, 1998). Participants rated the degree to which they agreed with 8 statements on a 7-point scale (1 = *strongly agree*, 7 = *strongly disagree*). Higher scores indicate higher perceived constraints and thus a *weaker* general sense of control. Scores ranged from 8 to 56 (α = .83).

Procedure

Participants were brought into the AE and read a consent form, which informed them that, "This research study is about emotion in adulthood. As a subject in this study, you will be presented with various different things to choose to interact with (magazines, news videos, movies, etc.)" After participants signed the consent form, they were given additional verbal instructions: "Once we get started, you will be alone in this room for 15 minutes, and you will be able to interact with a selection of materials that are in front of you. Throughout your time here you will have the freedom to choose from any of these materials in whatever order you want, and for however long you want." Participants were shown how to select content on the computers, and, in order to minimize time spent browsing, were given a short time to familiarize themselves with the choices available. MediaLab software and a video camera recorded their choices and how long they spent viewing each item (we did not use eyetracking, so do not know if participants looked away from the stimuli, but we know that they had chosen them and how long they looked in their general direction). The experimenter waited outside the room with a timer, and returned after 15 minutes. Participants then completed the ESES, perceived constraints, emotional control, LOT, CES-D, Neuroticism, digit-span, MMSE, and demographics measures.

Analytic Approach

Our paradigm allowed participants the freedom to choose varying types and amounts of stimuli. We had no a priori predictions about the number of selections people would make, only about the valence of their choices. Thus, variability in the number of choices participants made might lead to some misleading conclusions if only raw choice scores were used in the analyses. For example, using the raw scores, a participant who chose 2 stimuli of each valence would earn a choice composite score of 2 (2 positive + 2 neutral − 2 negative), whereas a participant who chose 3 of each – who selected the identical ratio of valenced materials – would have a choice composite score of 3 (3 positive + 3 neutral − 3 negative). Controlling for their total number of choices eliminates this spurious discrepancy, and for measures split by valence, ensures that higher scores are not simply a function of having

chosen more stimuli overall. Therefore, we divided participants' choice scores by the total number of choices they made, and their time scores by their total time spent on stimuli. We refer to these as "adjusted" scores. Results with raw and adjusted scores were largely the same: Whenever the raw analyses were significant, the adjusted analyses were too. However, there were several *additional* significant findings with the adjusted scores. Below, we report analyses with raw scores when raw and adjusted showed identical patterns, because they are easier to interpret and provide the more conservative tests of our hypotheses. In those cases where raw and adjusted scores had different results, we present both sets of results. Thus, unless explicitly noted otherwise, the analyses reported below use raw variables.

Results

We first used repeated-measures ANOVAs to assess differences in number of choices and time spent as a function of valence. Across age, participants selected significantly more emotional material compared to neutral material, $F(2, 65) = 31.70$, $p < .001$, $\eta_p^2 = .49$. Specifically, participants selected more negative material ($M = 3.64$, $SD = 2.31$) than neutral ($M = 1.67$, $SD = 1.49$), $p < .001$ and more positive material ($M = 2.99$, $SD = 1.60$) than neutral, $p < .001$, with the difference between positive and negative not reaching significance, $p = .35$. A similar effect of valence emerged for time variables, $F(2, 65) = 63.43$, $p < .001$, $\eta_p^2 = .66$. Across age, participants spent significantly more time with negative material ($M = 347.58$ sec, $SD = 196.01$) than neutral ($M = 109.05$ sec, $SD = 97.77$), $p < .001$ and more time with positive material ($M = 297.43$ sec, $SD = 197.83$) than neutral, $p < .001$, with the difference between positive and negative not reaching significance, $p = .71$.

Next, we used one-way ANOVAs to look at age differences in the number of choices of, and time spent with, materials overall and materials of each valence (see Table 1). Younger adults spent more time viewing materials overall than did older adults, $p = .02$, $\eta_p^2 = .08$, but did not make a significantly greater number of choices, $p = .53$, $\eta_p^2 = .006$ (time that was not spent viewing specific stimuli was spent assessing the choices available and deciding which materials to select). There were no other statistically significant age differences in any of the choice or time dependent variables, meaning there were no age differences in number of choices or time spent with positive, negative, or neutral stimuli, or in the composite scores for choices or time (see Table 1), with one exception: The age difference in time spent on neutral stimuli (older adults spent more time on neutral) was marginally significant, $p = .051$, $\eta_p^2 = .06$, with this difference becoming significant when adjusting for total choices, $p = .03$, $\eta_p^2 = .08$.

No age differences emerged in the types of stimuli participants chose: Younger and older adults chose similar numbers of websites ($p = .46$), videos ($p = .74$) and magazines ($p = .24$).[1] There were no significant age differences on the ESES scale, the emotional control item, or the perceived constraints scale (see Table 1).

The Role of Age and Control Beliefs in Predicting Choice Variables

We hypothesized that age differences in situation selection would be more pronounced at high levels of control beliefs. Thus, using a moderated multiple regression analysis with the situation selection composite choice score as the dependent variable, we tested for an interaction between ESES (as a continuous variable) and age group (with younger adults coded as 0 and older adults coded as 1). ESES had a differential effect on the choices

[1]We could not investigate age differences in the valence of choices for each stimulus type separately because a number of participants did not choose any materials of certain types, and many participants did not choose any stimuli of a certain valence within particular types.

younger and older adults made: There was a statistically significant interaction between age group and ESES, $b = .55$, $SE = .24$, $p = .03$ (see Figure 1). Analyses of group differences showed that at high levels of ESES (1 *SD* above the mean), older adults had significantly higher choice composite scores than younger adults, $b = 2.72$, $SE = 1.18$, $p = .02$. At low levels of ESES (1 *SD* below the mean), the difference was not significant, $b = -1.14$, $SE = 1.19$, $p = .34$. Decomposing the interaction in another way by looking at simple slopes, we found that, as predicted, higher ESES scores were associated with higher choice composite scores among older adults, $b = .37$, $SE = .16$, $p = .03$, but not younger adults, $b = -.18$, $SE = .18$, $p = .31$. These findings support our hypotheses that age differences would be greater at high levels of control beliefs and that control beliefs would be positively related to situation selection in older adults.

In order to provide a conceptual replication of this finding, we conducted similar analyses using the single emotional control item, which measures a construct essentially identical to ESES. As with ESES, there was a statistically significant interaction between age group and emotional control in predicting choice composite scores, $b = 1.39$, $SE = .61$, $p = .03$ (see Figure 2). Analyses of group differences showed that at high levels of emotional control (1 *SD* above the mean), older adults had significantly higher choice composite scores than younger adults, $b = 2.67$, $SE = 1.19$, $p = .03$. At low levels of emotional control (1 *SD* below the mean), the difference was not significant, $b = -1.31$, $SE = 1.22$, $p = .29$. Simple slopes were not significant in either age group using raw scores; however, when adjusting for total choices made, a significant negative relationship emerged between emotional control and choice composite scores in younger adults, $b = -.19$, $SE = .08$, $p = .02$. Thus, these results generally replicate the patterns found with the ESES scale, but go further to provide initial evidence for a *negative* relationship between control beliefs and situation selection in young adults.

To test whether the differential effect of control beliefs on choice behavior for younger and older adults is specific to the emotion regulation domain or whether it also emerges with the broader construct of general control beliefs, we conducted similar analyses using the perceived constraints scale. There was a statistically significant interaction between age group and perceived constraints in predicting choice composite scores, $b = -.24$, $SE = .11$, $p = .03$ (see Figure 3). Analyses of group differences showed that at high levels of general control (1 *SD* below the mean on perceived constraints), older adults had significantly higher composite choice scores than younger adults, $b = 2.73$, $SE = 1.23$, $p = .03$. As with the ESES and emotional control patterns, at low levels of general control, (1 *SD* above the mean), the difference was not significant, $b = -1.48$, $SE = 1.29$, $p = .25$.[2]

To better understand which valence conditions drove the effects described with composite scores, we repeated the moderated regression analyses separately for each valence. As shown in Table 2, significant results emerged primarily in predicting negative choices: Age group significantly interacted with ESES in predicting the number of negative choices, $b = -.37$, $SE = .16$, $p = .02$. Analyses of simple slopes demonstrated that there was a significant relationship between ESES and number of negative choices in older adults: The higher older adults were on emotion regulation self-efficacy, the fewer negative stimuli they chose, $b = -.26$, $SE = .11$, $p = .02$, whereas there was no relationship in younger adults, $b = .11$, $SE = .12$, $p = .36$.

[2]An inspection of the raw data indicated that there was an outlier on the number of negative choices dependent variable. We kept this participant in the data set because choosing more stimuli is a legitimate behavior, and does not suggest anything wrong with this participant's data. Removing this outlier makes the interaction with age group and ESES not significant, but the interactions with age group and perceived constraints and emotional control remain significant.

Age group also significantly interacted with perceived constraints in predicting negative choices, $b = .16$, $SE = .07$, $p = .02$. Analyses of simple slopes demonstrated that there was a significant relationship between perceived constraints and number of negative choices in younger adults: The more general control younger adults had (i.e., the lower their perceived constraint scores), the more negative stimuli they chose, $b = -.13$, $SE = .06$, $p = .04$, whereas no significant relationship emerged in older adults, $b = .04$, $SE = .04$, $p = .35$.

The age group by emotional control interaction in predicting number of negative choices made did not reach significance, $b = -.76$, $SE = .42$, $p = .07$, but did using adjusted scores, $b = -.10$, $SE = .04$, $p = .02$. Simple slopes using adjusted scores showed that, the higher younger adults were on emotional control, the more negative stimuli they chose, $b = .05$, $SE = .02$, $p = .045$. In addition, when using adjusted scores, analyses of age group differences demonstrated that younger adults chose a significantly greater proportion of negative stimuli than older adults at high levels of ESES, $b = -.18$, $SE = .08$, $p = .02$, emotional control, $b = -.20$, $SE = .08$, $p = .01$, and general control, $b = -.02$, $SE = .08$, $p = .01$.

Effects also emerged with neutral choices. Emotional control and age group interacted in predicting number of neutral choices, $b = .54$, $SE = .26$, $p = .04$, and emotional control was positively related to choosing neutral stimuli for older adults, $b = .51$, $SE = .21$, $p = .02$. Analyses of age group differences showed that at high levels of emotional control, older adults chose more neutral stimuli than younger adults, $b = 1.19$, $SE = .51$, $p = .02$, and ESES, $b = 1.17$, $SE = .51$, $p = .03$. When using adjusted scores, ESES and age group interacted in predicting number of neutral choices, $b = .03$, $SE = .01$, $p = .002$, and ESES predicted the number of neutral choices among older adults, $b = .02$, $SE = .01$, $p = .01$. Also, when using adjusted scores, older adults chose a greater proportion of neutral materials than younger adults at 1 SD below the mean for perceived constraints, $b = .13$, $SE = .06$, $p = .02$.

The findings remain unchanged when controlling for education. In addition, to alleviate the concern that preexisting differences in mood might contribute to the effects, we repeated the analyses controlling for an initial self-reported mood rating made using a 100-point scale (0 = completely unpleasant, 100 = completely pleasant), and the effects remained unchanged. Finally, to rule out the possibility that age differences in pretest relevance ratings for websites could produce these effects, we reran the analyses without website data. The age group by perceived constraints ($p = .03$), ESES ($p = .07$), and emotional control ($p = .08$) interactions were all still in the same directions despite the limited range of the dependent measure.

The Role of Age and Control Beliefs in Predicting Time Variables

Results predicting time spent with stimuli were less robust, but they reveal trends consistent with the patterns found with choice variables. The emotional control by age group interaction in predicting time composite scores was marginally significant, $b = 127.01$, $SE = 63.74$, $p = .051$, with older adults having significantly higher time composite scores than young adults at high levels of emotional control (1 *SD* above the mean), $b = 282.68$, $SE = 123.91$, $p = .026$. The ESES by age group interaction in predicting time composite scores was not significant, $b = 36.32$, $SE = 25.35$, $p = .16$; nor was the perceived constraints by age group interaction, $b = -16.13$, $SE = 11.12$, $p = .15$. Only two interactions reached statistical significance when predicting time spent for each valence separately: Age group and emotional control interacted to predict time spent on neutral stimuli, $b = 43.94$, $SE = 16.31$, $p = .01$, and so did age group and ESES, $b = 16.16$, $SE = 6.50$, $p = .02$.

Discussion

The current study investigated whether age and control beliefs influence the use of situation selection. In contrast with recent theorizing suggesting that older adults should be more likely to proactively avoid negative situations (e.g., Charles, 2010), we did not find an overall age difference in avoidance of negative stimuli despite having reasonable power (.7) to detect a medium effect. There were no age differences in the selection of positive, negative, or neutral stimuli, or in composite scores reflecting negativity avoidance. Instead, we found that significant age differences only emerged among individuals high in control beliefs. Similar patterns emerged across three measures of control beliefs: Among those individuals who felt competent in their emotion regulation abilities or had a strong sense of control over life in general, older adults approached fewer negative stimuli than younger adults.

Analyzing the valence conditions separately revealed that control beliefs were associated with avoiding the negative in older adults, but not approaching the positive. This pattern is consistent with some positivity effect studies that find negativity reduction but not necessarily positive enhancement (e.g., Gruhn, Scheibe, & Baltes, 2007). In addition, older adults spent more time with neutral stimuli and control beliefs were related to increased selection of neutral stimuli among older adults. Though neutral stimuli lacked explicit emotional content, participants may have found them interesting, and neutral content may have served as an important avenue through which older adults with strong control beliefs could avoid negative materials. Future research will need to further parse why older adults may prefer neutral stimuli.

Control Beliefs: A Prerequisite for Situation Selection for Older but not Younger Adults

These findings suggest that the desire older adults have to regulate emotion, as postulated by socioemotional selectivity theory (e.g., Carstensen, 2006), may not be sufficient for age-related positivity effects in situation selection to emerge. An additional precondition seems to be necessary before older adults can proactively avoid negative emotional situations: Specifically, the belief that their behavior can influence how they feel seems to constrain older adults' use of situation selection. Believing they could control their emotions may have helped older adults recognize they could regulate their emotions by behaviorally avoiding negative stimuli. Because participants were not placed into inherently negative situations that demanded regulatory responses, our paradigm allowed ample room for natural regulatory preferences as well as individual differences to influence participants' behaviors.

Whereas older adults high in control beliefs acted in a way consistent with SST and the extant literature on the role of control beliefs in promoting proactive emotion regulation by avoiding negative stimuli, how can the behavior of younger adults be explained? We predicted that emotional and informational goals would lead to a less clear mapping between beliefs and regulatory choices for young adults, but we instead found a reversal of the relationship in younger adults: Stronger emotional and general control beliefs in younger adults were related to selecting *more* negative stimuli. One possibility is that control beliefs promote goal-consistent behaviors. While older adults prefer emotion regulation goals (Carstensen et al., 1999), younger adults may sometimes be hedonically-oriented but other times (perhaps more frequently) find engagement with the negative to be a key component of emotion regulation (see also Riediger et al., 2009; Tamir, 2009). Strong control beliefs may provide younger adults with a sense of security, allowing them to more confidently approach negative stimuli, perhaps facilitating the pursuit of their contra-hedonic and information gathering goals in the face of negative emotional information. This alternative

function of control beliefs among younger adults may be more powerful than previously thought.

Extending previous research on reappraisal and suppression in young adults (Tamir, et al., 2007), our findings provide initial support for two ideas: When it comes to situation selection, weak control beliefs may 1) hinder older adults' emotion regulatory pursuits and 2) may actually encourage *more* avoidant emotion regulatory behavior in younger adults. We further demonstrate that similar effects can be obtained with both general and emotion-specific control belief measures.

The Affective Environment Paradigm: Measuring Situation Selection

Our paradigm sought to enhance the ecological validity of the typical forced-choice laboratory methodology. Rather than highly controlled images or emotional faces, the Affective Environment contains a variety of stimuli that participants might encounter in the real world. It offers participants the initial choice of what to engage with, rather than forcing them to choose between attending to one image or another (akin to using a remote control at home). We believe the situation selection paradigm will be important in translating research on aging and emotional processing, primarily conducted in the laboratory, to the real world, where there is significant choice in what activities to engage in. The correlation between choices in the AE and self-reported use of situation selection provides initial evidence for the validity of the measure, though the ecological validity of the paradigm remains an open empirical question.

The finding that younger adults spent more time than older adults engaging with stimuli is noteworthy. The only time not accounted for in the total time spent score was time spent viewing selection pages while choosing stimuli to view. That older adults would spend more time viewing selection pages fits with mainstream lifespan developmental theorizing, perhaps reflecting age differences in processing speed (Salthouse, 1996) or increased informational selectivity in older adults, in line with findings from SST (Löckenhoff & Carstensen, 2004). Future research might explore these possibilities more thoroughly.

Though the vast majority of analyses remained the same when using adjusted scores, a few differences emerged. As expected given that our hypotheses were primarily concerned with valence, controlling for variability in number of choices and total time spent viewing stimuli (which can be thought of as measurement error in the measure of valence) only yielded additional significant findings, all of which were consistent with our main hypotheses. The most pronounced discrepancies involved the emotional control question. The single-item measure likely introduced measurement noise, making it harder to detect the effects given additional noise in the dependent variable. The other major discrepancy involved analyses of age differences in negative choices at high levels of all control belief measures; here, age differences may have been easier to detect when variability from total choices was partialled out because negative choices and total choices were highly correlated, $r = .66$, $p < .001$, suggesting that much of the variability in negative choices overlapped with variability in total choices, which was not the variability we were trying to predict. Future research should consider other potential factors predicting number of choices, or might alternatively hold the number of choices allowed constant.

Findings with time spent variables were less robust than those with choice variables; this may be because, in addition to being a measure of selection, time spent variables also incorporate measures of persistence, absorption, interest in the particular content of the stimuli, and proneness to using situation *modification* (Gross, 1998), thus potentially obscuring effects of pure selection.

Limitations and Future Directions

Our pretest had a small sample size, and though we matched stimuli on valence, and to a large extent on relevance as well, it is clear that other dimensions should also be considered in future research. For example, it would be helpful to match stimuli on arousal, though it is difficult to know how to match both thumbnails and content on arousal. While the lack of main effects of age on choice variables speaks against serious stimulus factors that differed by group, future studies should nonetheless try to equate stimuli on as many dimensions as possible. Older adults' relatively more avoidant attitudes toward computers (Charness & Boot, 2009, Czaja et al., 2006) could explain why they found websites less relevant than younger adults in our pretest: Pretest ratings did not seem to affect behavior in the AE since no age differences emerged in the number of websites selected, and the general pattern of findings held when removing websites from the analyses.

There is still room to get even closer to capturing real-world environments, and our paradigm would benefit from the inclusion of a greater variety of affective stimuli. Also, while situation selection occurs relatively early in the emotion regulation process, it does not happen in isolation (Gross, 1998). The examination of other emotion regulation strategies in concert with situation selection is therefore a necessary extension of the current paradigm that will further enhance ecological validity. In addition, longitudinal studies will be necessary to ensure that differences in situation selection are truly related to age and not cohort differences.

Future research will also need to experimentally test the mechanisms underlying our findings. Links between stimulus choices and mood regulatory outcomes remain to be explored, and it would be informative to investigate how people select materials in response to a negative mood induction. Studies that manipulate goals (e.g., Xing & Isaacowitz, 2006) could isolate their role in moderating the effects of control beliefs. Control beliefs could also themselves be manipulated; in the current study, participants responded to the control beliefs items after completing the behavioral task in order to prevent priming effects, but it could be that selecting fewer negative stimuli led to stronger control beliefs, and not the other way around. This alternative account would not explain the moderation by age group, but could be ruled out by manipulating control beliefs. Future work should also consider the subtle but potentially important distinctions between beliefs about controllability and beliefs about self-efficacy (see Tamir & Mauss, 2011).

Future research might also explore the cognitive mechanisms involved in situation selection. Research demonstrates that the cognitive mechanisms involved in remembering the past and imagining the future overlap, and that older adults display reduced specificity in both domains (Addis, Wong, & Schacter, 2008; Buckner & Carroll, 2007). It could be that a deficit for imagining detailed futures prevents older adults from thinking carefully enough about the emotional qualities of future situations. Still, older adults display a positivity effect in memory (Kennedy, Mather, & Carstensen, 2004), so why should the impact of reduced specificity differ when it comes to imagining the future? Perhaps there are different demands for dealing with the past and the future – maybe abstracting the past helps older adults reframe it in a more positive light but abstracting the future leads them to miss cues that would help them shape the future in desirable ways.

The nascent literature on situation selection would benefit from a more explicit integration with the literature on affective forecasting (e.g., Loewenstein, 2007; Wilson & Gilbert, 2005). Some evidence suggests that older adults are better than younger adults at predicting how future situations will make them feel: In a gambling task, older adults more accurate in predicting how aroused they would feel after winning and losing money (Nielsen, Knutson,

& Carstensen, 2008). Future work might consider whether more accurate predictions help older adults anticipate and avoid negative situations (Urry & Gross, 2010).

Conclusion

This study demonstrated that high emotion regulation self-efficacy and general control helps older adults use situation selection to avoid negative stimuli as a way to regulate their emotions. It also demonstrated that these beliefs may lead younger adults to approach negative stimuli. Our paradigm marks the first examination of behavioral situation selection in the context of aging; thus, these intriguing first results would benefit from some modification and extension. Nonetheless, our findings suggest that the age-related positivity effect in cognition extends to volitional behavioral choices, given the important precondition of strong control beliefs.

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Appendix. Descriptions of Affective Environment Stimuli

News Videos

Negative:

1. Oil Spill Wildlife Devastation – Follows wildlife rescue teams to explore animal suffering caused by the Gulf oil spill.
2. Oklahoma City Bombing: 15 Years Later – The families of victims of the Oklahoma City bombing remember their lost loved ones.
3. Mental Health Care in America: A Tragic Story – Recounts the neglectful treatment of a disabled woman that ultimately resulted in her death.
4. Mexico’s Drug War – A story about powerful drug cartels, the deaths and suffering they cause, and the futility of any attempts to stop them.
5. Snow Storm Hits DC Homeless – Testimonials from homeless individuals unable to find shelter during a major D.C. snowstorm.

Positive:

1. Funny News Bloopers – A collection of humorous errors made by newscasters on television.
2. Millionaire Leaves Fortune to Hometown – Story about an eccentric and frugal woman who made millions on the stock market and donated it to her hometown.

Neutral:

1. Medical Shoe Phone – Engineers design a phone to be implanted in shoes.
2. The Haiti Recovery Effort – An exposition of the role of women in the Haitian earthquake recovery effort.

Websites

Negative:

1. Remembering the Horror of Hurricane Katrina – Photographs and brief vignettes of several victims of the devastation caused by Hurricane Katrina.
2. Devastation of Earthquake in Haiti – Images and descriptions of individuals facing hardships during the aftermath of the earthquake in Haiti.
3. Aftermath of Gulf Oil Spill – Photographs and detailed captions of birds, fish, and crabs, covered in oil.
4. Violence in Iraq – Images and captions depicting wounded soldiers and bomb victims.
5. Holocaust: Stories of Sadness – Personal accounts of atrocities committed during the Holocaust.

Positive:

1. Hearts n Souls: A Heartwarming Story – A poem about a man who buys a bus ticket for a young girl who lost her ticket.
2. American Love Stories: So Close, Yet So Far Away – A story about a couple that falls in love over the internet and overcomes racial obstacles to form a stronger relationship.

Neutral:

1. Brandeis Campus Map – A color map of the Brandeis University campus.
2. MBTA Maps and Schedules – Local bus and train routes, fares, and travel information.

Hard-Copy News Articles

Negative:

1. Second Acid Attack in One Week Leaves Woman Scarred – Recounts details of an attack that left a woman with second degree burns on her face and chest.
2. Ohio Man Held His Family Hostage, Raped Child – Story about a man who isolated his family from the outside world and sexually abused one of his children.
3. Serial Slasher Gets More than 400 Years in Prison – Details the crimes and sentencing of a man who brutally attacked women.
4. Child Prostitutes' Sad Stories – Details the horrors of prostitution trafficking.

5. Coroner Investigates Hospital Mistake Causing Baby's Death – A story about an error in administering IV fluids, which resulted in a baby's death.
6. U.N. Officials Say 500 Were Victims of Congo Rapes – Report on violence in eastern Congo.

Positive:

1. Louisville at Work: Laughter Yoga – Describes efforts by yoga practitioners to incorporate laughter and other practices that raise one's spirits into yoga routines.
2. Still in Love After 80 Years: The Couple Who Met Aged Five That Have Been Together Ever Since – Story about a happy couple who have been almost constantly together for 80 years.
3. Radical Kindness: The Banker Who Gave it all Away – Describes the charitable efforts of the vice-president of a major corporation who donated millions to help build schools, parks, and orphanages.

Neutral:

1. Kazakhstan the Home of the Apple: The Apple Originates in Kazakhstan –Traces back the origins of the apple, using DNA sequencing, to Kazakhstan.
2. President Obama's Oval Office Remodel – A brief history of the décor of the Oval Office and a description of President Obama's plans to renovate it.
3. Japanese Man Calculates Pi to 5 Trillion Digits on Home Computer – Story about how a man broke the world record for the number of digits of Pi calculated.

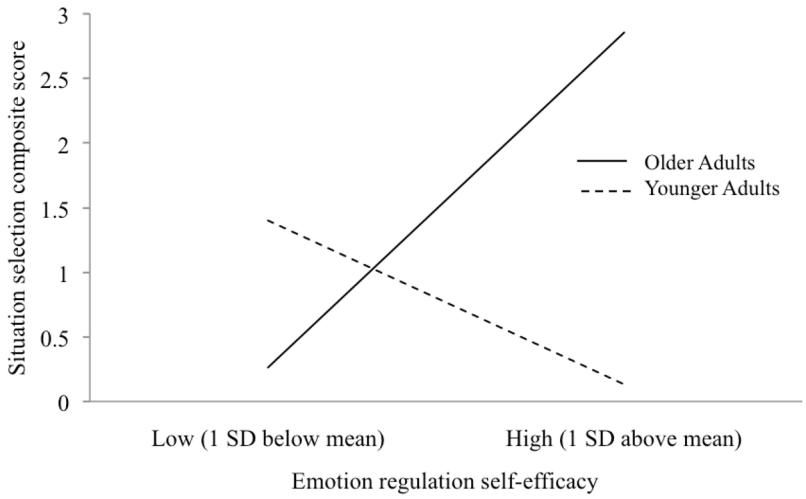

Figure 1.
Relationships between situation selection composite choice score and emotion regulation self-efficacy for older and young adult participants.

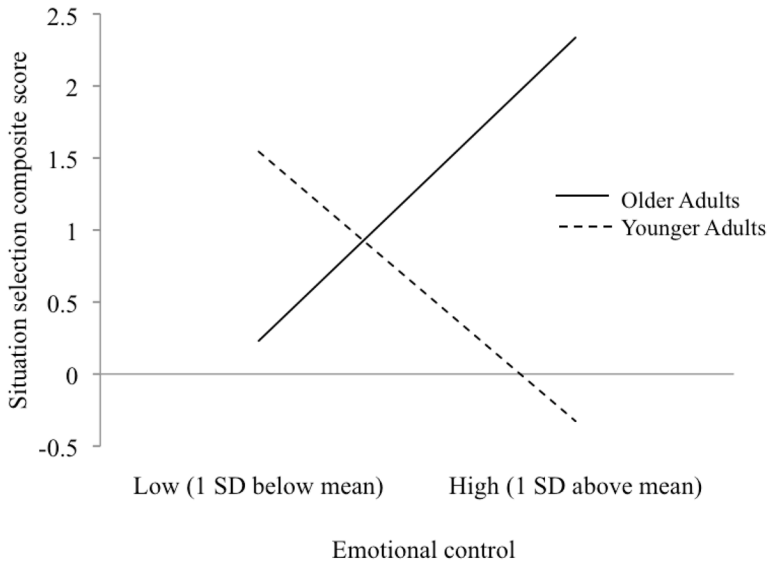

Figure 2.
Relationships between situation selection composite choice score and emotional control for older and young adult participants.

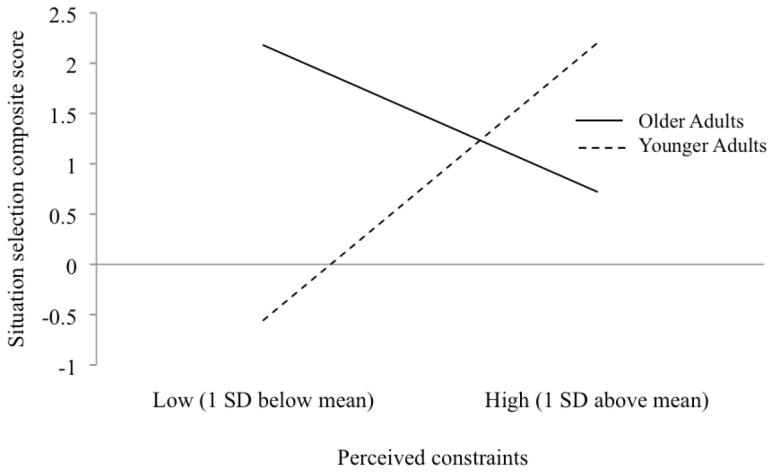

Figure 3.

Relationships between situation selection composite choice score and perceived contraints for older and young adult participants. Note: Lower perceived constraints indicates a stronger sense of general control.

Table 1

Means (SD) of Individual Difference, Choice, and Time Measures, Split by Age Group

	Younger Adults	Older Adults	p-value
Individual Difference Measures			
LOT	19.74(5.42)	22.21 (5.74)	.07
CES-D	10.82 (7.89)	8.64 (8.37)	.28
Neuroticism scale	14.82 (2.72)	13.82 (2.76)	.14
Digit Span Forward	7.56 (1.13)	7.03 (1.31)	.08
Digit Span Backward	5.68 (1.32)	5.39 (1.27)	.38
Mini Mental State Exam	29.74 (.45)	29.34 (1.72)	.22
Emotion regulation self-efficacy	18.50 (3.33)	17.42 (3.72)	.22
Emotional control	6.82 (1.62)	7.03 (1.21)	.56
Perceived constraints	20.56 (6.57)	22.39 (10.80)	.41
Choice Measures			
Number of negative choices	3.71 (2.01)	3.58 (2.61)	.82
Number of positive choices	2.94 (1.77)	3.03 (1.42)	.82
Number of neutral choices	1.44 (1.42)	1.91 (1.55)	.20
Total number of choices	8.09 (2.50)	8.52 (3.00)	.53
Selection composite score (choice)	.68 (3.44)	1.36 (3.52)	.42
Time Measures			
Time spent on negative	386.68 (220.10)	307.30 (161.21)	.10
Time spent on positive	310.41 (190.76)	284.06 (156.29)	.54
Time spent on neutral	86.18 (81.14)	132.61 (108.62)	.051
Total time spent with content	783.26 (107.64)	723.97 (89.89)	.02*
Selection composite score (time)	.03 (.51)	.15 (.42)	.27

Note: Time measured in seconds.

* $p < .05$.

Table 2

Regression Table for Interactions Predicting Composite Choice Variables Split by Valence Condition

Analysis	Valence Condition (Choices)	*b*	SE	p-value
Emotion regulation self efficacy x Age Group	Negative	−.37	.16	.02*
	Positive	−.02	.12	.87
	Neutral	.20	.10	.06
Emotional control x Age Group	Negative	−.76	.42	.07
	Positive	.10	.29	.74
	Neutral	.54	.26	.04*
Perceived constraints x Age Group	Negative	1.64	.07	.02*
	Positive	−.03	.05	.57
	Neutral	−.04	.05	.34

Note.

* $p < .05$.