The choices we make: An examination of situation selection and attentional deployment in young and older adults

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Nikolaus James Skogsberg

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ABSTRACT

The choices we make: An examination of situation selection and attentional deployment in young and older adults

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By Nikolaus James Skogsberg

The current study examined the interaction between situation selection and attentional deployment in young and older adults, and how the interaction between these two strategies differentially affected mood. We created a novel paradigm to examine situation selection, and gave participants free-choice to interact with material of varying emotional valence. Participants’ choice and time spent with each valence and mood were recorded. In another part of the study, participants were presented with, and chose videos and pictures varying in their emotional valence while their eyes were tracked and mood recorded. At the completion of both of these tasks, participants completed a variety of individual difference questionnaires. Results showed that older adults tended to avoid negative material, while young adults did not. There were no age differences in mood, nor in the use of attentional deployment when given the opportunity to choose material,
yet the use of these emotion regulation strategies was differentially affected by control beliefs.
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Introduction

Situation selection is the most forward-looking strategy in emotion regulation (Gross & Thompson, 2007). Emotion regulation is defined as the way “individuals influence which emotions they have, when they have them, and how they experience and express them” (Gross, 1998, p. 271). In the past, older adults have reported that they possess superior emotion regulatory skills compared to younger adults (Gross et al., 1997). More recently, experimental research has shown support for age differences in emotion regulatory abilities (Blanchard-Fields, Mienaltowski, & Seay, 2007; Phillips, Henry, Hosie, & Milne, 2006), with some older adults also being able to resist mood declines by using a reliance on positive gaze (Isaacowitz, Wadlinger, Goren, & Wilson, 2006; Isaacowitz, Toner, & Neupert, 2009).

While it is helpful to show that individuals can (and do) regulate their emotional experiences, delineating specifically how this is done, by looking at the processes involved as opposed to focusing on the outcomes, is necessary in order to achieve a greater understanding of these processes. The purpose of this study is to investigate age differences in specific aspects of emotion regulation. Particularly, we are interested in the choices older and younger adults make to either approach or avoid certain emotional situations/stimuli in order to regulate their emotional experiences.

Gross (1998) introduced the Process Model of Emotion Regulation, as a way to better make sense of the many possible emotion regulation strategies that one can use.
According to this model, emotions can be regulated along five different points of emotion generation: situation selection, situation modification, attentional deployment, cognitive change (antecedent-focused) and response modulation (response-focused). During the duration of an emotional response, these strategies will differ in their overall effect on emotion generation. Antecedent-focused strategies occur prior to an emotional response or behavioral/physiological change (e.g., entering into a day of work with the anticipation that it will be fun and challenging instead of boring), whereas response-focused strategies occur both while we are experiencing an emotion as well as following our individual response to an emotion (e.g., suppressing feelings of sadness to not draw attention to oneself) (Gross, 2001). Although there has been ample research focusing on suppression and cognitive reappraisal(Gross, 1998; Gross, 2002; Gross & John, 2003), Gross (2001) concludes that future research needs to be aimed at understanding each step in the Process Model of Emotion Regulation.

Attentional deployment, another step in the Process Model, happens relatively early on in the emotion regulation process and refers to the direction of an individual’s attention. This step is encompassed by what one pays attention to either when interacting with another person or object, or within a certain situation; this attention can take the form of distraction, concentration, or rumination (Gross, 1998). Attentional deployment is an internal strategy used to regulate emotion, as opposed to situation selection or situation modification which only acts on targets external to the individual. Some of the findings related to attentional deployment conclude that older adults tend to use positive gaze preferences when in negative moods, while younger adults use more mood-congruent gaze when experiencing negative moods (Isaacowitz, Toner, Goren, & Wilson,
2008). Also, other researchers have documented that older adults attend more to positive than to negative information, compared to younger adults (Carstensen, Fung, & Charles, 2003). Further, researchers have found that participants’ gaze patterns can predict real-time mood changes (Isaacowitz, Toner, & Neupert, 2009). However, there are more steps proceeding attentional deployment.

Prior to attentional deployment, an individual activates situation modification, characterized by how one actively alters a situation so as to achieve a desired emotional experience. For example, after choosing to have a conversation with a friend, if the conversation is going in an unwanted direction, the individual may tell his/her friend that they would rather talk about something else (Gross, 2001). Even still, there is another step further preceeding all of these steps, which is most pertinent to the current discussion, and has yet to be studied in the context of aging: situation selection.

Situation selection is the first step in the Process Model of emotion regulation, and is characterized by “approaching or avoiding certain people, places or objects in order to regulate emotions” (Gross, 1998, p.283). Some examples of situation selection include walking a different route home to avoid a bully, or meeting up with a friend one can laugh with after having a bad day (Gross, 1998). As the initial step in the Process Model, the situations one choose to approach or avoid mark critical proactive decisions in the process of affecting how one feels (Gross & Thompson, 2007, p.11). There are some researchers who propose that older adults are more likely to use situation selection as a regulation strategy, because it is less cognitively taxing than other emotion regulation strategies (Piazza, Charles, & Almeida, 2007). Even with this notion, there is relatively
little research examining this construct, and to our knowledge, there is no extant research examining age difference in situation selection.

Emotion regulation is not a process that merely happens without reason. We regulate our emotions, so that we can obtain a more optimal emotional experience (Gross, 1998). As will be true for the current study, previous researchers have evaluated the “success” of emotion regulation by examining the affect it has on participants’ subsequent moods (Charles & Carstensen, 2008; Gross, et al., 1997; John & Gross, 2007).

In summary, the purpose of this project was to investigate age differences in situation selection and attentional deployment. As this study marks some of the first proposed research examining situation selection, and likely the first examining age differences in situation selection, we hoped to gain a better understanding of how individuals differ in their regulation of emotion, especially at these critical stages in the emotion regulation process. In order to truly understand the dynamic nature of emotion regulation, this interplay between both situation selection and attentional deployment needed to be investigated in a paradigm that more closely mimics what individuals actually encounter in their lives.

To our knowledge, there is no current research that directly attempts to accomplish this. However, a discussion of previous findings relevant to each piece of the project will follow.

The Process Model of Emotion Regulation identifies two types of regulation strategies: antecedent-focused, and response-focused, with the former altering the emotional experience very early on and the latter happening after the response has
occurred. Specific antecedent-focused strategies have been considered healthier strategies to employ, while suppression, a response-focused strategy can be less efficient, and can even come along with memory loss (Gross & John, 2003). Older adults self-report that they use the response-focused strategy of reappraisal more than suppression, compared to younger adults (John & Gross, 2007). Older adults also report having higher emotional control, better perceived affect regulation and mood stability than younger adults, all of which point to the conclusion that older adults may have superior emotion regulation skills than younger adults (Gross, et al., 1998; Gross, et al., 2007).

Along with these self-reported differences in emotion regulation, empirical research has helped to elucidate specifically, how, and under what conditions, older and younger adults differ in their emotion regulation. In a laboratory study in which participants were asked to down-regulate negative emotions while performing a memory task following a disgust-inducing video clip, older adults needed fewer cognitive resources and were more successful in the memory task compared to younger adults, suggesting that older adults are more efficient in this down-regulation of negative emotion (Scheibe & Blanchard-Fields, 2009). Also, others have concluded that older adults are better at disengaging from negative situations compared to younger adults (Charles & Carstensen, 2008). With some cognitive slowing with age, it would seem that older adults would be more apt at performing the emotion regulation strategies that require the least cognitive effort (ie., situation selection) (Gross, 1998). Age differences have been documented in certain aspects of the emotion regulation process, with general decrements in the ability to perform detached reappraisal, increased abilities in positive reappraisal and maintained functioning in suppression, all coming with increased age.
Similarly, a number of age differences in affective experience have been documented, concluding with the notion that older adults may in fact enjoy greater positive affective experiences than young adults. Examining diverse groups from many different cultures, older adults reported fewer negative experiences along with greater emotional control, compared to younger adults (Gross, Carstensen, Pasupathi, Tsai, Skorpen, & Hsu, 1997). Using the experience sampling method, researchers found that age was not related to the frequency of positive emotional experiences, that negative emotions slowed in number until the age of 60 when the slowing stopped, and that older age corresponded with a more differentiated emotional experience (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). So, there seems to be some disagreement in the trajectory of affective experience across the life span. As can be seen, a large amount of research has given attention to age differences in affective experience while using certain emotion regulation strategies to explain these differences. To our knowledge, however, no one has yet attempted to examine situation selection in the context of aging.

While the need to study this emotion regulation strategy exists, a wealth of research is not available, with no prior studies conducted in the context of aging. However, some researchers have introduced the notion that situation selection may be particularly beneficial for older adults (Charles & Piazza, 2009). According to the Strength And Vulnerability Integration (SAVI) model, older individuals become more interested in maintaining positive affect compared to younger adults, due to a sense of limited time remaining in their lives. Further, this motivation is coupled with previous experience gained over time. However, with aging generally comes a decline in social, cognitive, and physical functioning. While it is usually the case that older adults have
more success using emotion regulation to avoid or reappraise negative situations, this
does not always happen. Due to their motivation and past experience, if older adults are
able to avoid prolonged exposure to highly arousing negative situations, then older adults
will experience greater positive affect overall. Yet, if older adults are unable to avoid
these prolonged exposures, then the age-related differences in positive affect discussed
earlier, will decrease, and will sometimes even be reversed (Charles & Piazza, 2009).

Previous research has been directed towards examining whether or not situation
selection is an automatic, or conscious response (Eder, Rothermund, & Proctor, 2010)
and has identified many barriers to situation selection, including difficulties in weighing
short-term benefits versus longer-term costs of emotion regulation (Gross & Thompson,
2007). To be expected, individuals have reported that they choose to spend time in certain
situations, while consciously avoiding others (Emmons, Diener, & Larsen, 1986). In a
variety of studies, situation selection (Emmons & Diener, 1986), music selection
(Knobloch & Zillmann, 2002), and movie selection (Strizhakova & Krcmar, 2007) have
all been found to be dependent upon participants’ moods, as well as the emotional
valence of what is selected. Also, some individual differences have been found in
situation selection behavior. Specifically, researchers have concluded that situation
selection can differ by personality (Emmons, Deiner, & Larsen, 1986; John & Gross,
2007), coping and attachment styles, and social-cognitive constructs like optimism and
the degree to which one believes he/she can control emotion (John & Gross, 2007). But
again, by extending the small amount of research on situation selection above, we aim to
investigate this construct in the context of aging.
After gaining a better understanding of how individuals use situation selection to regulate emotion and how it affects mood, we want to delve further, to measure how situation selection interacts with a more frequently studied component of emotion regulation, attentional deployment. Socioemotional Selectivity Theory posits that as individuals perceive their time as more limited, priorities shift toward optimizing close social relationships and emotionally satisfying experiences. In contrast, an open-ended perception of time cultivates a focus that is more centered on knowledge-seeking (Carstensen, Fung, & Charles, 2003). A body of literature has accumulated showing that older adults have a preference for paying attention to positive over negative information. As was previously mentioned, these age-related positivity effects may act to maintain positive moods, decrease negative moods, and increase overall well-being (Isaacowitz, Toner, Goren, & Wilson, 2008; Isaacowitz, Toner, & Neupert, 2009; Mather & Carstensen, 2005). As older adults feel that their time is more limited, the need to change things decreases, and in its place is a want to optimize what is currently happening. In other words, negative stimuli/situations are avoided, because with a limit on remaining time, one will not be able to learn from these negative experiences, nor change them, and thus interaction with them will cause distress. With a limited amount of time remaining, optimizing the present, and focusing on the positive is viewed as a much more efficient use of time. While a variety of empirical studies have examined these age differences in positive preferences in attention and memory, a meta-analysis of this literature as a whole revealed that there are actually few age differences in positivity preferences overall (Murphy & Isaacowitz, 2008). Yet, the question still remains as to how the emotion
regulation processes of situation selection and attentional deployment interact to regulate mood, especially in old age.

While the vast majority of studies of emotion regulation neglect situation selection, those that do examine it, fail to factor in attentional deployment. It is not merely the case that individuals only use situation selection, or only attentional deployment, rather, these two strategies, along with others interact in concert to regulate emotion. When using situation selection, how do older and younger adults differ in their use of attentional deployment? It would be assumed that if an individual chooses a certain type of situation (positive or negative), he/she would then focus one’s attention on the central positive or negative aspects of this situation. Up to this point, studies of attentional deployment have only provided participants with stimuli (not of their choosing), and it remains undetermined what individuals would attend to in chosen stimuli, and how these choices would differ among the young and old. Understanding this interaction may shed new light onto the degree to which age differences in emotion regulation truly exist.

Still, there is another piece worth examining. Control beliefs have been offered as possible mediators of well-being. A general sense of control (ie., “I am responsible for what goes on in my life), has been shown to lead to higher levels of well-being, via intrinsic motivation (Ryan & Deci, 2000). Also, by acting as a stress buffer, this general sense of control has been related to more successful aging (Lachman & Weaver, 1998; Lachman, Rosnick, & Rocke, 2009) and increased well-being (Diehl & Hay, 2010; Neupert, Almeida, & Charles, 2007). But with lower control beliefs, feelings of helplessness can amount, even resulting in downstream depression (Abramson, Seligman,
& Teasdale, 1978). Researchers mediated college freshman relationships by high emotion regulation self-efficacy and found that those individuals who believed that emotions were controllable used more adaptive emotion regulation strategies, were better adjusted to college, and had higher positive affect. (Tamir, John, Srivastava, & Gross, 2007). So, a compelling proposal is that our general control beliefs should relate to emotion regulation planning behaviors by approaching positive situations and avoiding negative ones (situation selection), which in turn should lead to increased well-being, depending upon our confidence in our own emotion regulation abilities. Alternatively, those with high control beliefs may still choose to approach negative situations, as their sense of control and confidence in their emotion regulation abilities would lead them to believe they could still handle negative situations. Thus, this proposed link, is still just that, a proposed link. However, how will control beliefs and efficacy beliefs differ between ages?

Some have shown that perceived general control tends to decline with age, with knowledge of the added functional difficulties associated with increased age (Agriogoroaei & Lachman, 2010). Yet, perceived emotional control has been shown to actually increase with age (Gross, et al., 1997). With increased age, older adults have a heads-up on their younger counterparts, in that they have had a lifetime of experience dealing with a myriad of emotional events (Charles & Piazza, 2009). This built up experience could lead older adults to believe that they can control their emotions more than young adults, simply because they have had increased experience doing so. However, this may not always be the case. According to the SAVI model, older adults may not always benefit from positive emotional experiences, especially in an uncontrollable situation involving an incurable medical condition, where focusing on the
pertinent, potentially negative information is essential (Charles & Piazza, 2009). Thus, with increases in both emotion regulation self-efficacy (Gross, et al., 1997) and preferences toward positive stimuli (Isaacowitz, et al., 2008) with age, older adults should adopt more adaptive emotion regulation strategies (i.e., situation selection) on the path to feeling positive emotions. But, as socioemotional selectivity points out, young adults are more likely to seek out information and explore their environments without a necessary preference toward positive and bias away from negative information. With increased perceived control and emotion regulation self-efficacy in young adults, this will likely lead them to believe that they can easily handle negative situations, and thus seek out more of them.

The majority of these previous findings were examined in a tightly constrained laboratory setting, which makes it difficult to afford the possibility of the highly subjective choice behavior of situation selection to be authentically captured. A common trade-off of laboratory research is an increase in experimental control with some loss to ecological validity. This has been one main reason why situation selection has yet to be studied previously. Current methods for studying emotion regulation in the laboratory have not allowed individuals the freedom to choose what they interact with. Instead, current methodologies have only given participants stimuli to interact with, which does not theoretically allow for situation selection to be examined (Gross, 1999). Thus, the current study has been designed to combat these methodological problems and examine situation selection without such a great loss of ecological validity. By creating a “free-choice” paradigm that allows participants to freely choose what they want to interact with from a variety of available options, we are getting closer to placing participants in an
environment that is similar to what would be encountered normally, outside of the laboratory. While the proposed project was still conducted in the laboratory, allowing individuals to choose among a variety of stimuli to interact got us a bit closer to observing how emotion regulation, and specifically the interaction between situation selection and attentional deployment actually happens in the real-world.

To accomplish this, we created an “affective environment” (AE) in the laboratory, consisting of an enclosed room with multiple (affective) information streams (eg., magazine articles, news video clips, computer with websites) of positive and negative emotional valence with which the participants can interact with. To examine situation selection, participants had the choice (situation selection) to interact with anything they see. In another room in the lab, we examined the interaction of situation selection and attentional deployment by again giving individuals the choice among different affective stimuli and will assess gaze preferences in the chosen stimuli. Affective stimuli were selected from previously validated sources, as well as from new sources, which were standardized and normed prior to the study.

Hypotheses

**Age-related positivity effects in selection and attention.** Older adults will show a selection preference for positively-valenced and neutral stimuli, as opposed to negatively-valenced stimuli, while younger adults will prefer, and choose relatively more negative stimuli (Charles & Piazza, 2009). It is unlikely that individuals will only use situation selection as their sole emotion regulation strategy, as one encounters and interacts with things in his everyday life that contain both positive and negative components. During eye-tracking, when presented with a negatively-valenced stream,
older adults are hypothesized to view them in a manner in which they fixate less on the most emotionally negative aspects (Isaacowitz, Wadlinger, Goren, & Wilson, 2006a; Isaacowitz, Wadlinger, Goren, & Wilson, 2006b).

**Age differences in mood.** Older adults’ selection of and attention preference for positive material will lead them to have sustained positive moods during their time in the AE & eye-tracking portion, and to rebound rapidly from the mood-disturbing effects of any negative material they encounter. Younger adults will have more variable moods as a product of the greater amount of negative material to which they select and attend. Young adults will therefore have more negative moods and will show longer negative mood responses to negative material (Isaacowitz, Toner, Goren, & Wilson, 2008). Also, high general control and emotion regulation self-efficacy should be related to higher moods, due to their relation to increased well-being (Tamir, John, Srivastava, & Gross, 2007).

**Age differences in questionnaire measures.** Older adults will believe emotions are more controllable than young adults. Thus, older adults should score higher on the Situation Selection Scale, Emotional Control Item, Emotion Self-Efficacy Scale, and the perceived constraints scale than young adults. Young adults should score higher on the personal mastery scale. Also, higher general sense of control and emotion regulation self-efficacy should relate to a greater preference for positive/neutral stimuli over negative stimuli in older adults, with the relationship being weaker in young adults (Charles & Piazza, 2007; Gross, et al., 1997).

**Dependent Measures**

Dependent variables assessed included: choice, fixation and mood change. **Choice** examined what streams of information were selected, and in what order. We determined
the percentage of selected choices from each stream of affective stimuli (i.e., negative, neutral/positive), and also how long individuals spent with each stream. **Fixation** examined what individuals looked at in specific stimuli during the eye-tracking piece. LookZones (pre-determined areas that vary in valence) were created, and the percent fixation differences between emotionally positive/neutral and negative content was assessed. **Mood change** was assessed from participants’ verbal ratings of their mood. These ratings were taken at 3-minute intervals, as well as when individuals changed affective streams. A mood change score was calculated by taking the pre-test mood rating from the post-test mood rating. All three variables were analyzed for age differences, and mood change was assessed as a function of choice of affective stimuli.
Method

Participants

A sample of 35 older adult participants (aged 60 and above) and 34 younger adults (aged range 18-25 years) were recruited for this study. Due to some difficulties with eye-tracking calibration and/or failure to follow instructions, the final sample consisted of 28 older ($M = 75.71$, $SD = 7.93$) and 29 younger adults ($M = 19.48$, $SD = 1.50$). The older adults were recruited from the surrounding community, and from the Emotion lab’s previous participants’ database. The younger adult sample was comprised of Brandeis University students, mostly from Intro to Psychology classes. Participants were excluded if they wore hard contact lenses or had any eye abnormalities that would render data unreadable from the eye tracker. Participants either received course credit or a monetary stipend for their participation.

Materials

Affective Environment Stimuli

To accurately examine situation selection, it is important that the paradigm created contains an area where participants are free to choose from a variety of stimuli that vary in their emotional valence. In an attempt to make this area as naturalistic as possible, we created an Affective Environment (AE), a small room, akin to a doctor’s waiting room, with a variety of different informational streams varying in emotional content. The stimuli contained in the AE consisted of television news clips, created websites, and hard-copy magazine articles. Television news clips and websites were downloaded and compiled from the internet, and presented using the MediaLab software.
program on 2 flat-screen computer monitors. As situation selection relies on the individual having prior knowledge of what they are approaching or avoiding prior to actually doing so, it was essential that our stimuli allow this prior knowledge to participants. Websites and television news clips had corresponding thumbnail pictures and titles on selection pages, representative of the emotional valence and general content of the stimuli. Once participants decided which website/television news clip stimuli they wanted to view, they merely had to click on the relevant thumbnail and begin viewing. 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 also drawn from the internet, and printed from internet news sources, bond and laid out on a desk in a pseudo-random order. Each hard-copy article had a cover page on the front, with a representative image and title, and the text of the article contained inside the covers.

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 rating 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, arousal and age relevance on a 9-point scale (1 = negative valence/low arousal/low relevance, 9 = positive valence/high arousal/high valence). Approximately twice the amount of the stimuli that made up the final set of stimuli for the study were viewed and rated in these piloting sessions. In the final stimuli set, negative stimuli were rated significantly lower on valence ($M = 2.89$) than neutral ($M = 5.10$), stimuli, which were rated significantly lower on valence than positive stimuli ($M = 7.12$), $F (1.88, 287.87) = 531.43, p < .001, \eta_p^2 =$
.78, using the Greenhouse-Geiser corrected values. Positive ($M = 5.68$) and negative stimuli ($M = 6.38$) were rated significantly more arousing than neutral stimuli ($M = 3.77$), $F (2, 306) = 113.16, p < .001, \eta^2 = .43$. Ratings of the stimuli content and thumbnail-caption pairs did not differ on the dimensions of importance, nor did valence and arousal differ across age groups. Finally, there were no significant age differences in relevance ratings, suggesting that the final set of stimuli were thought of as relevant to both older and young adults.

A greater percentage of negative stimuli was included to allow an adequate amount of material that could be potentially mood-disturbing. This greater percentage of negative material is likely to be a comparable, or even lower representation of what is available in current news media sources. Of sets of 9 websites and videos that were used, there were 5 negative, 2 positive, and 2 neutral of both news videos and websites. Due to the common notion that older adults may have an aversion to technology, a slightly higher amount of magazine articles overall were used (6 negative, 3 positive, and 3 neutral).

**Eye-Tracking Stimuli**

To test the interaction of situation selection and attentional deployment, participants also viewed picture and video presentations, some of their choosing and some not, while their eyes were tracked. Picture presentations were comprised of real-world images from the International Affective Picture System (IAPS). The emotional valence and arousal of each image was provided by the IAPS manual (Lang, Bradley, & Cuthbert, 2001). The emotional valence and arousal for each picture was rated on a 9-point Likert scale ranging from 1 (most negative/lowest arousal) to 9 (most positive/highest arousal). Images with
emotional valence ratings of 1-4 comprised the negative images \((M = 2.77, SD = 0.66)\), 4-6 the neutral images \((M = 5.49, SD = 0.63)\), and 6-9 the positive images \((M = 7.42, SD = 0.41)\) used. Arousal of the stimuli followed a similar pattern of that used in the AE, with positive \((M = 4.38, SD = 0.67)\) and negative \((M = 5.64, SD = 0.76)\) stimuli being rated as higher than neutral stimuli \((M = 3.92, SD = 0.99)\).

All participants were first shown the same negatively-valenced picture set, containing a variety of negative images, and then participants were given the choice among some other picture presentations. Again, like in the AE, a selection page was presented to participants, which contained thumbnail images corresponding to each picture presentation. There were 4 groups of images (people, food, animals, nature), with each group containing a positive, negative, and neutrally-valenced picture presentation. Order of the images on the selection pages was presented in 3 different versions in a counter-balanced nature between participants to help curb order effects.

Participants also viewed some videos that varied in their emotional content. All participants saw a clip from the movie “Cry Freedom,” depicting an especially violent and disturbing demonstration of the South African apartheid. Following this, participants were again able to choose one more video to watch from a selection of video clips ranging in valence from positive (Robin Williams; stand-up comedy), negative (The Champ; scene of dying fighter) and neutral (Sticks; a computer screensaver). Again, there was a selection page containing a title/thumbnail pair corresponding to the videos, and there were 2 videos available for each valence. As before, there were 3 different random orders of this selection page, which were presented in a counter-balanced fashion. To assess gaze preferences away or towards the emotional regions in each film and picture
presentation, Areas of Interest (AOIs) were identified. To determine the most emotional regions in each presentation, rectangular or elliptical areas were drawn over the slides and videos, and were used in subsequent analyses. Validation of the emotionality of these clips had been established in previous research (Rottenberg, Ray, & Gross, 2007).

Measures

Choice of stimuli

In the AE, a video camera recorded participants’ choice behaviors. Choice measures of interest in the AE involved the amount of choices of each valence made, as well as the time spent with each choice. We operationalized situation selection, as a preference for positive and neutrally-valenced stimuli over negative stimuli. This was calculated by summing the number of positive and neutrally-valenced stimuli together, and subtracting the total number of negative choices made. With the amount of negative material available being about twice as much as neutral and positive together, this type of characterization was deemed appropriate. A positive choice score would correspond to a preference for positive and neutral stimuli over negative stimuli, while a score of zero meant no preference for positive and neutral over negative, and with negative scores meaning that participants had more of a preference for negative material over the other two emotional valences. Thus, a “selection score” was calculated for each participant to categorize their use of situation selection. Also, the time spent with each valence was tabulated as well, to determine whether or not this choice score actually reflected a true preference for a certain valence.

We followed similar operationalizations during the eye-tracking portion to reflect participants’ use of situation selection. An overall “choice score” was again calculated to
reflect preferences for a particular valence over another (ie., positive/neutral vs. negative). Also, as this paradigm offered the definite induction into a negative mood, we also paid particular attention to the valence of the choices made after the presentation of the non-choice negative video and picture presentations, to determine whether or not negative mood would facilitate a different pattern in choices made.

Mood Ratings

In the AE, participants rated their mood out-loud on a 0-100 scale (1= very unpleasant, 50 = neutral, 100 very pleasant) before making each new stimulus choice. In order to help control for forgetting to do this, a tonal mood prompt was played every three minutes, and upon hearing this prompt, participants were again asked to rate their mood on the same scale. In the very rare cases that participants failed to rate their mood prior to switching to a new stimulus, we used the rating made at the most near 3-minute interval to the choice. All mood ratings were recorded with a microphone.

During the eye-tracking portion, mood ratings were also taken. A baseline mood rating was taken, and then following the first non-choice negative presentation, and subsequently prior to each new choice selection. A final mood rating was taken at the end of this session. In the AE, and during eye-tracking, the mood-change (baseline mood minus final mood) was of particular interest, as well as the average mood rating throughout the session(s).

Gaze direction

Participants’ gaze to film and picture presentations were measured with an Applied Science Laboratories eye tracker (Tracker Model D6). The tracker recorded the movements and position of participants’ right eye with a camera and a non-invasive beam
of infrared light sixty times per second. The visual fixation in this study was defined as those series’ of gazes in which an individual stays within 1° visual angle for 100 ms or longer (Manor & Gordon, 2003) within pre-determined areas of interest (AOIs). Gaze patterns and visual fixations to the film and picture presentations were recorded throughout the presentation by using GazeTracker software (ERICA, Inc.) on a Dell Dimension 8400, 17” desktop. This order seems weird given the other related variables described at the beginning.

**Self-Report Measures**

**Implicit Theories of Emotion Scale (ITOES).** Controllability of emotions was measured by the ITES (Tamir, et al., 2007; see Appendix). Participants rated how much they agreed with statements by using a 5-point scale (1 = strongly agree, 5= strongly disagree). This scale consists of two entity items and two incremental items. Entity items were reverse-scored, and following averaging across all items, higher scores would correspond to incremental theories of emotion and lower scores to entity theories of emotion. Scores ranged from 9 to 19 (α = .57).

**Emotional Self-Efficacy Scale (ESES).** Participants’ beliefs in their confidence to personally regulate their own emotions were measured using the ESES. We used five items from the managing own emotions subscale of the ESES (Kirk, Shutte, & Hine, 2008; see Appendix). This subscale asks participants to rate their confidence in their own abilities to execute 5 emotion regulatory functions on a 5-point scale (1 = not at all confident, 5 = very confident. Scores ranged from 10 to 24 (α = .77).

**Emotion Control Item.** Perceived emotion control beliefs were also measured using a single item (*Overall, how much control would you say you have over your*
emotions?), which has previously been used in research on emotion and aging (Gross, et al., 1997; see Appendix). Participants responded to this item on a 10-point scale (1 = no control, 10 = complete control), with scores from our sample ranging from 2 to 10.

**Situation Selection Scale.** With scarce extant research on situation selection, we also created a questionnaire to help assess the validity of our behavioral situation selection paradigm (see Appendix). Participants were asked to respond to 5 items measuring trait tendencies to use situation selection as an emotion regulation strategy on a 7-point scale (1 = strongly disagree, 7 = strongly agree). Scores ranged from 18 to 35 (α = .72).

**Other Individual Difference Measures.** Participants also completed measures of stable personality traits and moods: the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) to screen for symptoms of depression, the Life Optimism Test (LOT; Scheier & Carver, 1985) to assess participants’ levels of optimism, and the Future Time Perspective measure (FTP; Carstensen & Lang, 1999) to assess participants’ attitudes toward their future. Current levels of positive and negative feelings were assessed using the Positive and Negative Affective Scales (Watson, Clark, & Tellegen, 1988). The Neuroticism Questionnaire (N-Questionnaire; Bolger & Schilling, 1991) was also administered as well as The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), to assess the stable emotion regulation style of the participant. These individual difference questionnaires were included to determine whether or not participants differed in their use of emotion regulation, between both different age groups and some other characteristics.
**Vision and Cognitive Measures.** In order to evaluate cognitive functioning participants completed several measures: the Folstein Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975), to screen for symptoms of dementia; the digit span and digit symbol tasks from the Wechsler Adult Intelligence Scale-Revised (WAISR; Wechsler, 1981), to measure fluid intelligence, and the Shipley Vocabulary Test (Zachary, 1986) as a measure of crystallized intelligence. Standard vision tests were administered to ensure that participants were all able to clearly see the film clips presented on the computer screen, as well as to ensure that the eye-tracker could accurately track eye movement. Visual acuity was assessed with the Snellen 20-20 E-Chart and contrast sensitivity with the Pelli-Robson (Pelli, Robson, & Wilkins, 1988) and close-up vision with the Rosenbaum Near-Vision chart. On both tests participants only used their right eye, as that was the eye that was tracked during the session. These introductory tasks took approximately 30 minutes to complete. These tasks were all completed outside of the affective environment (AE).

**Procedure**

**Affective Environment**

Informed consent was obtained prior to participation in the study. Participants read and signed two consent forms. The first consent described the purpose and design of the study. Participants also read and signed a consent form that clearly stated that they would be videotaped during the session and that these videotapes would be used solely for research purposes. Participants also filled out a demographics form (i.e., age, ethnicity, level of education, religious affiliation, and current health status).
Participants were told that the study was investigating attention and behavior in natural environments, such as waiting rooms. Participants were first brought into the Affective Environment (AE), a medium-sized room featuring a computer with multiple monitors and magazines, and a moveable chair that participants could choose to use. Participants were instructed that they had 15 minutes to spend in the AE and should “interact with whatever looks interesting, and that nothing is off limits.” Participants were shown how to select content on the computers, and in order to minimize time spent browsing, were given a moment to familiarize themselves with all of the choices available. Participants were also familiarized with the mood rating procedure and were given practice with rating their mood as well. Once their practice performance suggested that they could do this efficiently, participants were left alone in the room for 15 minutes, while the microphone recorded their mood, and MediaLab and the video camera recorded their stimuli choices. The experimenter waited outside the room with a timer, and returned following the 15 minute duration.

Following this, participants completed the cognitive tasks. This was done outside of the AE, in order to keep the time spent in the AE dedicated only toward the procedure of interest.

**Eye-Tracking**

After spending time in the AE, participants were then taken into another room to perform the eye tracking component of the study. Next, the right-eye was calibrated using the eye-tracker. The participants were asked to adjust their gaze to 17 points presented on the screen in order to ensure that the tracker recorded within 1 degree visual angle of each point (Isaacowitz, Wadlinger, Goren, & Wilson, 2006). After calibration participants
were presented with a negatively-valenced picture slide show or movie (order of this was counter-balanced). Following the presentation of the negatively-valenced stimuli, participants were given the option to choose from other videos and picture slide shows.

Participants chose 1 video and 3 picture slide shows, which equated to approximately equal durations of videos and picture shows. Participants were told to watch the film clips and look at the pictures “as if you are watching TV, while keeping your head as still as possible.” Throughout the viewing section, gaze (duration and direction), and mood were recorded. Participants were asked to rate their mood out-loud using the same scale described previously, prior to the presentation of each video or picture show, as well as at the beginning and end of their time in eye-tracking.

Following this, participants then completed the battery of individual difference measures. The questionnaires were administered at the conclusion of the study, so that responses would not bias participants to behave differently during the behavioral portions of the study. Further, the timing of the individual difference questionnaire administration was determined so that participants could hopefully respond more accurately, as they could call to mind the behaviors that were recently performed (i.e., thinking about their recent emotion regulation, when being asked to rate it). Also, the ITES was administered prior to other subsequent scales (i.e., the ESES, which presents questions in ways that assume emotions are controllable), so that this scale would not influence naïve beliefs about controllability of emotions. Following the completion of these measures, participants were compensated, debriefed and excused.
Results

See Table 1 for the samples demographic characteristics and Table 2 for mean scores on the health, cognitive and vision measures.

Age Differences in Questionnaire Measures

Significant age differences emerged on a few of the self-report scales (see Table 3 for information on those scales which did not show any age differences). Not surprisingly, older adults ($M = 35.04, SD = 12.74$) scored lower on the Future Time Perspectives measure than did younger adults ($M = 54.90, SD = 10.07$), $t(55) = 6.54, p < .001$, showcasing that in our sample, older adults had a less hopeful view of their future than did young adults. Further, younger adults ($M = 17.36, SD = 8.84$) scored higher on the PANAS Negative Affect scale than did older adults ($M = 13.32, SD = 5.90$), $t(55) = 2.02, p = .048$, highlighting that in our sample, younger adults were experiencing significantly higher negative affect levels than the older adults sampled.

Affective Environment

Age Differences in the Use of Situation Selection. To better understand the patterns in the valence of chosen stimuli, we ran repeated-measures ANOVAs, with the number of stimuli of each valence, and time spent with each valence (positive, negative, neutral) as within-subjects factors. Across age, there was a significant main effect of valence, $F (2, 112) = 18.73, p < .001, \eta^2 = .25$. Follow-up paired-samples t-tests revealed that there was a significant difference between the number of negative ($M = 3.25, SD = 1.81$) and neutral stimuli chosen ($M = 1.44, SD = 1.28$), $t (57) = 6.18, p < .001$, and a significant difference between the number of positive ($M = 3.14, SD = 1.63$)
and neutral stimuli chosen, \( t (57) = 5.99, p < .001 \), with the difference between negative and positive not reaching statistical significance. A similar pattern emerged for the amount of time (in seconds) spent engaging with material of each valence. Again, across age, there was a significant main effect of valence on the amount of time spent engaging with each valence, \( F (2, 112) = 23.17, p < .001, \eta^2 = .29 \). Follow-up paired-samples t-tests revealed that there was a significant difference between the time spent with negative material (\( M = 321.47, SD = 191.88 \)) and the time spent with neutral material (\( M = 109.25, SD = 97.76 \)), \( t (57) = 6.68, p < .001 \), and a significant difference between the amount of time spent interacting with positive material (\( M = 317.88, SD = 173.17 \)) and the amount of time spent with neutral material, \( t (57) = 7.27, p < .001 \), with the difference between time spent with negative and positive not reaching statistical significance.

Next, a mixed-model ANOVA was conducted to assess age differences in the amount of time spent with material of each valence. As the assumption of sphericity was violated, the greenhouse-geiser correction was used. There was a significant main effect of valence across age, \( F (1.44, 79.22) = 22.54, p < .001, \eta^2 = .30 \) (please refer to the above descriptive statistics for mean and standard deviation values). There was a significant main effect of age, \( F (1, 55) = 11.17, p = .002, \eta^2 = .17 \), with no significant interaction, \( F (1.44, 79.22) = 2.51, p = .086, \eta^2 = .04 \).

To follow up on the above, three separate one-way between-subjects ANOVAs were run to test for age differences in the amount of time spent with each valence. There was a significant age difference in the amount of time spent interacting with negative material, such that young adults (\( M = 370.35 \) sec, \( SD = 230.38 \)) spent more time on negatively-valenced material than did older adults (\( M = 270.86 \) sec, \( SD = 126.88 \)), \( F (1, \).
There was also a significant age difference in the amount of time spent interacting with neutral material, such that older adults ($M = 137.96 \text{ sec, } SD = 108.05$) spent more time on neutrally-valenced material than did young adults ($M = 81.52 \text{ sec, } SD = 78.97$), $F (1, 55) = 5.10, p = .028$. Please note, there were not any statistically significant age differences in the number of choices of each valence (see Table 3 for means for each valence and dependent variable of interest, split by age group).

Correspondence Between Reported and Behavioral Situation Selection. The self-reported situation selection items were used to determine whether or not participants actually used their selections to regulate their emotions. Across age, scoring high on the Situation Selection Scale was significantly negatively related to the number of negative choices made, $r (57) = -.519, p < .001$, but not significantly related to the amount of time spent with negative material, $r (57) = -.196, p = .15$, suggesting that our participants who used situation selection tended to avoid negative material. Also, scoring high on the Situation Selection Scale was not significantly related to the choice of positive material $r (57) = .209, p = .12$, but was significantly positively related to the amount of time spent interacting with positive material, $r (57) = .345, p < .01$. There were no significant relationships between scores on this scale and choice of, or time spent with neutral material, implying that the people who use situation selection to regulate their emotions, tend not to select, or spend much time with neutral (unemotional) material.

Relationships Between Individual Difference Measures and Selection. Across age, there were very few significant correlations between individual difference measures and selection and time spent?? behavior. However, scores on the LOT were positively
associated with the number of choices of positively-valenced material, $r(57) = .267, p = .045$, suggesting that those with higher optimism scores were more likely to select more positive material to interact with. Also, those indicating higher PANAS Positive Affect scale scores, also tended to chose more neutral stimuli, $r(57) = .284, p = .032$, along with a significant positive relationship between PANAS Negative Affect scale scores and time spent interacting with negative stimuli $r(57) = .303, p = .022$. These last findings indicating, that in our sample, there was a relationship between one’s affective ratings and their selection behaviors.

Next, we considered whether or not these individual differences affected older and younger adults’ tendencies to engage with positive, negative and neutral stimuli, and looked at each age group separately (see Table 4 for correlation matrices showing intercorrelations between questionnaires and correlations between questionnaires and selection measures split by age group). When older adults believed that their emotions were controllable as assessed by responses on the single Emotion Control Item, they tended to select more neutral material, $r(28) = .528, p < .001$, and spend more time with this material as well, $r(28) = .525, p < .001$. This same pattern did not hold up in our young adult sample, indicating that beliefs about emotion control differentially affected older and young adults in our sample.

Next, we examined whether or not confidence in regulating emotions, as measured by the ESES, would differentially affect choices of stimuli. In older adults, there was a significant negative relationship between scores on the ESES and the amount of time spent engaging with negative material, $r(28) = -.418, p < .05$, as well as a significant relationship with the number of choices of neutral material made, $r(28) =$
.523, \( p < .001 \). Again, this pattern did not hold up on the young adult sample, with no significant relationships found between the ESES and selection behavior.

Further, we examined relationships between responses on the Situation Selection Scale, and selection behavior. Both older adults’ \( r (28) = -.539, p < .001 \), and young adults’, \( r (29) = -.538, p < .001 \) high scores on this scale were negatively related to the amount of time spent engaging with negative material. Thus, in our sample, regardless of age, it seemed that those who responded that they used situation selection to regulate their emotions, actually tended to do this, by spending less time with negative material.

No other significant correlations emerged between individual difference measures of interest, and selection behavior.

Following these correlational analyses, we conducted ANOVAs to directly examine age differences in low/high scores on these measures (using median splits) and patterns of engagement with stimuli. We calculated a “situation selection” score, by subtracting the sum of the times spent interacting with positive and neutral choices from the time spent interacting with negative choices. Thus, this dependent variable reflected a preference for positive/neutral stimuli over negative if the score was positive, or a preference for negative over positive/neutral, if the score was negative.

For the Implicit Theories of Emotion Scale, there were no significant main effects for age group (older adult vs. young adult), \( F (1, 53) = 1.45, p = .234 \), nor questionnaire group (high vs. low), \( F (1, 53) = .17, p = .683 \), on selection behavior, with no significant interactions. Similarly, for the single Emotion Control Item, there were no significant main effects for age group (older adult vs. young adult), \( F (1, 53) = 1.62, p = .208 \), nor questionnaire group (high vs low), \( F (1, 53) = 1.05, p = .310 \) on selection behavior, with
no significant interactions. However, for the Situation Selection Scale, there was a significant main effect for questionnaire group (high vs low), $F (1, 53) = 5.25, p = .026$, with no significant main effect of age (older adult vs young adult), $F (1, 53) = 2.05, p = .158$, nor significant interaction on selection behavior. Across age, those individuals who scored higher ($M = 203.24$ sec, $SD = 430.04$) on the Situation Selection scale had a significantly higher preference for positive/neutral material as indicated by the time spent interacting with it compared to negative, than those individuals who scored low on the scale ($M = 4.57$ sec, $SD = 224.02$). This verified the correlational evidence cited previously, that individuals who indicated that they used situation selection to regulate emotion, actually did so behaviorally.

For the LOT Scale, there were no significant main effects for age group (older adult vs young adult), $F (1, 53) = 1.38, p = .245$, nor questionnaire group (high vs low), $F (1, 53) = .165, p = .686$, on selection behavior, with no significant interactions. Similarly, with the PANAS Negative Affect Scale, there were no significant main effects for age group (older adult vs young adult), $F (1, 53) = .82, p = .370$, nor questionnaire group (high vs low), $F (1, 53) = .138, p = .712$, on selection behavior, with no significant interactions. Also, with the PANAS Positive Affect Scale, there were no significant main effects for age group (older adult vs young adult), $F (1, 53) = 1.71, p = .197$, nor questionnaire group (high vs low), $F (1, 53) = .97, p = .329$, on selection behavior, with no significant interactions.

Finally, we examined the effects of the ESES, and found some significant effects on selection behavior. As was mentioned previously, a significant main effect of age was found, such that older adults ($M = 270.86$ sec, $SD = 126.88$) spent significantly less time
interacting with negative material, than did young adults \((M = 370.34 \text{ sec}, SD = 230.38)\), \(F (1,53) = 7.75, p = .007, \eta p^2 = .128\). Also, a statistically significant interaction emerged with age and the emotional self-efficacy scale, \(F (1, 53) = 5.36, p = .024, \eta p^2 = .092\), such that younger adults with high emotional self-efficacy scores \((M = 464.78, SD = 273.34)\) spent more time engaging with negative material than older adults \((M = 201.44, SD = 113.97)\) with high emotional self-efficacy scores, while younger adults with low emotional self-efficacy scores \((M = 327.85, SD = 201.58)\) did not differ from older adults with low emotional self-efficacy scores \((M = 303.74, SD = 121.75)\). This finding suggests that younger adults with higher confidence in their ability to manage emotions are perhaps better equipped to handle prolonged exposure to negative stimuli.

**Effects of Stimuli and Stimuli Valence on Age and Mood.** Mood was assessed by considering the mood ratings immediately following stimuli of each valence. Thus, each participant had an average mood rating following each valence type. We conducted a repeated-measures ANOVA to determine if our stimuli elicited moods congruent with our pilot data. Indeed, there was a significant main-effect of mood, \(F (2, 105) = 18.02, p < .001, \eta p^2 = .34\). We followed up with paired-samples t-tests, and found that consistent with our pilot data, mood ratings following positive stimuli \((M = 77.58, SD = 12.55)\) were significantly higher than moods following neutral \((M = 69.37, SD = 21.24)\), which were both significantly higher than moods following negative stimuli \((M = 57.83, SD = 22.46)\).

Next, we considered mood change throughout the session, which was calculated by subtracting the final mood rating from the first mood rating. There were no significant age differences in mood change, \(F (1, 55) = 2.45, p = .123, \eta p^2 = .043\) between older adults \((M = -16.25, SD = 30.81)\) and young adults \((M = -2.55, SD = 35.01)\). Also, we
considered age differences in average mood throughout the session, and again there were not any significant age differences, between older adults \((M = 66.26, SD = 17.88)\) and young adults \((M = 62.68, SD = 18.04)\), \(F (1, 55) = .567, p = .455, \eta^2 = .010\).

Finally, we considered whether or not age and or selection pattern (time spent on positive/neutral material vs negative) could be used to predict mood change from the beginning to the end of the time in the AE. Hierarchical multiple regression was used, after looking at the significant correlations between specific individual difference measures and the dependent variable, we controlled for scores on the ESES and the Situation Selection Scale. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. ESES and Situation Selection scores were entered in Step 1, explaining 0.5% of the variance in the mood change scores. After entry of the selection pattern variable (time spent on positive/neutral vs negative material) and age at Step 2, the total variance explained by the model as a whole was 25.4\%, \(F (5, 51) = 3.48, p = .009\). These two added predictors explained an additional 24.8\% of the variance in mood change, after controlling for ESES and Situation Selection Scale scores, \(R^2\) change = .248, \(F\) change \((2, 52) = 8.65, p = .001\). In the final model, only age and the selection pattern variable were statistically significant predictors, with the selection pattern variable having a higher beta value \((\beta = .48, p < .001)\) than age \((\beta = .31, p = .015)\), \(R^2 = .254\), such that the model predicted those selecting more positive/neutral material across age, and young adults to have greater mood improvements from the beginning to the end of the session compared to older adults or those selecting more negative material.

**Eye-Tracking**
**Age Differences In Selection Behavior.** As was mentioned previously, all participants were presented with a negative video and negative picture slide show, followed by a video of their choosing, and 3 pictures slide shows of their choosing (the order of picture and video presentations was counter-balanced). As there were fewer choice opportunities, and thus a greater potential for absent choices of certain valence, positive and neutral choices were summed together into one variable. A 2 (age) x 2 (valence: negative vs neutral/positive) mixed-model ANOVA was run, resulting in a significant difference between the number of choices of each valence across age, $F(1, 55) = 148.63, p < .001$, with significantly more positive/neutral choices made ($M = 3.23, SD = .76$) compared to negative choices ($M = .77, SD = .76$), and no significant main effect of age, $F(1, 55) = .001, p = 1.00$. With no significant interaction between valence and choice, $F(1, 55) = .316, p = .576$ So, across age, there seemed to be a preference away from the negative in choice; this pattern did not differ across ages.

We were also interested in the choice patterns of participants to be used as an independent variable in subsequent analyses. Based off of the picture and video choices made, we computed a “*selection pattern*” variable, that reflected either a preference for positive/neutral or a preference for negatively-valenced material as evidenced by the number of choices of each that were made. This was calculated as a dichotomous variable, with those making 2 or more negative choices (0) and those making fewer than 2 negative choices (1). As was mentioned previously, overall, there was a strong tendency for individuals to choose positive/neutral material ($M = 3.23, SD = .76$), with much fewer negative choices made ($M = .77, SD = .76$).
Relationships Between Individual Difference Measures and Selection. When considering correlational relationships separately among older and young adults, some significant relationships emerged. Interestingly, in the young adult sample, there was a significant positive relationship between high scores on the single Emotion Control Item and the number of choices of negative material, $r(29) = .451, p = .014$. Also, in the young adult sample, there was a significant positive relationship between high scores on the PANAS Negative Affect scale and the number of choices of negative material, $r(29) = .378, p = .043$. There were no significant correlations for older adults between the individual difference measures of interest and selection behavior (Table 5).

Next, we created a “situation selection” score, similar to what was done with the AE data, which summed together the number of positive and neutral choices overall and subtracted the number of negative choices overall from this to yield a single score. Higher, and positive scores indicated a preference for positive material, with scores close to zero indicating a preference for non-emotional content, and negative scores indicating a preference for negative material. Again, like above, we then followed up on these correlational findings and conducted ANOVAs to directly examine age differences in how scoring high or low on each measure of interest affected selection patterns.

A 2(age) x 2 (high/low Emotion Control Item) ANOVA was run, resulting in no significant main effects of age, $F(1, 53) = .039, p = .945, \eta^2 = .052$, nor questionnaire group, $F(1, 53) = .383, p = .011$. However, there was a significant interaction between questionnaire group and age, $F(1, 53) = 5.83, p = .019, \eta^2 = .10$. Simple-effects analyses revealed that older adults scoring low ($M = 1.82, SD = 1.74$) on the Emotion Control item made fewer positive/neutral choices than those scoring high ($M = 3.09, SD$
= .94). In younger adults this difference in selection behavior between those scoring high
($M = 2.00, SD = 1.73$) and those scoring low ($M = 2.75, SD = 1.41$) was not significant.

All other age and questionnaire response interactions on selection were not
significant.

**Age Differences in Fixation.** Please see table 5 for descriptive statistics of
fixation, split by age group. Replicating past findings, there was a significant age
difference between the average percent fixated on the most emotional parts of the
negative video that was shown to all participants, such that older adults ($M = 49.89, SD =
20.17$) spent less time fixated on the most emotional parts, compared to younger adults
($M = 61.76, SD = 20.72$), $F (1, 55) = 4.80, p = .033, \eta_p^2 = .08$. Aside from this, fixation
data for videos was not considered in future analyses, as there was only one choice video,
and it would not be logical to compare fixation to pictures to fixation to videos. However,
when considering the negative picture slide show that was shown to all participants, there
were no significant age differences in the percent fixation to the most negative parts of
the slide show, $F (1, 54) = 1.68, p = .200, \eta_p^2 = .03$.

Next, A 2(age) x 2(selection pattern: positive/neutral vs negative preference)
ANOVA was run with overall fixation pattern over all choice picture trials (average
percent fixation to most emotional parts of the picture) as the dependent variable. A main
effect of selection pattern emerged, such that those with a negative choice pattern ($M =
77.09, SD = 17.88$) fixated significantly less on the most emotional parts ($M = 92.89, SD
= 9.67$) of their choice pictures, $F (1, 52) = 15.46, p < .001, \eta_p^2 = .23$. There was no
significant effect of age $F (1, 52) = 2.09, p = .154, \eta_p^2 = .04$ and no significant interaction
between age and selection pattern, $F (1, 52) = .544, p = .466, \eta_p^2 = .01$, suggesting that
those who chose more negative material, tended to also look less at the most emotional parts of this negative material.

We then examined correlations between fixation pattern across all choice picture trials, and the individual difference measures. There were no significant correlations between fixation patterns and any of the individual difference measures of interest, so we turned next to analyzing mood (Table 5).

**Mood During Eye Tracking.** First, to ensure that individuals’ moods actually decreased when shown the negative presentations, and to determine if these changes differed between ages, we ran a 2(age) x 2(mood: pre vs post) mixed-model ANOVA. There was a significant interaction between mood and age, such that older adults’ moods following the negative presentations ($M = 31.18, SD = 23.40$) were significantly lower than young adults’ moods ($M = 40.57, SD = 19.62$), $F (1, 55) = 4.39, p = .041, \eta_p^2 = .07$, suggesting that older adults’ moods were impacted to a greater degree by the negative material. There was also a significant main effect of mood, such that across age, mood prior to the negative presentations ($M = 68.33, SD = 18.16$) was higher than mood following the negative presentations ($M = 35.96, SD = 21.88$), $F (1, 55) = 131.80, p < .001, \eta_p^2 = .71$, which is not surprising based off of the valence of the material.

Next, we looked at age differences in average mood across all negative presentations and all choice presentations. There were no significant age differences in average overall mood between older ($M = 60.08, SD =14.23$) and young adults ($M = 61.80, SD = 13.11$), $F (1, 55) = .23, p = .636, \eta_p^2 = .004$. However, when considering average mood following any negative presentation, older adults ($M = 31.66, SD = 22.97$) displayed significantly lower moods compared to young adults ($M = 42.99, SD = 19.71$),
Again, this finding suggests that older adults in our sample were more greatly affected by the negative material that was presented compared to their younger counterparts.

Finally, we wanted to determine if there were any relationships between mood change, and the individual difference variables of interest. There were significant correlations between mood change and scores on the ESES, \( r (57) = .40, p < .001 \) and the CES-D, \( r (57) = -.33, p = .012 \), such that high confidence ratings in emotion regulation abilities were associated with higher moods at the end of the session, and ratings of higher state depression were associated with lower moods at the end of the session. To follow up on this, a one-way between-subjects analysis of covariance was conducted to examine age differences in mood change, after controlling for some individual differences. As there was significant multi-collinearity between these two measures, the measure that had the greatest relationship with our dependent variable of interest was chosen as a covariate for analysis (ESES). The independent variable was age (young vs older adults), and the dependent variable was mood change (difference in mood from beginning to the end of the session). Participants’ scores on the ESES were used as the covariate in this analysis.

Preliminary checks were conducted to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. After adjusting for scores on the ESES, there was no significant difference between young (\( M = 6.21, SD = 18.27 \)) and older adults’ (\( M = .96, SD = 25.60 \)) mood changes from the beginning to the end of the session, \( F (1, 54) = .405, p = .527, \eta_p^2 = .007 \). However, there was a strong positive significant
relationship between scores on the ESES and mood change, \( F(1, 54) = 9.82, p = .003, \eta^2_p = .154. \)

**Mood, Choice, Fixation and Individual Difference Variables Considered**

**Together.** We next turned to examine the dependent variables from the previous analyses as independent variables, such that fixation and selection pattern, as well as age were used to predict mood change during the eye tracking session. As in the previous regression analyses, we needed to control for scores on some of the individual difference variables, as they both shared high correlations with the mood change variable.

Hierarchical multiple regression was used, with age, fixation and selection pattern as predictors of mood change, and ESES and CES-D scale scores as covariates. Preliminary analyses revealed that no violations of the assumptions of normality, linearity, multicollinearity and homoscedasticity were made. ESES and CES-D scores were entered in Step 1, explaining 20.9\% of the variance in mood change scores during eye-tracking.

After entry of the selection pattern, fixation pattern and age variables at Step 2, the total variance explained by whole model was 28.1\%, \( F(5, 50) = 3.90, p = .005. \) The three additional predictors explained an additional 7.2\% of the variance in mood change scores, after controlling for ESES and CES-D scores, \( R^2 \text{ change} = .072, F \text{ change} (3, 50) = 1.66, p = .187, \text{RMSE} = 19.68. \) In the final chosen model, only the ESES score was a statistically significant predictor (\( \beta = .33, p = .014 \)), with CES-D scores (\( \beta = -.25, p = .070 \)), fixation pattern (\( \beta = -.15, p = .317 \)), choice pattern (\( \beta = -.13, p = .357 \)), and age (\( \beta = .16, p = .205 \)), not emerging as significant predictors of mood change.
Discussion

The current study investigated age differences in the use of two antecedent-focused emotion regulation strategies (attentional deployment and situation selection) in a less constrained laboratory setting. To our knowledge this marked the first attempt to examine age differences in situation selection, as well as the interaction between situation selection and attentional deployment. We further looked at the link between some individual differences of interest, and explored how all of this ultimately affected mood. We hypothesized that: older adults would make more positive and fewer negative selections than young adults, and would also fixate less on the most emotionally negative material in the eye-tracking session than young adults. Also, we predicted that older adults would have higher sustained positive moods than young adults, and that high emotion control beliefs and emotion regulation self-efficacy beliefs would be related to higher moods. Finally, we predicted that older adults would believe that emotions were more controllable overall than young adults as evidenced by higher scores on the Emotion Control item, ESES and Situation Selection scales which would also relate to a preference for positive material.

We did find some support for our hypothesis that older adults would select a greater amount of positive/neutral stimuli than negative material, compared to young adults, while in the AE. While not direct confirmation of this hypothesis, older adults did spend a significantly lower amount of time interacting with negative material than did young adults. There were no age differences in the amount of time spent on positive material, but interestingly, older adults did spend more time with neutral material than
did their younger counterparts. So, it would seem that older adults are not necessarily motivated to focus only on positive information, but instead use a strategy that avoids prolonged exposure to negative material, an example of age-related positivity effects (Carstensen & Mikels, 2005).

Again, replicating findings from previous research, when shown a video of very high negative valence, age differences did emerge (Isaacowitz, Wadlinger, Goren, & Wilson, 2006). Older adults spent a significantly lower percentage of time fixated on the most emotional parts of this video compared to young adults. However, when considering fixation patterns to the rest of the stimuli chosen, no significant age differences emerged. This is not particularly surprising, as these fixation patterns were computed for pictures chosen by the participants, and thus it makes sense that individuals will want to look at what they chose. Not in accordance with our hypotheses, across age, there was a selective preference away from negative material during the eye-tracking session. The mood disturbing capacity of the negative material shown to all participants could be an explanatory mechanism for this. Moods declined significantly from before the presentation of this negative material to the end of the presentation, deterring even young individuals from further interaction with negative material. Finally, across age, when individuals did choose negative material, they tended to fixate less on the most emotionally evocative parts of the presentation. So, it would seem that even though these individuals did not rely on situation selection to regulate their mood, they did use another emotion regulatory process (attentional deployment) to help curb the mood disturbing effects of the negative stimuli (Isaacowitz, Toner, & Neupert, 2009).
Not in accordance with our hypotheses, there were no age differences in scores on our measure of attitudes toward using situation selection. Rather than older adults scoring higher than young adults, there was a similar pattern that developed for both ages. Those individuals who scored high on the situation selection scale did in fact spend less time interacting with negative material while in the AE, regardless of age. This does provide some evidence that those individuals who believe that they use situation selection to regulate their emotions, actually do tend to do so behaviorally (Gross, 1998). However, how did scoring patterns on the scales of control beliefs differentially relate to age differences in the use of situation selection?

We did find some support for the hypothesis that believing emotions are controllable promotes the use of antecedent-focused emotion regulation strategies (Tamir, John, Srivastava, & Gross, 2007). Believing that emotions are controllable led older adults to select more positive and neutral stimuli while in the AE than did older adults who did not have this belief, with this distinction non-existent in young adults. Interestingly, during eye-tracking, older adults with high emotion control beliefs made fewer positive/neutral choices than those older adults with low beliefs. Due to the differences in context between the AE and the eye-tracking session, this is not particularly surprising, as the contexts did vary between both settings (Charles & Piazza, 2009).

Conversely, for young adults there was a positive relationship between believing that emotions were controllable and selecting more negative choices during the eye-tracking session. As we proposed earlier, believing that emotions are controllable in young age could actually lead to young adults being more confident in their ability to
deal with negative information, and this seemed to be the case in our sample. So, as predicted, when older adults believed that emotions are more controllable, they tended to adopt more antecedent-focused emotion regulation strategies, while similar scores served to provide young adults with the confidence to interact with negative material (Tamir, et al., 2007).

Also of interest, was how efficacious beliefs about emotion regulation would relate to the use of situation selection. As predicted, there was a strong relationship between high scores on the ESES scale and an avoidance of negative material for older adults while in the AE, such that higher scores were related to a decreased amount of time spent interacting with negative material. In line with empirical predictions, higher efficacious beliefs about emotion regulation abilities was related to an avoidance of prolonged exposure with negative material for older adults, a prime example of the use of situation selection (Piazza, Charles, & Almeida, 2007). When young adults had high scores on the ESES, they spent more time interacting with negative material, than did young adults scoring low on the ESES. So, while there were not any significant age differences on this scale, within groups there were some relationships between efficacy and the use of situation selection. So again, for older adults, believing that they could successfully regulate their emotions was related to an avoidance of negative material, while in young adults, these higher beliefs served to promote an increased interaction with negative material, as predicted by some researchers (John & Gross, 2007).

Regarding mood, our results did not support our hypothesis that older adults would have higher sustained moods in comparison to young adults. In fact, a quite different story seemed to emerge. During the eye-tracking portion of the study, after the
presentation of negative material, older adults displayed lower moods averaged across all of the ratings taken after negative presentations than did young adults. When given the choice to interact with whatever they wanted to in the AE, our expected pattern emerged such that older adults would avoid negative material in comparison to young adults, but both groups ended up with similar moods at the beginning of the study. So, it would seem that when given the choice, both groups do successfully use situation selection, with older adults avoiding negative material, and young adults approaching it (Carstensen & Mikels, 2005). After controlling for scores on the ESES, age and selection pattern did emerge as significant predictors of mood change in the AE, yet not quite in the hypothesized direction. Across age, those individuals who selected more positive/neutral material over negative were predicted to have increased moods at the end of the session. However, regardless of selection pattern, regression results predicted that young adults would have higher moods than older adults, in direct contradiction of our hypothesis.

Both age groups were given the freedom to select whatever they wanted, and predicted patterns did emerge in regards to selection, yet young adults’ moods seemed to benefit more from this.

Finally, we also wanted to examine mood changes from the beginning to the end of the eye-tracking session. Again, there were no significant age differences in mood change, nor were there any significant differences between those individuals with a preference for negative versus a preference for positive/neutral material. Based off of correlational results, we wanted control for scores on the ESES and CES-D when using age, fixation pattern, and choice pattern to predict mood change. Interestingly, and again
in contradiction of our hypothesis, none of these variables, except for scores on the ESES emerged as significant predictors of mood change.

**Implications**

A key implication of these findings is that situation selection is differentially used across the lifespan. Similar to previous findings there were age-related biases in selection and attention such that, when given the choice, older adults tended to spend less time interacting with negative material than did young adults (Carstensen, Fung, & Charles, 2003), and when not given the choice, older adults still avoided negative material to a greater degree than young adults through their use of attentional deployment (Isaacowitz, Toner, & Neupert, 2009). Interestingly, specific control and efficacy beliefs seemed to play different roles across the lifespan as they relate to these emotion regulation strategies. But what is perhaps even more interesting, despite some between-group differences in emotion regulation strategy use, there were not any differential effects on self-reported mood. The above findings will be interpreted using the socioemotional selectivity theory and SAVI model frameworks to explain how individual differences in control beliefs relate to how older and young adults differentially use emotion regulation strategies in pursuit of their individual goals.

Socioemotional selectivity theory posits that with increased age, comes increased motivation to focus on emotionally meaningful goals and activities, while avoiding potentially mood disturbing stimuli (ie., preference for positive over negative), due to a feeling of limited time left in life (Carstensen, Isaacowitz, & Charles, 1999). When given the choice, older adults did in fact avoid negative material, while young adults did not. However, these age differences in interaction with negative material did not result in any
differences in mood change from the beginning to the end of the session, nor in
differences in average mood throughout the session. As evidenced by relatively stable
mood ratings from the beginning to the end of the session, both age groups were able to
successfully regulate their emotions through their use of situation selection, yet the
specific parameters of their use of situation selection were strikingly different.

When the opportunity to use situation selection was not available, similar age
differences in the use of another emotion regulation strategy emerged. With the
presentation of the non-choice negative videos, older adults fixated significantly less on
the most negative parts of the videos than did young adults, yet this did not result in any
age differences in mood, with similarly sustained moods for both age groups. These
patterns are not particularly surprising, yet they do contradict some findings. For
example, Isaacowitz, et al., (2009), found that older adults with better executive
functioning were indeed able to stave off mood declines by activating positive gaze
preferences during the presentation of negative images. However, in our sample,
preferential looking did not lead to any age differences in mood. While there were no age
differences in mood change overall, this is not to say that the differential emotion
regulation strategies employed between age groups did not work, quite the contrary, both
ages groups did not seem to suffer any mood declines overall. Further, Noh, Lohani, and
Isaacowitz (2011) found that higher alerting older adults who avoided more negative
looking patterns had a smaller mood decline from before and after being presented with
negative material. For younger adults, more negative looking was associated with higher
moods in the short-term, and attentional functioning did not seem to have an effect on
this younger group. Again, in our sample, regardless of fixation pattern, both age groups
rated their moods similarly from before and after viewing negative material not of their choice. Perhaps individual differences could account for these contradictory findings, such that in our sample, differences in attentional and executive functioning may have served to moderate the gaze-mood links. Aside from these findings regarding selection and fixation behaviors, some individual differences were also of interest.

The SAVI model outlines that prolonged exposure to uncontrollable negative situations can decrease older adults’ success at regulating emotion, and also can subsequently result in decreased well-being (Charles & Piazza, 2009). We tested this contention with an examination of individual differences. During negative presentations not of participants’ choosing, when the situation was uncontrollable (i.e., situation selection not available as an emotion regulation strategy), older adults fixated less to the most negative portions of the videos shown, yet fixation patterns did not differ between those with high/low perceived control or emotion regulation efficacy. However, when situations were controllable (i.e., situation selection was available as an emotion regulation strategy), older adults who believed their emotions were controllable made more positive/neutral selections than those older adults who had low control. Yet, no pattern seemed to emerge for young adults. As a general sense of control only seemed to have a relation to the use of emotion regulation in older adults, we also wanted to examine how efficacy in emotion regulation related to emotion regulation. Is a general sense of perceived control over one’s emotions, or are feelings of efficacy in controlling emotions more likely to be determinant of actual behavior?

Emotion regulation self-efficacy scores seemed to relate to the actual use of regulation to a large degree across age. High ESES scores were a significant predictor of
mood change, above and beyond fixation pattern, age and selection pattern. Further, for older adults, those with high self-efficacy in emotion regulation were more likely to spend less time with negative material, while high scores on the ESES were associated with increased time with negative material for young adults, in comparison to those scoring low on the ESES who tended to spend less time with negative material while in the AE. As predicted by the SAVI model, in uncontrollable situations, older adults may be worse at regulating their emotions, yet efficacy and control beliefs seem to help buffer this potential detriment (Charles & Piazza, 2009; Tamir, et al., 2007). Both older adults who believed they had control over their emotions and those who had strong confidence in their abilities to control emotions actually did tend to use situation selection, as evidenced by a reliance on positive/neutral choices, and a limited amount of time spent engaging with negative material when situation selection was, and was not available.

On the contrary, young adults who had high emotion regulation efficacy tended to spend more time with negative material, than did young adults with low efficacy. As predicted by socioemotional selectivity theory, older and young adults have different information seeking priorities. So while it may be tempting to assert that efficacious beliefs only serve to benefit older adults, instead, it clearly seems to benefit both age groups differentially. Again, ESES scores were significant predictors of mood change above and beyond all of the other theoretically hypothesized predictors. Taken together, these findings provide some evidence that suggests a high sense of control (as evidence by general control and/or self-efficacy) can help steer both older and young adults toward their most proactive emotion regulation strategy, leading to downstream increases in mood.
Limitations and Future Directions

With the novelty of the current study, there are always a few limitations, as well as many more opportunities to expand upon the current work and take it in some promising new directions.

First, as much as we did try to increase the ecological validity of the procedures used, this study was still done in a laboratory setting, and perhaps some of the hypothesized findings may have been hampered due to this fact. While participants were given free choice from a variety of material to interact with, there still was a limited number of valenced materials to approach and or avoid. Also, in the AE, all of the material was news-related, which may only cater to a certain type of individual’s preferences. Some ways to improve upon this would obviously be to provide a large amount of material for participants to interact with, that varied in not only emotional valence, but also in the information medium in which it is presented. Specifically, we could provide some hard-copy works of fiction, radio broadcasts, poster diagrams, sports programming, etc. All of these added materials would also need to vary in valence in similar ratios of the stimuli already used, such that there was not only a wide spectrum of types of information available, but also that these types varied in their emotional valence. Further, with an increased number of possible choices, we could also allow for more time to be spent in the AE, to hopefully have more data to examine. Despite this shortcoming, we were still able to find support for many of our hypotheses.

Next, a variety of our data were collected using self-report. While there was some validation of this with the relationship between responses on the situation selection scale and behavioral tendencies, self-report is not always the most accurate form of data. To
address this, some psychophysiological data could be collected in order to determine whether or not self-reported moods corresponded to physiological markers of emotional expression and experience. Also, while difficult to use when assessing situation selection, neurophysiological data could also be collected when examining attentional deployment.

A main question of interest was how attentional deployment and situation selection would interact, yet, we did not have much data to use in examination of this. With only 3 choice picture presentations and 1 choice video, it was very difficult to compare across these. In the future, there could be a greater number of choice opportunities that would be eye-tracked. This could also have manifest itself in the number of available choices for only one valence, and we could see how individuals attended to material that may not have been of interest to them, but they did make the conscious effort to choose. Also, we could see how individual differences (ie., control beliefs) could affect fixation patterns when there was a discrepancy between the choice that was made, and what was actually presented. In other words, participants could make a choice and expect something different than that is presented to them. We could have been comparing how individuals, high and low in control, regulated their emotions after their sense of control was interfered with.

Finally, to address both the interaction of attentional deployment and situation selection and the issues of ecological validity, we could measure these emotion regulatory processes differently. Specifically, through the use of mobile eye-tracking, participants would be free to move around in ways more similar to their real-world behaviors. This procedural alteration would also allow us to simultaneously measure
situation selection (selection) and attentional deployment (fixation) while participants moved around unconstrained.

**Conclusion**

To our knowledge, this work marked the first attempt to measure age differences in situation selection and attentional deployment in the same study. As hypothesized older adults tended to avoid negative material, while young adults did not. Both age groups, when given the free choice to use their preferred emotion regulation strategy did not differ in their overall mood, nor in their mood change from the beginning to the end of the session. Further, perceived control and efficacy beliefs regarding emotion regulation served to better equip both young and older adults to preferentially use effective emotion regulation; it is thus not enough to assert a general theory of well-being and emotion regulation, but rather to consider individual differences, and the ways in which these processes adapt and change throughout the lifespan.
Table 1

Demographic Frequencies Split by Age Group

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Young Adult</th>
<th>Older Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>41.4</td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>58.6</td>
</tr>
<tr>
<td><strong>Highest level of education completed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>7</td>
<td>24.1</td>
</tr>
<tr>
<td>College Freshman</td>
<td>10</td>
<td>34.5</td>
</tr>
<tr>
<td>College Sophomore</td>
<td>6</td>
<td>20.7</td>
</tr>
<tr>
<td>College Junior</td>
<td>4</td>
<td>13.8</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Master’s degree</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td>Technical/vocational/trade school</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>JD/MD/PhD</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>16</td>
<td>55.2</td>
</tr>
<tr>
<td>More than one race</td>
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<td>6.9</td>
</tr>
<tr>
<td>Asian</td>
<td>8</td>
<td>27.6</td>
</tr>
<tr>
<td>Black or African American</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jewish</td>
<td>12</td>
<td>41.4</td>
</tr>
<tr>
<td>Catholic</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td>Protestant</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>Atheist</td>
<td>1</td>
<td>3.4</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>13.8</td>
</tr>
<tr>
<td>Agnostic</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td>No affiliation</td>
<td>5</td>
<td>17.2</td>
</tr>
</tbody>
</table>
Table 2

*Health, Cognitive Tasks, and Vision Test Means (standard deviations) Split by Age*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Young Adults</th>
<th>Older Adults</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reported health</td>
<td>3.86(.74)</td>
<td>3.36(.99)</td>
<td>.033*</td>
</tr>
<tr>
<td>Mini-Mental State Exam</td>
<td>29.77(.43)</td>
<td>29.23(1.88)</td>
<td>.135</td>
</tr>
<tr>
<td>Forward Digit Span</td>
<td>7.57(1.19)</td>
<td>7.15(1.32)</td>
<td>.224</td>
</tr>
<tr>
<td>Backward Digit Span</td>
<td>5.80(1.32)</td>
<td>5.38(1.36)</td>
<td>.252</td>
</tr>
<tr>
<td>Digit Symbol Substitution</td>
<td>77.40(14.31)</td>
<td>67.17(17.66)</td>
<td>.018*</td>
</tr>
<tr>
<td>Shipley Vocabulary Test</td>
<td>14.16(2.23)</td>
<td>15.92(2.23)</td>
<td>.007**</td>
</tr>
<tr>
<td>Snellen (visual acuity)</td>
<td>24.97(10.36)</td>
<td>36.67(11.68)</td>
<td>&lt;.001**</td>
</tr>
<tr>
<td>Pelli-Robson (contrast sensitivity)</td>
<td>1.62(.16)</td>
<td>1.48(.14)</td>
<td>.001**</td>
</tr>
<tr>
<td>Rosenbaum (near vision)</td>
<td>21.03(2.46)</td>
<td>38.52(14.92)</td>
<td>&lt;.001**</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01
Table 3

*Means (sd)* of Main Choice and Time Measures Split by Age Group (In AE)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Older Adults</th>
<th>Younger Adults</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotion control item</td>
<td>7.00 (1.31)</td>
<td>6.55 (1.55)</td>
<td>.243</td>
</tr>
<tr>
<td>Implicit theories of emotion</td>
<td>13.64 (3.08)</td>
<td>13.76 (2.98)</td>
<td>.886</td>
</tr>
<tr>
<td>Emotional self-efficacy scale</td>
<td>17.57 (3.61)</td>
<td>18.28 (3.38)</td>
<td>.450</td>
</tr>
<tr>
<td>Situation selection scale</td>
<td>27.11 (4.51)</td>
<td>28.21 (4.36)</td>
<td>.354</td>
</tr>
<tr>
<td>Future time perspectives scale</td>
<td>35.04 (12.74)</td>
<td>54.90 (10.07)</td>
<td>&lt;.001**</td>
</tr>
<tr>
<td>Personal mastery</td>
<td>23.32 (5.10)</td>
<td>24.41 (3.09)</td>
<td>.330</td>
</tr>
<tr>
<td>Perceived constraints</td>
<td>22.79 (11.36)</td>
<td>20.48 (6.12)</td>
<td>.343</td>
</tr>
<tr>
<td>Number of negative choices</td>
<td>3.07 (1.74)</td>
<td>3.41 (1.88)</td>
<td>.479</td>
</tr>
<tr>
<td>Number of positive choices</td>
<td>3.18 (1.33)</td>
<td>3.10 (1.90)</td>
<td>.864</td>
</tr>
<tr>
<td>Number of neutral choices</td>
<td>1.61 (1.34)</td>
<td>1.23 (1.22)</td>
<td>.334</td>
</tr>
<tr>
<td>Time spent on negative (sec)</td>
<td>270.86 (126.88)</td>
<td>370.34 (230.38)</td>
<td>.049*</td>
</tr>
<tr>
<td>Time spent on positive (sec)</td>
<td>295.93 (144.70)</td>
<td>339.07 (197.08)</td>
<td>.349</td>
</tr>
<tr>
<td>Time spent on neutral (sec)</td>
<td>137.96 (108.04)</td>
<td>81.52 (78.97)</td>
<td>.028*</td>
</tr>
</tbody>
</table>
Table 4

**Bivariate Correlation Table for Older Adult Sample in AE (n=28)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>1. Emotion control item</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Implicit theories of emotion scale</td>
<td>.028</td>
<td>---</td>
<td></td>
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<tr>
<td>3. Emotion self-efficacy scale</td>
<td>.457*</td>
<td>.349</td>
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<tr>
<td>4. Situation selection scale</td>
<td>.403*</td>
<td>.011</td>
<td>.142</td>
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<tr>
<td>5. Future time perspectives scale</td>
<td>.140</td>
<td>.367</td>
<td>.092</td>
<td>.410*</td>
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</tr>
<tr>
<td>6. Time spent on negative (sec)</td>
<td>-.340</td>
<td>-.208</td>
<td>-.418*</td>
<td>-.361</td>
<td>.118</td>
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<tr>
<td>7. Time spent on positive (sec)</td>
<td>-.128</td>
<td>.244</td>
<td>-.003</td>
<td>.311</td>
<td>-.081</td>
</tr>
<tr>
<td>8. Time spent on neutral (sec)</td>
<td>.525**</td>
<td>-.156</td>
<td>.332</td>
<td>.352</td>
<td>.113</td>
</tr>
<tr>
<td>9. Number of negative choices</td>
<td>-.277</td>
<td>-.030</td>
<td>-.284</td>
<td>-.539**</td>
<td>-.061</td>
</tr>
<tr>
<td>10. Number of positive choices</td>
<td>-.149</td>
<td>.322</td>
<td>-.045</td>
<td>.249</td>
<td>-.237</td>
</tr>
<tr>
<td>11. Number of neutral choices</td>
<td>.528**</td>
<td>.027</td>
<td>.523**</td>
<td>.313</td>
<td>.165</td>
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</table>

**Bivariate Correlation Table for Younger Adult Sample in AE (n=29)**

<table>
<thead>
<tr>
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<th>3</th>
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<tbody>
<tr>
<td>1. Emotion control item</td>
<td>---</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Implicit theories of emotion scale</td>
<td>.470*</td>
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<tr>
<td>3. Emotion self-efficacy scale</td>
<td>.557**</td>
<td>.248</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Situation selection scale</td>
<td>.057</td>
<td>-.292</td>
<td>.224</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>5. Future time perspectives scale</td>
<td>.203</td>
<td>.021</td>
<td>.343</td>
<td>.236</td>
<td>---</td>
</tr>
<tr>
<td>6. Time spent on negative (sec)</td>
<td>.161</td>
<td>-.023</td>
<td>.076</td>
<td>-.188</td>
<td>.198</td>
</tr>
<tr>
<td>7. Time spent on positive (sec)</td>
<td>-.204</td>
<td>-.015</td>
<td>.014</td>
<td>.360</td>
<td>-.105</td>
</tr>
<tr>
<td>8. Time spent on neutral (sec)</td>
<td>-.115</td>
<td>.164</td>
<td>-.242</td>
<td>-.349</td>
<td>.113</td>
</tr>
<tr>
<td>9. Number of negative choices</td>
<td>.164</td>
<td>.158</td>
<td>.060</td>
<td>-.538**</td>
<td>-.026</td>
</tr>
<tr>
<td>10. Number of positive choices</td>
<td>-.154</td>
<td>.055</td>
<td>.040</td>
<td>.196</td>
<td>.172</td>
</tr>
<tr>
<td>11. Number of neutral choices</td>
<td>-.159</td>
<td>.058</td>
<td>-.235</td>
<td>-.366</td>
<td>-.018</td>
</tr>
</tbody>
</table>

\* \( p < .05 \), \** \( p < .001 \)
### Table 5

**Bivariate Correlation Table for Older Adult Sample During Eye-Tracking (n=28)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotion control item</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Implicit theories of emotion scale</td>
<td>.028</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Emotion self-efficacy scale</td>
<td>.457*</td>
<td>.349</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>4. Situation selection scale</td>
<td>.403*</td>
<td>.011</td>
<td>.142</td>
<td>---</td>
</tr>
<tr>
<td>5. # of positive/neutral choices</td>
<td>.358</td>
<td>-.255</td>
<td>.035</td>
<td>.267</td>
</tr>
<tr>
<td>6. # of negative choices</td>
<td>-.358</td>
<td>.255</td>
<td>-.003</td>
<td>-.267</td>
</tr>
<tr>
<td>7. Overall fixation pattern</td>
<td>.199</td>
<td>-.178</td>
<td>-.036</td>
<td>.093</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01

### Bivariate Correlation Table for Older Adult Sample During Eye-Tracking (n=29)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotion control item</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Implicit theories of emotion scale</td>
<td>.470*</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Emotion self-efficacy scale</td>
<td>.557**</td>
<td>.248</td>
<td>---</td>
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<tr>
<td>4. Situation selection scale</td>
<td>.057</td>
<td>-.292</td>
<td>.224</td>
<td>---</td>
</tr>
<tr>
<td>5. # of positive/neutral choices</td>
<td>-.451*</td>
<td>-.309</td>
<td>-.307</td>
<td>.112</td>
</tr>
<tr>
<td>6. # of negative choices</td>
<td>.451*</td>
<td>.309</td>
<td>.307</td>
<td>-.112</td>
</tr>
<tr>
<td>7. Overall fixation pattern</td>
<td>-.309</td>
<td>-.342</td>
<td>.233</td>
<td>.435*</td>
</tr>
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</table>

* p < .05, ** p < .01
Table 6

*Older Adult Means & Standard Deviation of Fixation Dependent Variables (Total n=28)*

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Avg. Percent Fixation on Most Emotional Part of Presentation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forced-Negative Video</td>
<td>66.55(25.20)</td>
<td>28</td>
</tr>
<tr>
<td>Choice Video (not by valence)</td>
<td>58.86(21.72)</td>
<td>28</td>
</tr>
<tr>
<td>Choice Video (negative)</td>
<td>70.55(15.00)</td>
<td>3</td>
</tr>
<tr>
<td>Choice Video (positive)</td>
<td>58.90(24.42)</td>
<td>17</td>
</tr>
<tr>
<td>Choice Video (neutral)</td>
<td>54.94(18.99)</td>
<td>7</td>
</tr>
<tr>
<td>Forced-Negative Picture</td>
<td>66.55(25.20)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 1 (not by valence)</td>
<td>79.31(24.89)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 2 (not by valence)</td>
<td>87.75(19.32)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 3 (not by valence)</td>
<td>88.58(16.49)</td>
<td>24</td>
</tr>
<tr>
<td>Choice 1 (negative)</td>
<td>64.76(28.56)</td>
<td>13</td>
</tr>
<tr>
<td>Choice 1 (positive)</td>
<td>91.34(11.53)</td>
<td>14</td>
</tr>
<tr>
<td>Choice 1 (neutral)</td>
<td>100(--                                                   )</td>
<td>1</td>
</tr>
<tr>
<td>Choice 2 (negative)</td>
<td>62.52(26.77)</td>
<td>5</td>
</tr>
<tr>
<td>Choice 2 (positive)</td>
<td>93.73(13.44)</td>
<td>16</td>
</tr>
<tr>
<td>Choice 2 (neutral)</td>
<td>92.08(10.11)</td>
<td>7</td>
</tr>
<tr>
<td>Choice 3 (negative)</td>
<td>82.63(--                                                   )</td>
<td>1</td>
</tr>
<tr>
<td>Choice 3 (positive)</td>
<td>88.40(15.11)</td>
<td>12</td>
</tr>
<tr>
<td>Choice 3 (neutral)</td>
<td>89.26(19.00)</td>
<td>12</td>
</tr>
</tbody>
</table>
**Table 7**

*Young Adult Means and Standard Deviations of Fixation Dependent Variables (Total n=29)*

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Avg. Percent Fixation on Most Emotional Part of Presentation (sd)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forced-Negative Video</td>
<td>75.85(19.00)</td>
<td>29</td>
</tr>
<tr>
<td>Choice Video (not by valence)</td>
<td>63.55(18.02)</td>
<td>29</td>
</tr>
<tr>
<td>Choice Video (negative)</td>
<td>31.63(--)</td>
<td>1</td>
</tr>
<tr>
<td>Choice Video (positive)</td>
<td>63.79(18.08)</td>
<td>25</td>
</tr>
<tr>
<td>Choice Video (neutral)</td>
<td>72.23(.89)</td>
<td>3</td>
</tr>
<tr>
<td>Forced-Negative Picture</td>
<td>66.55(25.20)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 1 (not by valence)</td>
<td>80.69(22.86)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 2 (not by valence)</td>
<td>89.58(17.12)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 3 (not by valence)</td>
<td>95.36(8.48)</td>
<td>28</td>
</tr>
<tr>
<td>Choice 1 (negative)</td>
<td>65.13(23.26)</td>
<td>14</td>
</tr>
<tr>
<td>Choice 1 (positive)</td>
<td>96.25(4.86)</td>
<td>14</td>
</tr>
<tr>
<td>Choice 1 (neutral)</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>Choice 2 (negative)</td>
<td>62.56(24.05)</td>
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<tr>
<td>Choice 2 (positive)</td>
<td>93.96(11.69)</td>
<td>21</td>
</tr>
<tr>
<td>Choice 2 (neutral)</td>
<td>95.00(4.37)</td>
<td>3</td>
</tr>
<tr>
<td>Choice 3 (negative)</td>
<td>61.15(--)</td>
<td>1</td>
</tr>
<tr>
<td>Choice 3 (positive)</td>
<td>97.48(3.18)</td>
<td>16</td>
</tr>
<tr>
<td>Choice 3 (neutral)</td>
<td>95.38(7.41)</td>
<td>11</td>
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</tbody>
</table>
References


