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Anxiety-Linked Expectancy Bias across the Adult Lifespan

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Abstract

Anxiety is characterized by a negative expectancy bias, such that anxious individuals report negatively distorted expectations about the future. Contrary to anxiety, aging is characterized by a positivity effect, such that aging is associated with a tendency to attend to and remember positive information, relative to negative information. The current study integrates these literatures to examine anxiety- and age-linked biases when thinking about the future. Participants ($N=1109$) completed a procedure that involved reading valenced scenarios (positive, negative, or ambiguous) and then rating the likelihood of future valenced events occurring. Results suggest that aging and anxiety have independent and opposing effects. Heightened anxiety was associated with a reduced expectancy for positive events, regardless of the scenarios' current emotional valence, whereas increased age was associated with an inflated expectancy for positive events, which was strongest when individuals were processing socially-relevant or negative scenarios.

Keywords

Anxiety; Aging; Expectancy Bias; Positivity Effect

Anxiety is characterized by cognitive biases, such that anxious individuals pay particular attention to negative information and tend to interpret ambiguous information as threatening (e.g., Mathews & MacLeod, 2005). Additionally, anxious individuals typically hold negative expectations about the future (e.g., Beck & Clark, 1988; MacLeod, Tata, Kentish, & Jacobsen, 1997; Miranda & Mennin, 2007; Stöber, 2000). Yet, it is unclear what conditions or processes give rise to this anxiety-linked negative expectancy bias, and whether this bias is stable across the lifespan. Given evidence of enhanced emotion regulation skills in older adults (e.g., Carstensen & Mikels, 2005), it is possible that this bias may be attenuated as individuals age.

Contrary to the negative biases that characterize anxiety, aging is sometimes associated with a so-called “positivity effect,” such that, as people age, they tend to preferentially attend to and remember positive, relative to negative, information (see Charles, Mather, & Carstensen, 2003; Mather & Carstensen, 2003). This is in line with socioemotional selectivity theory (e.g., Carstensen, Isaacowitz, & Charles, 1999), which posits that the positive bias occurs because emotionally meaningful goals are prioritized by older adults. This is the first study (to our knowledge) to examine the age-linked positivity effect with respect to expectancy bias.

By evaluating the impact of age and anxiety on expectancy biases in a large sample with a broad age range across the adult lifespan, the current study integrates the anxiety-linked

negative bias and age-linked positive bias literatures. It is hypothesized that anxiety will be associated with relatively more negative future expectancies, while aging will be associated with relatively more positive future expectancies. The specific nature of the relationship between the age and anxiety effects on expectancy may be interactive, such that increased age attenuates or reverses the anxiety-linked negative expectancy bias, or it may be that age and anxiety exert independent influences on expectancy bias.

A computerized procedure, the Expectancy Task (Cabeleira, Bucks, Teachman, & MacLeod, 2010), is used to examine what conditions or processes elicit anxiety- and age-linked expectancy biases. This task presents participants with scenarios describing negative, neutral, or positive events, which either concern physical wellbeing or social situations. For each scenario, participants rate the likelihood of negative, neutral, or positive possible future events occurring. The current study will reveal not only how emotional tone of the initial scenario influences future expectancies (providing hints at processes underlying the bias), but also how expectancies are influenced by anxiety and by age. A number of possibilities can be distinguished, each of which would result in a different pattern of results.

First, it is possible that anxiety and/or age may influence expectancy bias regardless of the valence of the initial scenario presented to participants. This would be indicated if individuals with higher levels of anxiety consistently judge future negative events to be more likely to occur, and/or if older individuals consistently judge future positive events to be more likely to occur, regardless of the emotional tone of the initial scenario. In this case, expectancy biases would reflect a pervasive inflation of the relative perceived likelihood of negative or positive future events. Thus, we refer to this as the Pervasive expectancy bias hypothesis.

Second, it is possible that anxiety and/or age may influence expectancy by biasing emotional extrapolation from the initial scenarios, such that future expectancies are more strongly affected by certain types of valenced information. For instance, for anxious individuals, who are hypervigilant for negative information (Eysenck, 1992; Williams, Watts, MacLeod, & Mathews, 1988), exposure to negatively valenced scenarios may inflate expectancy of future negative events to a greater degree than exposure to positively valenced scenarios inflates expectancy of future positive events. In contrast, given older adults' tendency for greater emotional stability compared to younger adults (Carstensen et al., 2010), it is possible that exposure to positively valenced scenarios may inflate expectancy of future positive events in older adults to a greater degree than exposure to negative scenarios inflates expectancy for future negative events. We refer to this as the Extrapolation expectancy bias hypothesis.

A third possibility is that age and/or anxiety may influence expectancy bias most clearly when initial scenarios are ambiguous with respect to valence (i.e., scenarios are neither clearly positive nor negative), suggesting a biased interpretation process. There is substantial research documenting negative interpretations of ambiguous information among anxious individuals (MacLeod & Bucks, 2011; MacLeod, Campbell, Rutherford, & Wilson, 2004), so it may be that anxiety will influence expectancy bias to be more negative most strongly when initial scenarios are emotionally ambiguous. Analogously, though it is an under-researched area, there is some indication that older adults impose positively biased interpretations on ambiguous social information (Werntz, Green, & Teachman, 2011). Hence, age may influence expectancy bias to be more positive most strongly when initial scenarios are emotionally ambiguous. We refer to this as the Interpretation expectancy bias hypothesis.

Overall, the current study tests whether and how two individual difference factors, age and anxiety, affect the relative tendency to expect positive and negative future events.

Additionally, the study uses the recently developed Expectancy Task to test differing predictions concerning the particular conditions or processes that give rise to expectancy bias: a pervasive pattern of biased expectation, a pattern of biased emotional extrapolation, or a pattern of biased emotional interpretation.

Methods

Participants

Participants included 1109 volunteers¹ from the United States (67% female) recruited through one of three methods: 42.3% through Amazon's Mechanical Turk (<http://www.mturk.com>), a website at which visitors can complete tasks that interest them for some small compensation (25 cents for the current study), 57.2% through Project Implicit (<http://implicit.harvard.edu/>), a website at which visitors can register to be randomly assigned to studies and learn about implicit biases, and 0.5% through an online advertisement. Given that older adults are less well-represented among mTurk and Project Implicit volunteers than younger adults, older volunteers at both sites were more likely than younger volunteers to be assigned to this study than to other studies running concurrently.

Participant ages ranged from 18 to 82, with a mean of 41 ($SD=16$). Ethnicity distributions were 7.5% Hispanic or Latino, 83% not Hispanic or Latino, and 9.6% unknown or not reported. In order of representation, 78% of participants reported their race as White, 9.8% as Black or African American, 5.8% as more than one race, 2.9% as other, unknown (or unreported), and 1% or less for each of the following: American Indian/Alaska Native, East Asian, South Asian, and Native Hawaiian or other Pacific Islander. Education level was reported as: 1.6% as less than graduating high school, 8.3% as graduating high school, 41% as some college, but not a bachelor's degree, 27% as bachelor's degree or some graduate school, 21.5% as a graduate degree, and 0.6% did not report their education.

Materials²

Anxiety Measure—Anxiety symptoms were assessed using the Anxiety Subscale from the Depression, Anxiety and Stress Scale – Short Form (DASS-Anxiety; Lovibond & Lovibond, 1995). On this 7-item questionnaire, participants report how much physiological indicators of anxiety, and apprehension related to losing control or panicking, applied to them in the past week using a scale from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). The DASS-Anxiety was selected due to its good psychometric properties (Antony, Bieling, Cox, Enns, & Swinson, 1998), including among older adults (Gloster et al., 2008), and because it is in the public domain (so it is possible to administer over the Internet free of charge). Additionally, the anxiety subscale is highly correlated with numerous other measures of anxiety (Brown, Chorpita, Korotitsch, & Barlow, 1997; Crawford & Henry, 2003), including the Beck Anxiety Inventory (Beck & Steer, 1990). In the current sample, Cronbach's alpha was .78, suggesting good reliability.

Expectancy Bias—Participants' relative tendency to expect future positive and negative events was assessed using the Expectancy Task (Cabeleira et al., 2010). The Expectancy

¹1510 participants gave informed consent. We excluded those under 18 ($n=4$), and those who did not report United States citizenship ($n=28$). Of the remaining 1478, 75% completed both the Expectancy Task and the DASS-Anxiety. Note that 82 participants who completed the Expectancy Task dropped out before completing the subsequent DASS-Anxiety scale. Logistic regression analysis indicated that this attrition was not related to participants' Expectancy Task condition or performance (all $p>.01$). Chi-square tests revealed that the Expectancy Task and the DASS-Anxiety "completers" and "non-completers" were similar in terms of gender, ethnicity, race, and education (all $p>.01$). However, the non-completers (Mean age=44.03, $SD=16.14$) were significantly older than the completers (Mean age=41.20, $SD=16.23$; $t(1476)=2.90$, $p=.004$, $d=.17$).

²This study is part of a larger project examining emotion across the lifespan. For a full list of materials, contact the second author.

task involves two parts: a “Scenario Presentation Component” presents scenarios that vary in the extent to which positive, ambiguous, or negative events occur, and an “Expectancy Rating component” then asks participants to judge the likelihood of subsequent positive, negative or neutral future events occurring.

Scenario Presentation Component: Participants were asked to read and imagine themselves in eight scenarios; one block of four scenarios was relevant to social concerns and the other block of four to physical concerns. Whether the social or physical scenarios appeared first was randomized. An effort was made to sample a variety of situations that varied in their likely aging-relevance. Each scenario consisted of six items: a Title, Orienting Sentence, and four events (see Appendix for examples). The Title remained in the center of the screen throughout the scenario, while all other items appeared directly below the Title and were replaced with asterisks once the participant signaled by a mouse click that she or he had read the item. All orienting sentences were different, with some having slightly positive or negative valences, but none being overtly positive or negative. Participants were randomly assigned to 1 of 4 valence conditions, which varied the type of information presented to participants for the portion of the scenario detailing the four events: Positive Valence (two positive and two neutral events), Negative Valence (two negative and two neutral events), Ambiguous/Conflicting Valence (two positive and two negative events), or Ambiguous/No Valence (four presentations of “+++and something else happens+++”; i.e., no specific events presented). In the Ambiguous/No Valence condition, participants were instructed to use their imagination to fill in what might have occurred. This condition was included so we could examine expectancy bias when no information (neither valenced nor neutral) was presented. Neutral events were included to control for the number of events presented in each condition (i.e., each scenario included four events, and each valence was always represented by two events). The order of events was counterbalanced between subjects (e.g., either two neutral events followed by two positive events, or two positive events followed by two neutral events).

Expectancy Rating Component: Following each block of four scenarios, participants were asked to rate what was likely to happen next in the scenarios. For each scenario, participants were again shown the Title and Orienting Sentence, followed by four rows of asterisks that matched the length and screen-positions of the text of that scenario’s previously presented four events. This was done to cue recall of the events. Next, three new events (one positive, one negative, and one neutral, occurring in random order) appeared on the screen, one at a time. Participants were asked to read each event, and judge the likelihood of it occurring next in the scenario. Participants were told to rate each new event on a scale of 1 (“Very UNLIKELY to happen next”) to 4 (“Very LIKELY to happen next”).

Scenario Event Sets: Each of the scenarios used in the Stimulus Presentation and Expectancy Rating Components was derived from its own Scenario Event Set. Each Scenario Event Set included 11 items: a Title, Orienting Sentence, and nine possible events (three positive, three negative, and three neutral; see Appendix). Half of the Scenario Event Sets related to social concerns and half related to physical concerns. These two domains were selected to test if any association between aging and positive expectations is diminished in the context of scenarios related to physical concerns, given research suggesting older adults’ more positive bias is reduced in the context of aging-relevant threats, such as risks to physical health (Teachman & Gordon, 2009). The four events presented in each scenario during the Scenario Presentation were randomly selected from a given Scenario Event Set in accordance with the requirements of the valence condition to which a participant was assigned. For example, a participant in the Positive Valence condition would see two positive events drawn randomly from the pool of three positive

events in that Scenario Event Set and two neutral events drawn from the pool of three neutral events. Then, during the Expectancy Rating Component, the one remaining positive event and one remaining neutral event from that Scenario Event Set would be presented, as well as one negative event drawn randomly from the Scenario Event Set's pool of three negative events. Each Scenario Event Set could thus be used for any valence condition.

All Scenario Event Sets were previously validated by an independent sample of 16 participants. All scenarios were pre-judged to be particularly relevant to either social or physical concerns, and all events were pre-judged to be consistent with the intended valence (e.g., negative, positive, or neutral). Finally, the positive and negative events were pre-rated to have equivalent intensities. See Cabeleira (unpublished honors' thesis) for more details on the validation process. The Expectancy task was originally developed in Australia. For the current study, minor modifications were made so that the wording was more typical of American English (e.g., "queuing" was changed to "waiting in line").

Procedure

The consent form indicated that the study "examines how people decide what happens next after reading brief outlines of stories." Following consent, participants completed a demographics questionnaire. Next, they were given instructions on how to complete the Expectancy Task and randomly assigned to one of the four valence conditions. Following the Expectancy Task, all participants completed the DASS-Anxiety and were debriefed.

Results

Given the large sample size, alpha was set to .01 for all analyses to reduce the risk of false positive results.

Descriptive Statistics

Random assignment to valence condition was effective in that participants did not differ at the .01 level across the four valence conditions in terms of sex, race, ethnicity, age, or anxiety. DASS-Anxiety scores ranged from 0 to 38, with a mean of 6.48 ($SD=6.75$). About one fifth (19.4%) of participants scored a 10 or higher, suggesting moderate to extremely severe anxiety.

Evidence for Expectancy Effects

To score the Expectancy Task, average likelihood ratings from the Expectancy Rating Component were computed for positive events and negative events.³ Given our interest in evaluating individuals' tendency to expect future positive, relative to negative, events, an expectancy bias index was created by subtracting average perceived likelihood rating for negative events from average perceived likelihood ratings for positive events.⁴ A score greater than zero indicates a tendency to rate positive events as more likely to occur than negative events (i.e., a positive expectancy bias), while a negative score indicates a negative expectancy bias. We conducted a repeated measures Analysis of Variance (ANOVA) with one within subjects factor (Scenario Domain: Physical, Social), one between subjects factor (Scenario Valence: Positive, Negative, Ambiguous/Conflicting Valence, Ambiguous/No Valence), and two continuous moderators (Age and Anxiety). To reduce positive skew,

³A series of independent sample *t*-tests revealed that the order of events presented in the Scenario Presentation Component of the task (e.g., positive events followed by neutral events vs. neutral events followed by positive events) did not influence the ratings made in the Expectancy Rating Component of the task (all $p>.01$). Thus, order of events was not used as a factor in the analyses presented.

⁴Given that participants were asked to rate each event in the rating component independently of other events, and because our primary questions concerned whether people expected relatively 'good' or 'bad' things to happen next, we decided to exclude neutral ratings from our analyses because they complicated interpretation of the primary comparison.

anxiety scores were base 10 log-transformed (after first adding .5 to every score, to eliminate scores of zero). In order to examine interactions involving continuous moderators, the log-transformed anxiety scores were standardized and age was mean-centered and scaled so that each unit represented five years. This ANOVA permits evaluation of the main and interactive effects of scenario valence, age (to test for the expected positive bias among older adults), anxiety (to test for the expected negative expectancy bias among anxious individuals), and scenario domain. Note, there was a small negative correlation between age and DASS-Anxiety scores, $r(1107) = -.26$, consistent with prior literature (see Teachman, 2006). This modest relationship is not likely to preclude the ability to observe an interaction between age and anxiety on the expectancy task should it exist.

If the Pervasive expectancy bias hypothesis is supported, results will indicate main effects of age and/or anxiety, and no interaction with the valence condition. If the Extrapolation expectancy bias hypothesis is supported, results will reveal interactions between age and valence condition, and/or anxiety and valence condition (e.g., that anxious individuals have more negative expectations than non-anxious individuals particularly following the presentation of negative information, relative to following positive information). Finally, if the Interpretation expectancy bias hypothesis is supported, results will indicate interactions between age and valence condition, and/or anxiety and valence condition, such that anxiety or age expectancy bias effects are more pronounced following the presentation of ambiguous information (i.e., following the Ambiguous/Conflicting Valence and Ambiguous/No Valence conditions).

The expected main effect of scenario valence was obtained ($F(3,1093) = 85.63$, $p < .001$, $\eta_p^2 = .19$), confirming that participants used the valence of scenarios to guide expectations concerning the relative probability of future positive and negative events. See Table 1 for expectancy bias across scenario valence conditions. Follow-up tests showed that the positive expectancy bias varied in the anticipated manner as a function of the amount of positive versus negative information presented: the mean expectancy bias index score was highest in the Positive Scenario condition, followed by the Ambiguous/No Valence Scenario condition, then the Ambiguous/Conflicting Valence Scenario condition, and finally, the Negative Scenario condition (all conditions differed at $p < .01$). This supports the validity of the Expectancy Task.

The main effects of anxiety ($F(1,1093) = 22.65$, $p < .001$, $\eta_p^2 = .02$) and age ($F(1,1093) = 12.68$, $p < .001$, $\eta_p^2 = .01$) were also as hypothesized. Pearson product-moment correlations confirmed that greater anxiety was associated with a less positive expectancy bias index score ($r(1107) = -.16$, $p < .001$), while older age was associated with a more positive expectancy bias index score ($r(1107) = .12$, $p < .001$). Average expectancy bias index scores were above zero, suggesting a general tendency to display positive expectancy bias, but these positive scores were lower for more anxious participants, and higher for older participants.

A main effect of scenario domain was obtained, such that participants displayed more positive expectancy bias index scores for social scenarios relative to physical scenarios ($F(1,1093) = 152.20$, $p < .001$, $\eta_p^2 = .12$). There was no significant scenario domain by anxiety interaction ($F(1,1093) = .49$, $p = .482$, $\eta_p^2 < .001$), but a scenario domain by age interaction was found ($F(1,1093) = 16.07$, $p < .001$, $\eta_p^2 = .01$). Follow-up tests indicated a small, but significant positive correlation between age and positive expectancy bias for social scenarios ($r(1107) = .18$, $p < .001$), but not for physical scenarios ($r(1107) = .04$, $p = .192$). Thus, results suggested that the tendency for increased age to be associated with a more positive expectancy bias was less evident when participants were processing information concerning physical well-being, than when processing information concerning social situations.

The only other effect to reach significance was an interaction between age and scenario valence ($F(3,1093)=10.39, p<.001, \eta_p^2=.03$). See Figures 1a and 1b. To understand this interaction, correlations between age and expectancy bias index scores (collapsed across scenario domain) were computed within each of the four scenario valence conditions. This revealed a significant positive relationship between age and positive expectancy bias in the negative scenario valence condition ($r(325)=.32, p<.001$), but not in the other scenario valence conditions (all $r \leq .16, p>.01$). Thus, age influenced expectancy bias to be more positive most strongly when participants were processing information about currently negative scenarios.

The anxiety by scenario valence interaction was not significant ($F(3,1093)=1.11, p=.343, \eta_p^2=.003$), indicating that the tendency for elevated anxiety to reduce positive expectancy bias did not differ as function of the scenario valence. No other main effects or interactions were significant, including the age by anxiety interaction (all $p>.01$). This indicates that age and anxiety each exerted an independent impact, rather than an interactive impact, on expectancy bias.

Finally, to insure that the effect of age on expectancy was not due to anxiety, a hierarchical regression was conducted with anxiety entered in the first step of the model, and age added in the second step. As expected, age was a significant predictor of expectancy bias, even when entered into the regression after DASS-Anxiety scores (when both variables are entered into the regression: DASS-Anxiety $\beta=-.14, p<.001$, Age $\beta=.09, p=.004$). Additionally, the pattern of results did not change when controlling for education level, race, or sex.

Discussion

This study examined three theoretically-derived, differing predictions about conditions under which expectancy bias can occur, and how age and anxiety influence this bias. Results indicated that anxiety is characterized by a small effect for a Pervasive expectancy bias, such that anxious individuals have a reduced expectancy for positive events, regardless of the valence of current events. In contrast, age is associated with a small effect for an Extrapolation expectancy bias, such that older individuals have a heightened expectancy for positive events, which is strongest when processing socially-relevant or negative scenarios.

The presence of an anxiety-linked expectancy bias confirms previous evidence of such an effect (e.g., MacLeod et al., 1997; Miranda & Mennin, 2007; Stöber, 2000), and is in line with other data from our research group, which suggest that both high trait anxious and high anxiety sensitive individuals have a reduced expectancy for positive events compared to low anxious individuals (Steinman, Cabeleira et al., 2012). The present study adds to previous literature by showing that this expectancy bias is pervasive in nature (occurs regardless of emotional valence of present events) and occurs across the adult lifespan.

The anxiety-linked Pervasive expectancy bias found in the current study suggests that anxious individuals do not merely catastrophize about minor negative events, but expect relatively less positive future events regardless of the valence of current events. This is in line with the idea that anxious individuals may have a reduced ability to learn from, or seem to disqualify, positive feedback (e.g., Beck, 1976; Heimberg & Becker, 2002). Given these results, it may be useful for clinicians to focus on increasing clients' positive expectancies and decreasing their negative expectancies across a wide variety of situations, rather than only in the context of negative events. In the future, it will be important to evaluate if a less positive expectancy bias predicts the development and maintenance of dysfunctional anxiety. Steinman, Cabeleira et al. (2012) found that expectancy bias scores are related to

state anxiety experienced during a stressor, highlighting the possible clinical relevance of expectancy bias.

As hypothesized, we found a small, positive expectancy bias associated with age, such that increased age was associated with less emotional extrapolation from negative events. In other words, younger participants showed the expected emotional extrapolation effects for both positive and negative scenarios, but older adults showed a reduction in this effect for negative (but not positive) scenarios, perhaps indicating less sensitivity to, or influence from, negative information. The presence of an age-related increase in positive expectancy bias is consistent with the more general finding that increased age is characterized by positivity effects (e.g., Charles et al., 2003). This is the first evidence that such age-related positive effects can be observed in the domain of expectancy. It also seems compatible with research suggesting that aging is associated with increased emotional stability (e.g., Carstensen et al., 2010). Older (versus younger) adults' greater tendency to expect positive events after reading about negative events may serve a homeostatic function that sustains emotional equilibrium. It may also reflect older adults' reduced tendency to attend to negative, relative to positive, events (Mather & Carstensen, 2003). Of note, the present results suggest that the relationship between age and positive expectancy bias is less robust in the context of physical concerns. This is in line with research suggesting that older adults' more positive bias is reduced in the context of aging-relevant threats, such as risks to physical health (Teachman & Gordon, 2009). Future research can examine other aging-relevant domains, and seek to determine whether this positive expectancy bias predicts effective emotion regulation.

The finding that age and anxiety have an additive (rather than interactive) effect on expectancy bias is a novel finding. This suggests that increased age exerts an independent influence on expectancy bias that is superimposed upon the impact of anxiety on expectancy bias. Another way to think about the findings is that the anxiety-linked expectancy bias is essentially the same regardless of the person's age. While it is not possible with these data to determine why an age by anxiety interaction was not present, one speculative explanation concerns differences in the robustness of the anxiety versus age effects. The anxiety effect is larger in magnitude than the age effect, and the anxiety effect is pervasive (i.e., evident across a number of conditions). In contrast, the effect of age is more circumscribed and may not always be operating, given that it was associated with less valenced extrapolation from negative events only, rather than a more positive bias overall. Therefore, there may have been insufficient opportunity for an opposing age effect to influence the pervasive, anxiety-linked expectancy bias.

Our study has a few limitations. First, because this study was publicly accessible over the Internet, the sample was not representative of any definable population. However, it was larger and more diverse than typical samples of college students and other single-site samples that characterize most psychological research. Second, only one measure of anxiety was included. Future studies should include additional measures to establish convergent evidence across methodologies. Finally, while we believe the effects described in this paper are meaningful, they were small effects. Given that age is a broad variable that involves changes in several heterogeneous domains (e.g., biological, emotional, and cognitive functioning); it is unsurprising that effects for age are small.

Despite these limitations, this study demonstrates that anxiety and aging both moderate expectancy bias, and illuminates the conditions and processes that give rise to these effects. The finding of a pervasive, anxiety-linked less positive expectancy bias, coupled with an age-linked reduction in the tendency to extrapolate that negative future events are likely to

follow negative current situations, provides insight into anxiety-linked expectations across the adult lifespan.

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Appendix

Example of a Scenario Event Set:

Title: Going to the Doctor

Orienting Sentence: You go to the doctor's rooms

Negative: You find out you need a biopsy done

Negative: The doctor prescribes you medication that can have bad side effects

Negative: The doctor warns you all your family is at risk of diabetes

Positive: The doctor says your heart sounds very healthy

Positive: The doctor informs you that you are at a healthy weight

Positive: The doctor says she is happy with your exercise regime

Neutral: A bird flies past the window

Neutral: The telephone rings

Neutral: You notice a car drive by outside

Sample scenarios of different valence types based on above Scenario Event Set:

1. Positive Valence

Title: Going to the Doctor

Orienting Sentence: You go to the doctor's rooms

Positive: The doctor informs you that you are at a healthy weight

Positive: The doctor says she is happy with your exercise regime

Neutral: A bird flies past the window

Neutral: You notice a car drive by outside

2. Negative Valence

Title: Going to the Doctor

Orienting Sentence: You go to the doctor's rooms

Negative: You find out you need a biopsy done

Negative: The doctor prescribes you medication that can have bad side effects

Neutral: A bird flies past the window

Neutral: You notice a car drive by outside

3. Ambiguous/Conflicting Valence

Title: Going to the Doctor

Orienting Sentence: You go to the doctor's rooms

Negative: You find out you need a biopsy done

Negative: The doctor prescribes you medication that can have bad side effects

Positive: The doctor informs you that you are at a healthy weight

Positive: The doctor says she is happy with your exercise regime

4. Ambiguous/No Valence

Title: Going to the Doctor

Orienting Sentence: You go to the doctor's rooms

+++and something else happens+++

+++and something else happens+++

+++and something else happens+++

+++and something else happens+++

Example of an Expectancy Rating component

Title: Going to the Doctor

Orienting Sentence: You go to the doctor's rooms

How likely is it that...

Negative: The doctor warns you all your family is at risk of diabetes

Positive: The doctor says your heart sounds very healthy

Neutral: The telephone rings

Figure 1.

a and b. The relationship between expectancy bias and age across scenario valence conditions.

Note. Pos=Positive Valence, Amb/N=Ambiguous/No Valence, Amb/C=Ambiguous/Conflicting Valence, Neg=Negative Valence. Age was mean centered and scaled by five, so each unit represents five years. Expectancy bias was scored by subtracting average ratings of negative events from average ratings of positive events. Thus, a score greater than zero indicates a tendency to rate positive events as more likely to occur than negative events (i.e., a positive expectancy bias), while a negative score indicates a negative expectancy bias.

Table 1

Expectancy bias across scenario valence conditions.

	Negative Valence (n=327)	Positive Valence (n=331)	Ambiguous/Conflicting Valence (n=278)	Ambiguous/No Valence (n=173)
Physical Expectancy	-.13 (1.01)	.83 (.86)	.19 (.95)	.47 (.86)
Social Expectancy	.15 (1.11)	1.13 (.81)	.63 (.91)	1.00 (.78)
Average Expectancy	.01 (.93)	.98 (.70)	.41 (.76)	.74 (.65)

Note. Expectancy bias was scored by subtracting average ratings of negative events from average ratings of positive events. Thus, a score greater than zero indicates a tendency to rate positive events as more likely to occur than negative events (i.e., a positive expectancy bias), while a negative score indicates a negative expectancy bias.