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Age Differences in Affective and Cardiovascular Responses to a Negative Social Interaction: The Role of Goals, Appraisals, and Emotion Regulation

Gloria Luong and
Max Planck Research Group "Affect Across the Lifespan," Max Planck Institute for Human Development

Susan T. Charles
Department of Psychology and Social Behavior, University of California, Irvine

Abstract

Older adults often report less affective reactivity to interpersonal tensions than younger individuals, but few studies have directly investigated mechanisms explaining this effect. The current study examined whether older adults' differential endorsement of goals, appraisals, and emotion regulation strategies (i.e., conflict avoidance/de-escalation, self-distraction) during a controlled negative social interaction may explain age differences in affective and cardiovascular responses to the conflict discussion. Participants (*N*=159; 80 younger adults, 79 older adults) discussed hypothetical dilemmas with disagreeable confederates. Throughout the laboratory session, participants' subjective emotional experience, blood pressure, and pulse rate were assessed. Older adults generally exhibited less reactivity (negative affect reactivity, diastolic blood pressure reactivity, and pulse rate reactivity) to the task, and more pronounced positive and negative affect recovery following the task, than did younger adults. Older adults appraised the task as more enjoyable and the confederate as more likeable, and more strongly endorsed goals to perform well on the task, which mediated age differences in negative affect reactivity, pulse rate reactivity, and positive affect recovery (i.e., increases in post-task positive affect), respectively. In addition, younger adults showed increased negative affect reactivity with greater use of self-distraction, whereas older adults did not. Together, findings suggest that older adults respond less negatively to unpleasant social interactions than younger adults, and these responses are explained in part by older adults' pursuit of different motivational goals, less threatening appraisals of the social interaction, and more effective use of self-distraction, compared to younger adults.

Keywords

interpersonal conflict; stress and coping; reactivity; recovery; aging; motivation

A growing number of studies find that older age is related to less affective reactivity to social conflicts in adulthood (see review by Luong, Charles, & Fingerman, 2011). These

Correspondence concerning this article should be addressed to Gloria Luong, Max Planck Research Group "Affect Across the Lifespan," Max Planck Institute for Human Development, Lentzeallee 94, 14195, Berlin, Germany. Luong@mpib-berlin.mpg.de.

findings are often explained by greater prioritization of socioemotional goals (Carstensen, Fung, & Charles, 2003) and enhanced emotion regulation abilities with age (e.g., Blanchard-Fields, 2007). No studies to our knowledge, however, have been able to rule out an important alternative explanation; namely, that social partners may play a role in dampening older adults' affective responses to the conflict. Older age is often confounded with longer relationship duration with social partners, which may influence the dynamics of conflict discussions (Luong et al., 2011). Additionally, social partners are less likely to use confrontation strategies with older adults as compared to younger adults (see review by Fingerman & Charles, 2010), so reduced affective reactivity may stem from social partners' actions, and not necessarily from older adults' own socioemotional goals and competencies. To control for these alternative explanations and disentangle the mechanisms underlying age differences in responses to social conflict, the current study investigates: A) differences between younger and older adults' affective and cardiovascular responses to a discussion with an equally disagreeable confederate; and B) the extent to which goals, appraisals, and emotion regulatory behaviors are associated with these age differences.

Age Differences in Affective and Cardiovascular Responses to Negative Social Interactions

Negative social interactions, such as arguments and disagreements, are among the most frequent and potent types of daily stressors people experience and are related to poorer physical and mental health (e.g., Almeida, 2005). Older adults, however, report less negative affect in response to social conflict than younger individuals (Birditt, Fingerman, & Almeida, 2005; but see Hay & Diehl, 2010). For instance, when recalling a past interpersonal tension (Birditt & Fingerman, 2003) or imagining that people are gossiping about them (Charles & Carstensen, 2008), older adults report less anger than younger adults. Studies of marital interactions show similar findings, with older couples reporting less negative affect reactivity to a conflict discussion than middle-aged couples (Smith, Berg, et al., 2009).

Research suggests that older adults may also exhibit reductions in cardiovascular reactivity to interpersonal tensions. Older age is associated with less heart rate reactivity but greater systolic blood pressure reactivity to general laboratory stressors (see review by Uchino, Birmingham, & Berg, 2010). This typical age-related increase in blood pressure reactivity, however, does not occur when comparing middle-aged and older married couples engaged in a disagreement (Smith, Uchino, et al., 2009). Thus, age-related increases in blood pressure reactivity appear to be attenuated in situations of social conflict, consistent with the literature on reduced negative affect reactivity to social conflict.

Explanations for Age Differences in Responses to Negative Social Interactions

Researchers posit that age differences in affective and cardiovascular responses to social conflict may by explained by socioemotional goals, appraisals, and emotion regulatory behaviors (including conflict avoidance/de-escalation and self-distraction).

Goals and Appraisals

Socioemotional selectivity theory posits that as people grow older and their temporal horizons diminish, they increasingly prioritize emotion-related goals (Carstensen et al., 2003). To this end, older adults place a greater emphasis on emotion regulation and social harmony goals and engage in strategies that result in more positive and less negative social experiences (see review by Charles & Carstensen, 2010). For example, in one study where people described a prior negative social exchange, older adults who reported that their primary goal was to regulate their emotions or maintain social harmony reported lower levels of distress and a shorter duration of negative affect following the conflict (i.e., more pronounced negative affect recovery) compared to older adults who endorsed goals to change their partner (Sorkin & Rook, 2006). Emotion-related goals are also used to explain why older adults appraise negative social interactions as less stressful (Birditt et al., 2005) or more positive (Smith, Berg, et al., 2009) than do younger individuals. These appraisals, in turn, are posited to enhance older adults' emotional well-being.

Additionally, older adults' greater focus on emotion-related goals may be related to their desire to perform well in the study. Previous studies have shown that older adults are more motivated to perform well on laboratory tasks compared to younger adults (e.g., Bluck, Levine, & Laulhere, 1999) and that task performance goals are related to positive emotions (Pekrun, Elliot, & Maier, 2006). Thus, laboratory settings may elicit more superordinate goals for older adults (e.g., performing well on a task to achieve high levels of emotional well-being), which may help them see the positive aspects of even unpleasant tasks in this setting. As a result, such goals may buffer older adults from the detrimental effects of negative social interactions in a laboratory context. Although all of these motivational goals and appraisals are assumed to explain age differences in affective and cardiovascular reactivity to social conflict, few studies have directly tested these mediation effects.

Emotion Regulatory Behaviors

Consistent with the prioritization of emotion-related goals, older adults more often engage in conflict avoidance strategies such as avoiding an argument, de-escalating the conflict, and letting the situation pass to down-regulate negative affective states when faced with interpersonal conflict than younger adults (Birditt & Fingerman, 2003; Blanchard-Fields, 2007; Holley, Haase, & Levenson, 2013). In addition, when older adults opt to avoid or withdraw from a conflict, they experience less daily negative affect reactivity compared to younger individuals using the same strategies (Birditt, 2013; Charles, Piazza, Luong, & Almeida, 2009). Older adults are also more likely to direct their attention away from negative stimuli than do younger adults (Reed & Carstensen, 2012), which is hypothesized to reduce negative affect reactivity. The current study distinguishes between and examines both: A) age differences in the frequency of emotion regulation strategies in explaining affective outcomes and B) age differences in the effectiveness of these strategies in dampening affective and cardiovascular responses.

Are social interactions simply less negative for older adults?

The literature suggests that older age is related to goals, appraisals, and emotion regulatory behaviors that reduce affective and cardiovascular reactivity to conflict, but previous studies

cannot rule out a simpler explanation: older adults are exposed to less negative social situations that are younger adults. Socioemotional selectivity theory posits that older adults interact with fewer peripheral social partners and a greater proportion of well-known, emotionally close social partners, and that they report more positive emotional experiences as a result (Carstensen et al., 2003; Charles & Piazza, 2007). Furthermore, social partners tend to treat older adults more kindly, forgive them more easily, and avoid conflict with them (see review by Fingerman & Charles, 2010). Thus, by controlling for the relationship dynamics with the social partner (e.g., emotional closeness, relationship duration, level of negativity of the social interaction), we can rule out the possibility that age differences are solely due to the fact that older adults' social conflicts are less caustic than those experienced by younger adults. Moreover, if this age effect remains after controlling for the negativity of the social interaction, it will be important to understand whether goals, appraisals, and emotion regulatory behaviors employed during the conflict explain age differences in affective and cardiovascular responses.

The Current Study

Current studies examining age differences in response to negative social exchanges provide a better understanding of affective responses to conflict with existing social partners, but we cannot definitively conclude that age differences in affective and cardiovascular responses to social conflict are not due to factors related to these particular relationships. The current study addresses this limitation by controlling for key aspects of the social conflict across age groups: the nature and duration of the relationship with the social partner (i.e., stranger) and the negativity of the social interaction. In doing so, we tested whether older adults show attenuated affective and cardiovascular responses compared to younger adults interacting with an equally negative partner (i.e., a disagreeable confederate).

The current study also examines age differences in affective and cardiovascular responses in greater depth than many previous studies. For example, past studies have primarily focused only on negative affect responses. The current study includes both negative and positive affect responses to an unpleasant social interaction. Additionally, most studies have only investigated reactivity processes (i.e., changes in affect from a baseline period to the task/conflict period). Because recovery is an important indicator of one's ability to rebound after the stressor has occurred, the current study examines age differences in both positive and negative affect recovery (i.e., affective experiences following the negative social interaction, controlling for baseline and task affect). It is also important to corroborate subjective emotional reports with objective assessments of cardiovascular reactivity (i.e., systolic and diastolic blood pressure, pulse rate). By examining each of these facets (i.e., positive vs. negative affect, reactivity vs. recovery, and subjective emotional reports vs. cardiovascular responses), our study provides a more comprehensive understanding of age differences in emotional response profiles.

The current study also moves beyond simply describing age differences in affective and cardiovascular responses to conflict and attempts to elucidate possible explanations for these effects. Given the same stressor, individuals may prioritize different goals, appraise the situation in unique ways, and choose myriad behavioral responses. The current study

therefore controls for the negativity of the situation (by using confederates to equate the level of negativity of the social interaction across age groups) while assessing the role of a wide array of goals, appraisals, and emotion regulatory strategies to test whether they mediate age differences in affective and cardiovascular responses to social conflict. To our knowledge, no study has taken this approach.

Research questions and hypotheses

We hypothesize that older adults will report less negative affect reactivity (i.e., smaller increases in negative affect from baseline to the task period) and smaller reductions in positive affect in response to the controlled negative social interaction compared to younger adults. We predict that age differences in cardiovascular reactivity will be attenuated such that older adults will exhibit equal to lower levels of blood pressure and pulse rate reactivity relative to younger adults. We will explore whether older adults show greater negative and positive affect recovery (i.e., lower post-task negative affect and greater post-task positive affect, controlling for baseline and task affect, respectively) following the negative social interaction than younger adults.

In addition to testing whether age differences in affective and cardiovascular responses would persist under controlled conditions, another aim of the study was to disentangle the mechanisms explaining these effects. We predicted that age differences in the endorsement of goals (related to emotion regulation, maintaining social harmony, changing one's partner (as a lack of social harmony), and task performance), appraisals (related to the task and confederate), and emotion regulation strategies (avoidance and de-escalation of conflict, self-distraction) partially explain age differences in affective and cardiovascular responses. We also hypothesized that older adults use emotion regulation strategies more effectively than younger adults to modulate their affective and cardiovascular responses to the task.

Method

Participants

To participate in the current study, individuals had to be between 18-30 years old (younger adult) or at least 60 years old (older adult), and identify as European American or Chinese American. Younger adults were recruited through the University of California, Irvine human subjects pool and received course extra credit for their participation. Older adults were recruited via flyers posted in the community, advertisements in local magazines and newspapers, and online postings (e.g., Craigslist) and were compensated $50.00 for their participation.

A total of 181 participants were originally recruited to the study, but 22 were excluded from the analyses because they suspected that the confederate was part of the study. The final sample included 159 participants stratified by age group [80 younger adults (18-28 years old; M = 20.23, SD = 1.79); 79 older adults (60-88 years old; M = 70.01, SD = 7.75)], gender (79 females), and ethnicity (79 European Americans, 80 Chinese Americans). Younger adults were predominantly single and never married (91.1%) with 5.1% married or cohabiting with their partner and the rest declining to state their marital status. Most of the

older adults were married (58.2%), divorced (21.5%), or widowed (15.2%), with a minority of single and never married individuals (5.1%). All younger adults had at least some undergraduate education because they were recruited through the university. Half of the older adults reported having completed some college or a college degree (50.7%), followed by some graduate school or a graduate degree (41.8%), and a small number reported a junior high to high school degree (7.6%).

Measures

Chronic health conditions and cardiovascular medications—Participants reported (0 = *no*, 1 = *yes*) whether they had experienced or been treated for any of 33 different chronic pain or health conditions in the past 12 months, such as osteoporosis or migraine headaches, from an adapted checklist used in previous studies (Marmot & Fuhrer, 2004). The health conditions were summed to create a total score. Participants also listed all medications they were currently taking, and a variable was created to indicate whether they were taking any medication known to influence blood pressure and/or heart rate (0 = *no*, 1 = *yes*). One younger adult (1%) and 37 older adults (46.8%) endorsed taking medications that may influence cardiovascular functioning.

Goals—Goals during the problem-solving task were assessed based on an adapted measure by Sorkin and Rook (2006). Participants used a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) to rate their agreement regarding 4 goals: *emotion regulation goals* (2 items; e.g., “I wanted to keep myself from feeling upset while working on the task” Cronbach’s α = .83), *social harmony goals* (2 items; e.g., “I wanted to preserve goodwill with my partner” Cronbach’s α = .78), *goals to change the partner*, which were viewed as a lack of social harmony because it reflects the participants’ motivation to assert their opinions and expectations of behavior onto another person (2 items; e.g., “I wanted to get my partner to change his/her mind”; Cronbach’s α = .77), and *task performance goals* (2 items; e.g., “I wanted to complete the task to the best of my ability” Cronbach’s α = .86).

Appraisals of the task and confederate—Questions about appraisals of the task and confederate were created for the current study using a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Participants rated their level of agreement with statements about *task enjoyment* (2 items; e.g., “I enjoyed working on the task;” Cronbach’s α = .69); *task performance* (5 items about how well they felt they performed on the task; e.g., “I performed well on the task”; Cronbach’s α = .86); *task difficulty* (two items regarding how difficult the task was to complete (e.g., “The task was difficult for me;” Cronbach’s α = .78); *confederate likeability* (8 items; e.g., “I enjoyed working with this person;” Cronbach’s α = .91); and *confederate cooperativeness* (2 items; e.g., “This person was cooperative during the task;” Cronbach’s α = .75).

Self-reported emotion regulation and conflict avoidance strategies—A single item assessed the extent to which participants avoided conflict with the confederate during the task, “I avoided getting into an argument with my partner,” using a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Participants also filled out a modified version of the Brief COPE (Carver, 1997) regarding the extent to which they engaged in two strategies

related to conflict avoidance and emotion regulation. Each strategy was assessed on a 4-point scale from 1 (*I did not do this at all*) to 4 (*I did this often*) with 2 items and included: *behavioral disengagement* (e.g., "I gave up trying to deal with the situation"; Cronbach's α = .66) and *self-distraction* (e.g., "I did something to think about the situation less often"; Cronbach's α = .68).

Behaviors related to avoidance or de-escalation of conflict—Two raters blind to the hypotheses coded participants' non-overlapping behaviors related to avoidance or de-escalation of conflict during the videotaped social interaction. Both raters coded 38% of the videotapes to establish reliability. Discrepancies were resolved via discussion with the first author; the remaining videos were coded separately by the raters. *Moving on to a new scenario* referred to the number times the participants initiated moving on to another discussion topic after the confederate made a negative statement (e.g., by telling the confederate to discuss something else or by reading the next hypothetical scenario), a conflict avoidance strategy used at least once by 90% of younger adults and 72.2% of older adults (inter-rater reliability as measured by the intra-class correlation (ICC) was .81). *Reducing negativity* referred to the number of statements the participant made to de-escalate conflict after any negative statement by the confederate, such as complimenting the confederate, agreeing with the confederate's answers, or compromising (used at least once by 90% of younger adults and 84.8% of older adults; ICC = .74). *Humor* was a de-escalation strategy based on the number of times the participants made fun of the scenarios/their own answers or laughed when the confederate made a negative statement (used at least once by 70.0% of younger adults and 70.9% of older adults; ICC = .91).

Positive and negative affect—Participants rated the extent to which they experienced each of 8 positive emotional states (happiness, accomplishment, excitement, contentment, pride, amusement, joy, interest) and 11 negative emotional states (sadness, frustration, anger, embarrassment, guilt, fear, shame, anxiety/worry, irritation, disgust, boredom) on a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*)(adapted from Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). Outliers were Winsorized at the 90th percentile. Cronbach's α's for baseline, task, and post-task affect were .92, .91, and .93, respectively, for positive affect, and .90, .86, and .84, respectively, for negative affect.

Blood pressure and pulse rate—Blood pressure is the arterial pressure of circulating blood in millimeters of mercury (mmHg) and a function of both systolic (high pressure during heart contractions) and diastolic (low pressure between heart contractions) measurements. Pulse rate is the number of pulse beats per minute. Blood pressure (systolic and diastolic) and pulse rate were assessed every 3 minutes during the 6 minute baseline period and during the 20 minute task period. A cuff was placed over the brachial artery of the non-dominant arm using Dinamap hemodynamic monitoring equipment, and readings within each period (baseline and task) were averaged given the unreliability of single readings of these measures (Kamarck & Lovallo, 2003). Systolic and diastolic blood pressure and pulse rate reactivity were each calculated as the average assessments during the task controlling for the average assessments during the baseline period.

Procedure

Baseline—At the beginning of the 1.5 hour laboratory session, participants were told that they were in a problem-solving study to investigate what people would do in different types of hypothetical situations. They were informed that they would be videotaped while discussing their answers to hypothetical dilemmas and introduced to the other "research participant," who was actually a confederate. Participants and confederates were matched by age-group (younger vs. older adult), gender (male vs. female), and ethnicity (European American vs. Chinese American). Next, the participant and confederate were separated into private rooms where the participant filled out questionnaires assessing their current (baseline) positive and negative affect. The participant was then reunited in the same room with the confederate but was separated by a screen for the baseline cardiovascular assessment. During this six minute baseline period, both the participant and confederate had automated readings of their blood pressure and pulse rate taken every three minutes while they filled out demographics questionnaires. The video camera was turned on at this time to allow the participant to acclimate to being filmed.

"Problem-solving task."—After the baseline period, the screen was removed and the participant and confederate were given eight hypothetical moral and social dilemmas to discuss for 20 minutes while they were videotaped and had their blood pressure and pulse rate assessed at three-minute intervals. The experimenter told the participant and confederate to take turns, with the first person reading the first scenario aloud and stating his/her opinion, and then the other person stating his/her opinion. They would then alternate being either the first to read aloud and answer the scenario, or the second to state an opinion, for the remaining eight scenarios. The order was arranged so the participant always started by reading and answering the first scenario first. This procedure allowed the confederate to follow a detailed decision-tree script (see below).

Two of the hypothetical scenarios were adapted from commonly used moral dilemmas (Kohlberg, 1958; e.g., Scenario 1 regarding whether to steal an antidote that could save a family member's life) and the remaining scenarios were created by the authors for the current study (e.g., Scenario 2: A stranger accidently swaps her lottery ticket with you without realizing it; the one you hold turns out to be the winning ticket. Would you return the ticket?). Each scenario required people to make a binary decision to engage in an action or not (e.g., return vs. do not return the ticket) and to explain why they made that decision.

Confederates memorized a script which provided explicit criticisms for either response option for each scenario and a format where they disagreed on most of the scenarios. Confederates were trained to maintain an unfriendly and competitive demeanor toward the participant, using specific verbal statements (e.g., "I really don't see where you're coming from") and non-verbal gestures, such as frowning or shaking one's head in disagreement. They were trained not to smile, nod in agreement, or provide any supportive behaviors even if participants made attempts to act friendly or agree with them.

Post-task recovery period—After the task, the participant and confederate were immediately separated into private rooms. Participants then completed questionnaires

regarding their negative and positive affect, goals, and use of conflict avoidance/de-escalation and emotion regulation strategies during the task; their appraisals of the task and confederate; and other unrelated questionnaires (e.g., chronic health conditions, medications). At the end of the session (approximately 20-25 minutes later), participants reported their current negative and positive affect as an assessment of post-task recovery.

Debriefing—One week later, participants completed a telephone interview where they were asked questions about the purpose of the study to ascertain if they suspected that their partner was a confederate. Participants were then fully debriefed and compensated for their time.

Results

Preliminary Analyses

Older adults had more chronic health conditions than younger adults (older adults: $M = 3.14$, $SD = 2.36$; younger adults: $M = 1.02$, $SD = 1.63$; $t(134) = -6.52$, $p < .001$, unequal variances). Thus, chronic health conditions, as well as gender (0 = *male*, 1 = *female*) and ethnicity (0 = *European American*, 1 = *Chinese American*), were included as covariates in all regression analyses. The use of heart and blood pressure medications (0 = *no*, 1 = *yes*) was added as a covariate in analyses of cardiovascular reactivity. Table 1 lists the means and age differences for goals, appraisals, emotion regulation strategies, and affective and cardiovascular responses.

Manipulation Check

The confederates' behaviors were coded to ensure that they were equally noxious across participant age groups. Research assistants blind to the hypotheses coded: A) the confederates' level of negativity on a scale from 0 (not at all negative) to 3 (extremely negative), and B) the number of scenarios that participants and confederates disagreed upon. Reliability between the two coders for 37% of the videotapes was good, ICC = .74. The remaining videotapes were coded separately by each rater. Results indicated that younger and older confederates did not differ in level of negativity, $t(154) = -1.38$, $p > .05$ (unequal variances) or on the number of scenarios they disagreed upon with the participants, $t(154) = -1.02$, $p > .05$.

Testing Age Differences in Reactivity

We hypothesized that older adults would exhibit attenuated affective and cardiovascular reactivity, as well as more pronounced affective recovery, than younger adults in response to the negative social interaction. Age differences in reactivity were tested using hierarchical multiple regression models, with the measure of interest (e.g., task negative affect) as the dependent variable and the baseline assessment included as a covariate (e.g., baseline negative affect). All models included the baseline assessments and covariates in the first step and age group in the second step to establish whether age is a statistically significant, unique predictor of reactivity after controlling for baseline levels of the measure of interest and covariates.

Negative affect reactivity—As shown in Table 1 and Figure 1A, older adults reported significantly lower mean levels of negative affect at each assessment point compared to younger adults. We then tested the hypothesis that older adults would exhibit less negative affect reactivity (i.e., smaller increases in negative affect from the baseline to task period) than younger adults. Consistent with our prediction, older adults exhibited less negative affect reactivity than younger adults (i.e., lower task negative affect controlling for baseline negative affect and other covariates; see Table 2 (Model 1) and Figure 1A).

Positive affect reactivity—Older adults reported significantly higher mean levels of positive affect at each assessment point relative to younger adults (see Table 1 and Figure 1B). Contrary to our hypothesis, however, we found no age differences in change in positive affect from the baseline to task period (see Table 2 (Model 3) and Figure 1B).

Systolic blood pressure reactivity—In line with previous studies, older age was related to significantly higher overall levels of systolic blood pressure (see Table 1). We hypothesized, however, that age differences in systolic blood pressure reactivity would be attenuated in response to a social conflict. We found that younger and older adults showed similar levels of systolic blood pressure reactivity (i.e., task systolic blood pressure when controlling for baseline systolic blood pressure), consistent with previous work showing that the typical age-related increases in blood pressure reactivity are reduced for social conflict tasks (see Table 3, Model 1).

Diastolic blood pressure reactivity—As expected, older adults had higher mean levels of diastolic blood pressure during the baseline and task periods than younger adults (see Table 1 and Figure 1C). Consistent with our hypothesis, older adults exhibited lower diastolic blood pressure reactivity than younger adults (see Table 3 (Model 2); Figure 1C).

Pulse rate reactivity—Pulse rate at baseline was similar across age groups (see Table 1 and Figure 1D). In support of our hypothesis and as presented in Table 3 (Model 3), older age was associated with significantly less pulse rate reactivity. Figure 1D illustrates that pulse rate from baseline to the task period increased to a greater degree among younger adults compared to older adults. In fact, for older adults, pulse rate did not change significantly from the baseline to the task period, $t(75) = -1.25$, $p = .21$.

Age Differences in Negative and Positive Affective Recovery

Age differences in affective recovery were tested by hierarchical regression models with the post-task measure of affect as the dependent variable. Baseline affect, task affect, and covariates were entered in the first step, and age group was entered in the second step.

Negative affect recovery—We hypothesized that older adults would report greater negative affective recovery than younger adults. As shown in Table 2 (Model 2), older age was related to steeper recovery of negative affect (i.e., lower post-task negative affect controlling for baseline and task negative affect; see Figure 1A).

Positive affect recovery—As hypothesized, older adults showed greater positive affect recovery (as indicated by higher levels of post-task positive affect when controlling for

baseline and task positive affect) relative to younger adults (displayed in Table 2 (Model 4) and Figure 1B).

Age Differences in Goals, Appraisals, and Emotion Regulatory Behaviors

We next tested whether age differences in goals, appraisals, and emotion regulatory behaviors endorsed during the task were related to the aforementioned age differences in affective and cardiovascular responses. T-tests were conducted to examine age differences in these variables.

Goals—As shown in Table 1 and contrary to our hypotheses, age was unrelated to goals to regulate one's emotions, $t(147) = 0.50$, $p = 0.62$, and to maintain social harmony with the confederate, $t(157) = -1.33$, $p = .19$. In support of our hypotheses, however, younger adults were more likely to endorse goals to change the confederate than were older adults, $t(157) = 3.39$, $p = .001$, and older adults reported significantly greater endorsement of task performance goals than younger adults, $t(145) = -3.82$, $p < .001$ (unequal variances).

Appraisals of the task and confederate—In support for our hypotheses regarding age and positive appraisals of the task, older adults appraised the task as more enjoyable, $t(155) = -3.50$, $p = .001$, their task performance more favorably, $t(155) = -3.91$, $p < .001$, and the confederate as more likeable, $t(157) = -4.92$, $p < .001$, than did younger adults. Contrary to our predictions, however, appraisals of task difficulty, $t(155) = 0.65$, $p = .51$, and perceived confederate's cooperativeness did not vary by age, $t(157) = -0.50$, $p = .62$.

Behaviors related to conflict avoidance/de-escalation and self-distraction—We predicted that older adults would avoid or de-escalate conflict with the confederate more so than younger adults, but this effect only trended towards significance for self-reported conflict avoidance, $t(156) = -1.93$, $p = .056$, and was not significant for self-reported behavioral disengagement from the conflict, $t(157) = 0.32$, $p = .75$. For behaviorally-coded indices of conflict avoidance and de-escalation, we found significant age differences in all three measures, but opposite to our predictions. Younger adults were more likely to engage in these conflict avoidance/de-escalation behaviors than older adults: moving on to a new scenario/topic, $t(156) = 2.59$, $p = .011$; reducing the negativity of the conversation, $t(146) = 4.50$, $p < .001$ (unequal variances); and using humor, $t(123) = 2.30$, $p = .023$ (unequal variances; see Table 1). We found no age differences in reports of self-distraction, $t(143) = -0.59$, $p = .55$, unequal variances.

Mediation of Age Differences in Affective and Cardiovascular Responses

For goals, appraisals, and emotion regulation strategies to mediate age differences in affective and cardiovascular responses to the task, age group should be related to the potential mediators, and the mediators should be associated with the outcome measure (e.g., task negative affect). The analyses above showed that age was significantly related to: 2 goals (i.e., goals to change the confederate and perform well on the task), 3 appraisals (i.e., task enjoyment, task performance, confederate likeability), and 3 conflict avoidance/de-escalation emotion regulation strategies (i.e., moving on to a new scenario/topic, reducing negativity, using humor). We then examined whether each of these goals, appraisals, and

emotion regulation strategies were significantly related to the affective and cardiovascular outcomes (see Table 4). Only those variables that had significant associations with both age group and the outcome of interest were tested as potential mediators. Mediation analyses were conducted using bootstrapping methods with 1,000 re-samples to test the indirect (i.e., mediating) effects (Preacher & Hayes, 2008). INDIRECT macros in SPSS (Preacher & Hayes) allowed us to test multiple mediators simultaneously in the model to control for the shared variance between mediators in explaining the outcome variable. We examined both A) total indirect effects, which refer to the combined indirect contributions of all of the mediators included in the model; and B) individual indirect effects to test which specific mediators remained significant after controlling for the contributions of the other mediators and covariates. All mediation analyses included the same covariates as in the full models described above.

Explaining age differences in negative affect reactivity—Four potential mediators had significant associations with both age group and task negative affect: goals to change the partner and appraisals of task enjoyment, task performance, and confederate likeability. When we simultaneously entered these four mediators in our model predicting negative affect reactivity, the direct pathway between age group and task negative affect was no longer significant (see Table 5). The 95% bias corrected confidence interval (BCI) for the total indirect effects (i.e., all of the mediators together in the model) ranged from −0.50 to −0.11 and did not include the value zero, which means there was a significant mediation effect between age and negative affect reactivity (indirect effect estimate = −0.28, SE = .09). We then examined the individual indirect unique effects of each mediator and found that only task enjoyment appraisals had a unique contribution that significantly mediated the age differences in negative affect reactivity (indirect effect estimate = −0.11, SE = .06, 95% BCI: [−.28, −.03] (this significant indirect effect is indicated by the boldface coefficients highlighted in the task negative affect model of Table 5).

Explaining age differences in diastolic blood pressure reactivity—None of the goals, appraisals, or emotion regulation strategies that varied by age were related to task diastolic blood pressure (see Table 4). Thus, no potential mediators were identified.

Explaining age differences in pulse rate reactivity—Three of the goals and emotion regulation strategies that differed by age group were also significantly associated with task pulse rate: appraisals of task enjoyment and confederate likeability, and number of times participants moved on to another scenario or topic when the confederate made a negative statement. In a mediation model examining pulse rate reactivity, we found the direct pathway between age group and task pulse rate was still significant with the mediators in the model (see Table 5), but the total indirect effect was also significant (total indirect effect estimate = −1.28, SE = .61; 95% BCI: [−2.57, −0.18]). This finding indicates that there was a significant mediating effect between age and pulse rate reactivity. Specifically, confederate likeability appraisals significantly mediated age differences in pulse rate reactivity, controlling for the effects of the other mediators (indirect effect estimate = −1.24, SE = .61, 95% BCI:[−2.73, −0.29]).

Explaining age differences in negative affect recovery—Six variables were identified as potential mediators of age differences in negative affect recovery: goals to change the partner; goals to perform well on the task; appraisals of task enjoyment, task performance, and confederate likeability; and reducing the negativity of the conversation when confederates made negative statements (i.e., a de-escalation emotion regulation strategy). When all variables were entered into the model simultaneously, the magnitude of the age difference in negative affect recovery was reduced (see Table 5), but the total indirect effect was not significant (total indirect effect estimate = −0.06, SE = .04, 95% BCI: [−.13, .01]), and none of the individual indirect effects were significant (see Table 5). Thus, these variables did not significantly mediate age differences in negative affect recovery.

Explaining age differences in positive affect recovery—Four potential mediators of age differences in positive affect recovery were identified: task performance goals as well as appraisals of task enjoyment, task performance, and confederate likeability. In a test of mediation, the direct pathway between age group and post-task positive affect was no longer significant (see Table 5). A significant total indirect effect (total indirect effect estimate = .33, SE = .16, 95% BCI: [.09, .74]) indicated that this group of mediators significantly explained age differences in positive affect recovery. As shown in Table 5, goals to perform well on the task significantly mediated the age differences in positive affect recovery, controlling for all other mediators in the model (indirect effect estimate = .08, SE = .06, 95% BCI: [.01, .25]).

Do Older Adults Use Emotion Regulation Strategies More Effectively?

These analyses revealed that certain goals and appraisals, but none of the emotion regulation strategies, mediated age differences in affective and cardiovascular outcomes. It is possible, however, that older adults may use particular emotion regulation strategies more effectively than younger adults to dampen their reactivity or expedite their recovery from the negative social interaction. That is, although the degree to which individuals used different types of emotion regulation strategies (a criterion for establishing mediation) does not vary by age group, the extent to which the emotion regulation strategies are related to affective and cardiovascular outcomes may vary by age group (i.e., statistical moderation/interaction effect). To examine this possibility, we included interactions between age group and the emotion regulation strategies to predict affective and cardiovascular responses in our regression models. We applied Bonferroni corrections to reduce the likelihood of a Type I error (effects significant at $p < .008$). We found a significant interaction between age group and the use of self-distraction, $\beta = -0.41$, $SE = .16$, $p < .001$, which shows that greater use of self-distraction was related to more pronounced negative affect reactivity for younger adults, but not for older adults (see Figure 2).

Discussion

The current study investigated whether age differences in affective and cardiovascular responses are still observed when younger and older adults interact with equally disagreeable partners. In general, we found that older adults exhibited less reactivity to the task (i.e., negative affect reactivity, diastolic blood pressure reactivity, and pulse rate

reactivity), and more pronounced positive and negative affect recovery following the task (i.e., greater post-task positive affect and lower post-task negative affect, controlling for baseline and task affect), compared to younger adults. Under no circumstances did older adults exhibit greater reactivity to the task than did younger adults. We interpreted these findings as older adults showing a "gain or same" response to the conflict (pp. 154, Uchino et al., 2010), suggestive of age-related advantages in abilities to modulate affective experiences.

Possible Explanations for Age Differences in Affective and Cardiovascular Responses

An additional aim of the study was to test the various theoretical explanations (mediators) of these age differences. Compared to younger adults, we hypothesized that older adults would focus more on goals, appraisals, and emotion regulation strategies that would facilitate attenuated affective and cardiovascular reactivity, and more pronounced affective recovery.

Goals—Consistent with our predictions, we found that older adults focused more on task performance goals than did younger adults, which mediated age differences in positive affect recovery (i.e., increases in positive affect following the task). These results are in line with previous studies which suggest that task performance goals are related to positive emotions (Pekrun et al., 2006). Although younger adults focused more on goals to change the confederate and these goals were related to greater task and post-task negative affect, they did not mediate age differences. It is possible that this effect would be more pronounced with close social partners; younger adults may be particularly motivated to change their existing social partners than older adults, which is in line with developmental tasks in early adulthood to learn to establish boundaries in social relationships.

We also predicted that older age would be related to greater endorsement of goals related to emotion regulation and social harmony, but found no age differences in these goals. The lack of age differences may be due to the fact that older adults have a larger proportion of emotionally close partners in their social networks compared to younger individuals (Carstensen et al., 2003) and may be more likely to select goals of regulating their emotions and maintaining social harmony in the context of these close partners as opposed to less intimate social ties, such as strangers. Future studies should explore whether there are age differences in how individuals adjust their goals in response to conflict as a function of their relationship to the social partner (e.g., romantic partner, friend, stranger), and the affective consequences of such goals.

Appraisals—We also found that older adults appraised the situation more positively than did younger adults: they rated the task as more enjoyable, their task performance as more favorable, and the confederate as more likeable. Moreover, these appraisals of task enjoyment and confederate likeability explained, in part, why older adults exhibited less negative affect reactivity and pulse rate reactivity to the task, respectively, compared to younger adults. Appraisals generally shape the initial emotional experience and are hypothesized to circumvent the formulation of strong affective responses (e.g., Charles, 2010). Thus, older adults' more benign appraisals likely helped to dampen their reactivity (as opposed to recovery) to the negative social interaction. In contrast, goals did not mediate

age differences in reactivity. Together, these findings suggest that immediate appraisals play a stronger role in dampening the initial response than goals. It is possible that goals are more consequential in helping individuals later reappraise the experience and place it in a more positive perspective, given that we found task performance goals mediated age differences in positive affect recovery. Additional studies are needed to better understand the time course of the associations between goals, appraisals, and affective and physiological responses to stressors.

Emotion regulation strategies—Contrary to our hypotheses, younger adults reported using emotion regulation strategies (e.g., conflict avoidance, behavioral disengagement, self-distraction) to the same degree as older adults and actually engaged in a greater frequency of behaviors to avoid (i.e., to move on to other topics) and de-escalate conflict with the confederate (i.e., reduce the negativity of the situation; use humor) than did older adults. In light of our appraisal results, it is possible that because older adults initially appraised the situation in a more benign manner than did younger adults, they did not feel the need to engage in proactive and vigorous efforts to regulate their emotional experiences during the conflict. Another (not mutually exclusive) possibility is that older adults may be able to regulate their emotions more effectively than younger adults, given the same emotion regulation strategies. Consistent with this interpretation, we found evidence for moderating effects, whereby younger adults appeared to use the emotion regulation strategy of self-distraction less effectively than older adults. Even when younger adults increased their self-distraction efforts, their distress levels remain elevated – this was not true, however, for older adults. This finding corroborates previous work showing that older adults may more effectively dampen negative affect to conflict situations than younger adults, even when using the same strategies (Charles et al., 2009).

Limitations and Future Directions

One limitation of the current study is that we did not have an assessment of cardiovascular recovery. Future research should include measures of both affective and cardiovascular reactivity and recovery to determine how the coherence of subjective reports of affective and cardiovascular arousal may vary by the time course examined (reactivity vs. recovery). Another caveat is that the proposed mediators (i.e., goals, appraisals, and specific emotion regulation strategies) did not explain age differences in diastolic blood pressure reactivity or negative affect recovery. In the case of diastolic blood pressure reactivity, none of the proposed mediators were related to task diastolic blood pressure. For negative affect recovery, although several potential mediators were identified, these indirect effects were not significant in the multiple mediator model. Future studies should test whether other emotion regulation strategies and appraisals (e.g., perceptions of control over the situation), as well as individual differences contributing to reactivity (e.g., stressful life events), explain age differences in these effects.

Additionally, aging represents the accumulation of years of life experience, which may provide the opportunities and lessons necessary to learn to effectively regulate one's emotions (Charles, 2010; Charles & Luong, 2013). Given that older adults in our study had more marital experience than younger adults, for example, it is possible that years of living

with a close partner and learning to negotiate conflict have afforded them with greater expertise in regulating their emotions in social contexts. A challenge for future studies will be to determine which facets associated with aging (e.g., social experience, time perspective) explain these age differences.

Conclusion

The current study makes several important contributions to the literature. First, our study ruled out an important confound of previous studies on age differences in responses to interpersonal conflict – namely, that age-related reductions in affective and cardiovascular reactivity to social interactions are the result of preferential treatment from social partners. By using trained confederates, we ensured that participants interacted with equally disagreeable partners, and yet, we still observed that older adults exhibited generally less affective and cardiovascular reactivity to the task, as well as greater affective recovery. Importantly, the study demonstrated that these age differences extend across multiple facets of the emotional experience, including valence (negative and positive affect), reactivity vs. recovery processes, and subjective vs. cardiovascular responses. The study also elucidated several potential mechanisms for these age differences – primarily, task performance goals and more benign appraisals of the task and confederate – which are endorsed and employed earlier in the emotion-eliciting phase, help to dampen affective and cardiovascular responses. Finally, the study showed that younger adults may use emotion regulation strategies, such as self-distraction, less effectively than older adults to down-regulate their negative affect reactivity. In sum, findings bolstered support that older adults' greater prioritization of unique goals and enhanced abilities to appraise situations in a more positive light, relative to younger adults, contribute to age-related reductions in affective and cardiovascular responses to interpersonal conflict.

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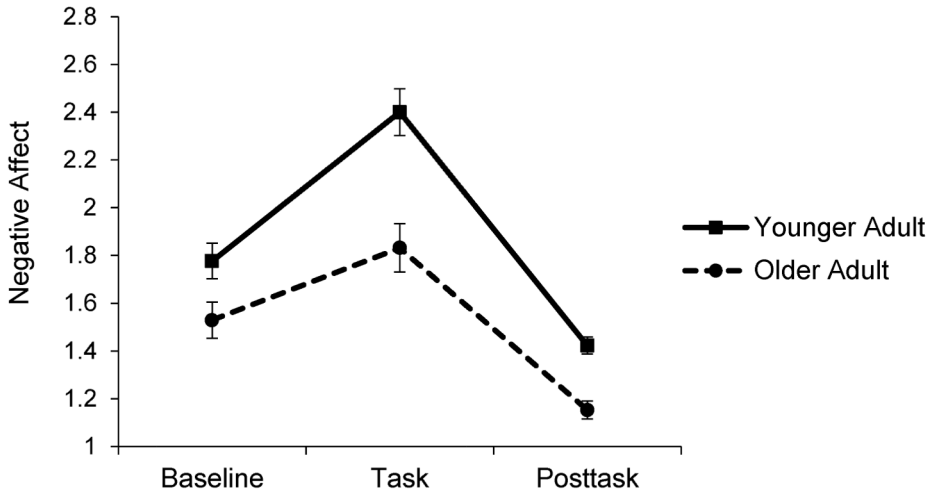
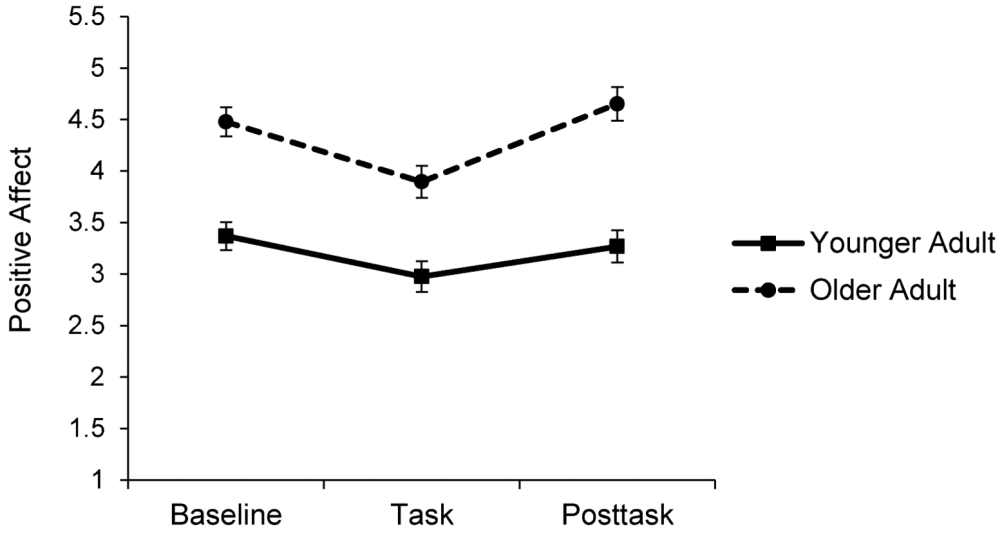
A



B



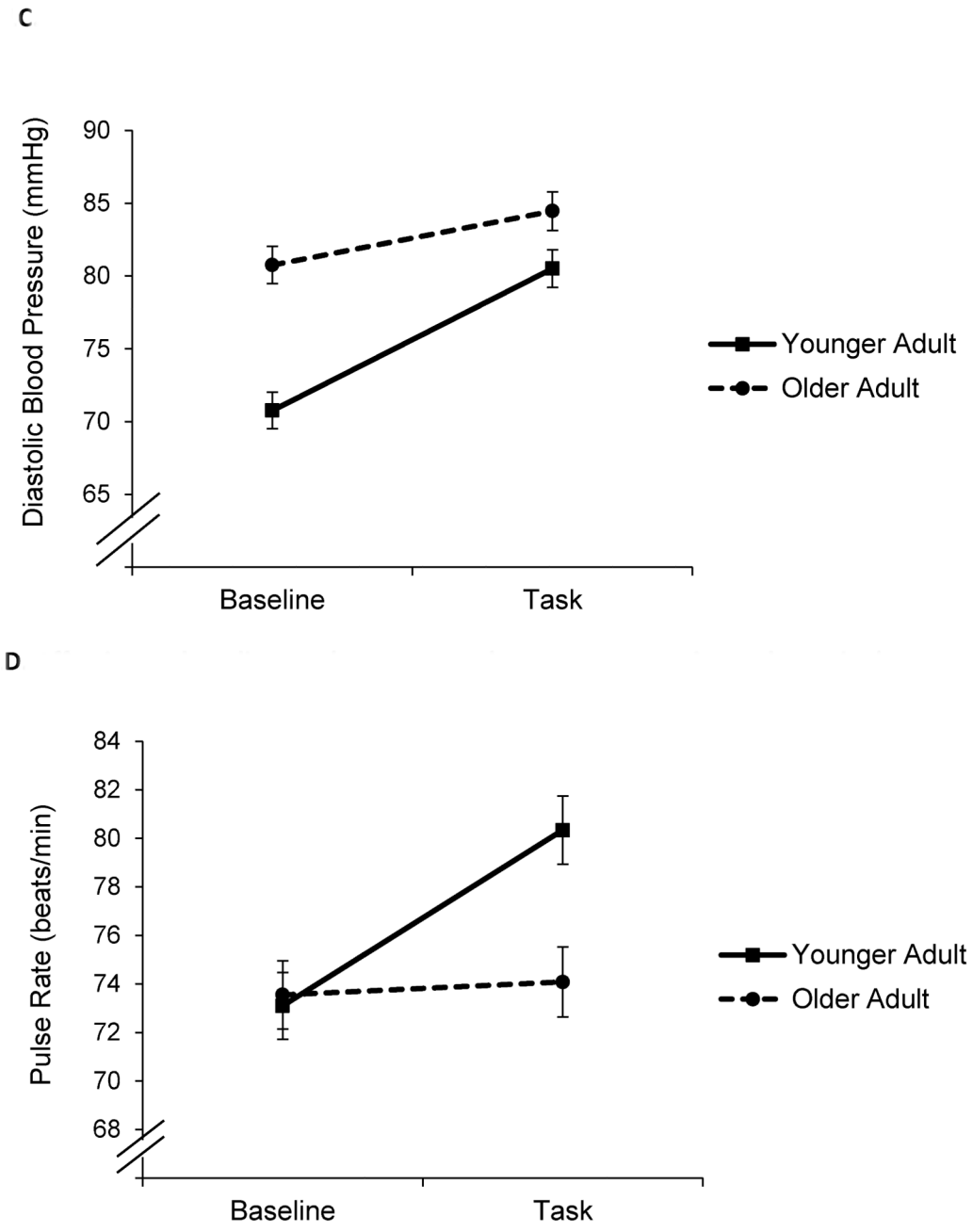


Figure 1A-1D. Affective and Cardiovascular Responses by Age Group – Estimated Marginal Means

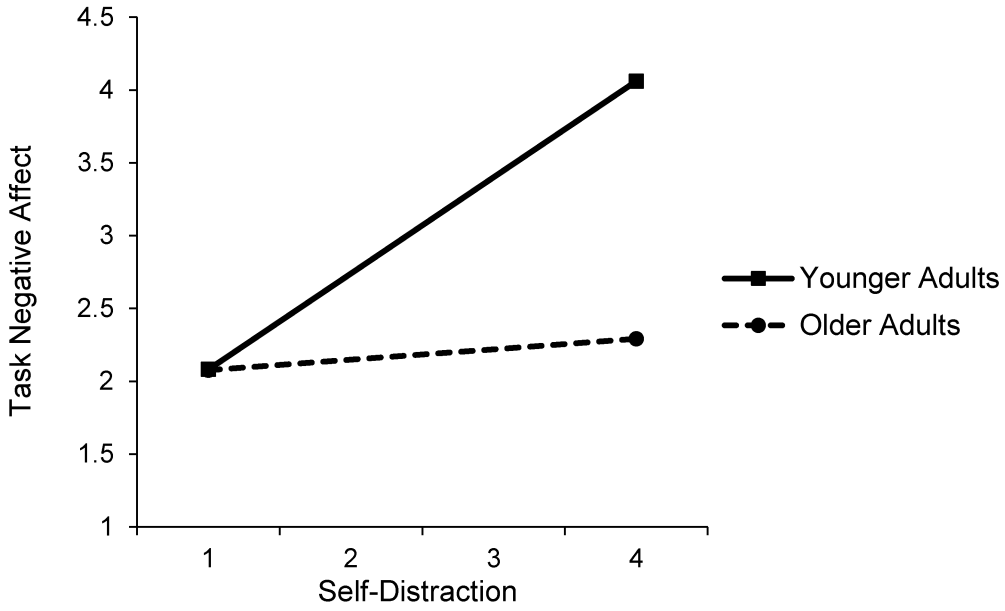


Figure 2. Age Moderates the Association Between Self-Distraction and Negative Affect Reactivity

Interaction between age group and self-distraction (± 1 SD above and below the mean) predicting task negative affect, controlling for baseline negative affect.

Table 1

Descriptive Statistics of Key Study Variables by Age Group

Variable	Younger Adults *M(SD)*	Older Adults *M(SD)*
Goals		
Emotion Regulation	4.84(1.47)	4.71(1.83)
Social Harmony	4.58(1.58)	4.94(1.79)
Change the Partner's Opinions/Behaviors**	3.41(1.74)	2.53(1.51)
Task Performance***	5.80(1.19)	6.44(0.88)
Task and Confederate Appraisals		
Task Enjoyment***	3.46(1.10)	4.04(0.96)
Task Performance***	3.70(0.74)	4.15(0.62)
Task Difficulty	2.62(1.11)	2.51(1.16)
Confederate Likeability***	2.91(0.96)	3.60(0.80)
Confederate Cooperativeness	3.81(1.04)	3.89(0.97)
Self-Reported Emotion Regulation Strategies		
Conflict Avoidance†	3.37(1.06)	3.71(1.09)
Behavioral Disengagement	1.63(0.69)	1.59(0.73)
Self-Distraction	1.76(0.69)	1.83(0.92)
Conflict Avoidance/De-Escalation Behaviors		
Moving on to a New Scenario/Topic*	2.16(1.33)	1.65(1.54)
Reducing the Negativity***	3.66(2.37)	2.15(1.81)
Humor*	2.46(2.74)	1.65(1.54)
Negative Affect		
Baseline*	1.78(0.70)	1.51(0.60)
Task***	2.40(0.94)	1.84(0.80)
Post-Task***	1.42(0.38)	1.15(0.26)
Positive Affect		
Baseline***	3.37(1.12)	4.48(1.32)
Task***	2.98(1.22)	3.87(1.48)
Post-Task***	3.27(1.31)	4.67(1.49)
Systolic Blood Pressure		
Baseline***	112.95(14.35)	136.71(20.31)
Task***	112.49(16.62)	142.66(19.61)
Diastolic Blood Pressure		
Baseline***	70.12(8.89)	81.64(11.46)
Task**	80.01(9.92)	84.98(11.15)
Pulse Rate		
Baseline	72.77(11.99)	73.30(10.80)

Variable	Younger Adults *M(SD)*	Older Adults *M(SD)*
Task**	79.93(12.08)	74.51(10.78)

Note. Asterisks denote significant age group differences.

† $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$

Table 2

Negative Affect Reactivity (Model 1) and Recovery (Model 2) and Positive Affect Reactivity (Model 3) and Recovery (Model 4) Regressed on Age Group

	Negative Affect				Positive Affect			
	Model 1: Reactivity		Model 2: Recovery		Model 3: Reactivity		Model 4: Recovery	
Variable	***β***	***SE***	***β***	***SE***	***β***	***SE***	***β***	***SE***
Intercept	2.59***	0.13	1.37***	0.05	3.21***	0.17	3.53***	0.17
Gender (1 = Female)	−0.13†	0.13	−0.01	0.04	−0.10†	0.17	0.05	0.17
Ethnicity (1 = Chinese American)	−0.09	0.13	0.04	0.05	0.20***	0.17	−0.01	0.18
Health Conditions	0.14†	0.03	0.10	0.01	−0.04	0.04	−0.10	0.04
Baseline Negative Affect	0.36***	0.10	0.26***	0.04	-----	-----	-----	-----
Baseline Positive Affect	-----	-----	-----	-----	0.65***	0.07	0.26***	0.09
Task Negative Affect	-----	-----	0.38***	0.03	-----	-----	-----	-----
Task Positive Affect	-----	-----	-----	-----	-----	-----	0 46***	0.08
Age Group (1 = Older Adult)	−0.31***	0.15	−0.27***	0.05	0.07	0.20	0.24***	0.21
Adjusted R Square	0.18***		0.36***		0.48***		0.53***	
R Square Change	0.07***		0.05***		0.00		0.04**	

Note. Unstandardized coefficients are reported for the intercepts in all models. All other beta coefficients represent standardized values. Adjusted R Square refers to the covariate only model (Step 1) and the R Square Change refers to the additional amount of variance explained by including age group in the model (Step 2).

† $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Table 3

Systolic Blood Pressure Reactivity (Model 1), Diastolic Blood Pressure Reactivity (Model 2) and Heart Rate Reactivity (Model 3) Regressed on Age Group.

	Systolic Blood Pressure		**Diastolic Blood Pressure**		**Pulse Rate**	
	Model 1: Reactivity		**Model 2: Reactivity**		**Model 3: Reactivity**	
Variable	***β***	***SE***	***β***	***SE***	***β***	***SE***
Intercept	135.79**	1.82	84.55**	1.16	81.57**	0.88
Gender (1 = Female)	−0.13**	1.76	−0.02	1.09	−0.07†	0.86
Ethnicity (1 = Chinese American)	−0.01	1.77	0.04	1.12	−0.03	0.88
Health Conditions	0.06	0.44	0.03	0.28	0.05	0.22
Cardiovascular Medications	−0.08	2.56	0.01	1.59	0.01	1.25
Baseline SBP	0.83**	0.05	-----	-----	-----	-----
Baseline DBP	-----	-----	0.86**	0.05	-----	-----
Baseline PR	-----	-----	-----	-----	0.86**	0.04
Age Group (1 = Older Adult)	0.03	2.38	−0.20**	1.48	−0.31**	1.07
Adjusted R Square	0.74**		0.59**		0.75**	
R Square Change	0.00		0.02**		0.06**	

Note. SBP = systolic blood pressure. DBP = diastolic blood pressure. PR = pulse rate. For cardiovascular medications, 0 = does not take blood pressure/heart medications, 1 = takes blood pressure/heart medications. In Model 1, SBP reactivity is being tested such that the dependent variable is average task SBP. In Model 2, DBP is being tested such that the dependent variable is average task DBP. In Model 3, PR reactivity is being tested such that the dependent variable is average task PR. Unstandardized coefficients are reported for the intercepts in both models. All other beta coefficients represent standardized values. Adjusted R Square refers to the covariate only model (Step 1) and the R Square Change refers to the additional amount of variance explained by including age group in the model (Step 2).

† $p < .10$;

* $p < .05$;

** $p < .01$;

** $p < .001$.

Table 4

Correlation Matrix of Goals, Appraisals, Emotion Regulation Strategies and Affective and Cardiovascular Outcomes

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Goals															
1. Change Partner	---														
2. Task Performance	.01	---													
Appraisals															
3. Task Enjoyment	.00	**.31**	---												
4. Task Performance	.05	**.37**	**.51**	---											
5. Confederate Likeability	**−.25**	**.25**	**.45**	**.17**	---										
Behavioral ER Strategy															
6. Moving on to Another Scenario/Topic	.04	−.14	**−.22**	−.06	**−.27**	---									
7. Reducing Negativity	.06	−.11	−.09	**−.16**	**−.21**	.06	---								
8. Humor	−.02	−.14	−.07	−.13	.05	−.10	**.19**	---							
Affective Outcomes															
9. Task Negative Affect	**.33**	−.11	**−.31**	**−.18**	**−.32**	.10	.11	−.14	---						
10. Post-Task Negative Affect	**.31**	**−.20**	**−.25**	**−.19**	**−.33**	.03	**.19**	−.06	**.56**	---					
11. Task Positive Affect	.06	**.25**	**.43**	**.38**	**.33**	−.05	−.05	−.07	−.01	−.02	---				
12. Post-Task Positive Affect	.07	**.40**	**.46**	**.45**	**.37**	−.14	−.12	−.15	−.02	**−.16**	**.70**	---			
Cardiovascular Outcomes															
13. Task Systolic BP	−.12	.11	.05	.06	**.20**	−.03	−.11	**−.18**	.06	−.11	**.20**	**.25**	---		
14. Task Diastolic BP	−.09	−.04	−.02	.02	.04	.09	−.09	−.12	.08	−.03	.02	.08	**.72**	---	
15. Task PR	.12	−.14	**−.18**	−.12	**−.21**	**.22**	.03	.02	**.19**	.12	−.15	−.12	.11	**.29**	---

Note. ER = emotion regulation. BP = blood pressure. PR = pulse rate. Correlations in boldface font are significant at $p < .05$.

Table 5

Tests of Indirect (Mediation) Effects of Age Differences in Affective and Cardiovascular Responses

	Dependent Variables							
	Task Negative Affect		Task Pulse Rate		Posttask Negative Affect		Posttask Positive Affect	
Potential Mediators	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
Goals								
Change Partner	−0.59(0.31)†	0.14(0.04)***	-----	-----	−0.32(0.32)	0.03(0.01)*	-----	-----
Task Performance	-----	-----	-----	-----	0.81(0.21)***	−0.01(0.02)	**0.60(0.22)** **	**0.14(0.08)** †
Appraisals								
Task Enjoyment	**0.62(0.19)** **	**−0.18(0.07)** *	0.62(0.21)**	−0.05(0.46)	0.42(0.21)*	−0.01(0.03)	0.43(0.20)*	0.15(0.10)
Task Performance	0.55(0.13)***	0.02(0.10)	-----	-----	0.52(0.14)***	0.001(0.04)	0.45(0.13)**	0.23(0.14)
Confederate Likeability	0.74(0.16)***	−0.13(0.08)	**0.88(0.17)** ***	**−1.37(0.58)** *	0.62(0.16)***	−0.03(0.03)	0.66(0.17)***	0.12(0.11)
Emotion Regulatory Behaviors								
Move on to new Scenario	-----	-----	−0.70(0.30)*	−0.01(0.32)	-----	-----	-----	-----
Reduce Negativity	-----	-----	-----	-----	−1.68(0.40)***	0.01(0.01)	-----	-----
Direct Path (Age Group to Dependent Variable)								
C	−0.55(0.15)***		−7.26(1.10)***		−0.19(0.05)***		0.73(0.21)***	
C’	−0.27(0.16)†		−6.03(1.19)***		−0.13(0.06)*		0.40(0.22)†	

Note. Each set of columns (A and B) tests whether there is an indirect effect between age group (i.e., predictor variable) and each dependent variable (DV) via the potential mediators. For each DV, Column A represents the coefficient between age group and the mediator, and Column B represents the coefficient of the mediator predicting the DV in the full model with age group included. Standard errors are denoted in parentheses. Dashed lines denote that the potential mediator was not included in the model. Coefficients in boldface denote significant indirect pathways (i.e., mediation) between age group and the dependent variable via the mediator. The rows for the Direct Path represent the direct association between age group and the dependent variable before (C) and after (C’) the mediators have been entered for each model. All models controlled for gender, ethnicity, and health conditions. In models testing mediation of reactivity, the baseline assessment of the key measure (e.g., negative affect, pulse rate) was included as a covariate. In models testing mediation of recovery, both the baseline and task affect were included as covariates. In the test of potential mediators of age differences in pulse rate reactivity, cardiovascular medications were also included as a covariate.

† $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$.