

AGE-RELATED EFFECTS OF ONLINE EMOTION REGULATION
STRATEGIES ON MOOD AND MEMORY

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**AGE-RELATED EFFECTS OF ONLINE EMOTION REGULATION
STRATEGIES ON MOOD AND MEMORY**

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SUMMARY

Research suggests that older adults have enhanced emotional outcomes and use different emotion regulation strategies (e.g., more distraction and positive reappraisal) relative to young adults. The present study investigated the mood and memory-related effects of these strategies in young and older adults. Participants watched a sad film clip while being instructed to use specific emotion regulation strategies (i.e., avoiding negativity, focusing on positivity, focusing on negativity, or no instructions). Young adults who were instructed to avoid focusing on negativity showed better mood outcomes and more positive memory for the film compared to non-instructed young adults. Instructions to down-regulate emotions did not affect older adults, possibly because they used such strategies spontaneously. Older adults' increased dispositional tendency to focus on positive stimuli in their everyday lives partially explained older adults' greater mood improvement. The results have implications for the effectiveness of particular emotion regulation strategies and for the generalizability of the positivity effect.

CHAPTER 1

INTRODUCTION

Research suggests that in older adulthood, emotional experience may be preserved. For example, older adults (except for very old individuals) report less negative affect than young adults (e.g., Gross, Carstensen, Pasupathi, Tsai, Skorpen, & Hsu, 1997). They also report more control over regulating their emotions than young adults do (Lawton, Kleban, Rajagopal, & Dean, 1992). Socioemotional selectivity theory interprets the findings of improved emotional outcomes as the result of an increased focus on emotion regulation (Carstensen, Isaacowitz, & Charles, 1999). Researchers from this perspective suggest changing time perspective as the underlying mechanism for improved emotion regulation. In particular, individuals who perceive a limited amount of time left (such as older adults) may be motivated to make the most of their remaining time. This may cause them to choose familiar social partners, regulate their emotions, and focus on positive over negative stimuli in order to maximize positive affect. This focus on positive and away from negative aspects of the environment has been termed the positivity effect (Carstensen & Mikels, 2005).

Focusing on positivity and not negativity is seen as a result of increased prioritization of emotion regulation. However, the relationship between focusing on positive over negative aspects of a situation and online mood regulation has not been directly examined. Thus, it is unclear if focusing on positivity over negativity truly maximizes positive affect. In addition, it is unclear whether the effect is driven by avoidance of negative or attraction to positive. During mood regulation, does the

positivity effect translate into a “focus on positivity” strategy or an “avoid negativity” strategy? The present study examined these issues in the context of emotion regulation after a mood induction. The goals were: 1) to examine emotion regulation strategies (namely, distraction from negativity, focusing on positivity, and the ineffective technique of focusing on negativity) that may underlie age differences in emotional outcomes, and 2) to test the generalizability of the positivity effect in an emotion-regulation task.

Older Adults’ Positive Emotional Experience

Older adults’ preserved emotional functioning has been demonstrated in many studies. Young adults reported more negative affect and less positive affect than older adults in studies of individuals’ retrospective emotional reports (Charles, Reynolds, & Gatz, 2001; Mroczek & Kolarz, 1998). An experience-sampling study provided a more proximal examination of emotion in everyday life and also showed enhanced emotional outcomes in older adults (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). This finding is also manifested in discrete emotions such that older adults report experiencing less anger than young adults (Birditt & Fingerman, 2003; Labouvie-Vief, Lumley, Jain, & Heinze, 2003).

In addition to their generally positive emotional reports, older adults often report that they have more control over their emotions than young adults do (Gross et al., 1997; Lawton et al., 1992). Older adults’ claims that they regulate their emotions and experience less negative affect are consistent with experience sampling reports. Across measurement occasions, older adults (up to a certain age) were more likely to maintain positive emotions and were more likely to reduce the amount of negative emotions (Carstensen et al., 2000). In an interview-based study in which participants recalled

interpersonal conflicts from their lives, older women similarly reported that their emotional reactions lasted for a shorter period than what younger women reported (Birditt & Fingerman, 2003).

Emotion Regulation Strategies: Effectiveness and Age Differences

Older adults are not only more motivated to regulate their emotions in comparison to young adults, research shows that they are more effective at using emotion regulation strategies when the situation calls for it (Blanchard-Fields, Mienaltowski, & Seay, in press). However, although past studies report positive emotional outcomes for older adults, they do not examine the process by which these outcomes occur. It is important to examine whether age differences in emotion regulation strategies underlie age differences in emotional experience. Which emotion regulation strategies might be related to older adults' positive affective picture?

Gross's Model of Emotion Regulation Strategies

An issue in the emotion regulation literature is how to theoretically classify the vast number of possible emotion regulation strategies. One classification scheme is Gross's process model of emotion regulation (Feldman Barrett & Gross, 2001; Gross, 1998b; John & Gross, 2004). In this model, strategies are placed on a timeline based on the point in the emotion generative process at which they occur. The first four processes (situation selection, situation modification, attentional deployment, and cognitive change) are antecedent-focused emotion regulation. These forms of regulation occur before the emotion is generated. The fifth process, response modulation, occurs after the emotion is generated and is therefore called response-focused emotion regulation. First, situation selection is the earliest form of emotion regulation in the timeline. It involves selecting

or avoiding particular people or situations for the purpose of emotion regulation. Second, situation modification occurs when individuals actively do something to change the emotional impact of the situation. Third, attentional deployment involves actively managing one's attentional focus. For example, a participant in an experiment may avoid thinking about the sad events in a film clip. Fourth, cognitive change involves changing the way one thinks about the situation in order to manage one's emotional reaction. It includes denial, intellectualization, downward social comparison, and reappraisal. For example, a participant may interpret a graphic image of a car accident as being from a movie and not from real life. Finally, response modulation is an attempt to directly influence one's emotional responses. It occurs after an emotion has been elicited, and includes actions such as exercise, relaxation, drinking alcohol, and suppression (Feldman Barrett & Gross, 2001).

Gross's process model is an important step forward for the emotion regulation literature. This model provides a theoretically driven method for organizing the diverse types of emotion regulation strategies that individuals use in everyday life. The current study focuses on two of Gross's categories: attentional deployment and cognitive change. These types of emotion regulation are effective for improving mood (Thayer, Newman, & McClain, 1994). Evidence also suggests that they are more common in older than young adults (Blanchard-Fields, Stein, & Watson, 2004; Kennedy et al., 2004). Thus, they are candidates for strategies that underlie age differences in emotional experience. The evidence for the effectiveness of and age differences in these strategies are reviewed next.

Attentional Deployment

Distraction is an example of attentional deployment strategies (Gross, 1998b). It involves focusing attention away from negativity (Rusting & Nolen-Hoeksema, 1998).

Effectiveness of distraction. Research suggests that distraction is generally an effective strategy for improving one's mood. A panel of 26 clinical psychologists rated an attentional distraction strategy as "mostly successful" (Thayer et al., 1994). Instructions to think about distracting topics (such as clouds in the sky) after a negative mood induction resulted in a substantial decrease in sadness, as compared to non-distracting conditions (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998; Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema, Morrow, & Fredrickson, 1993). In one study, participants read a sad story while vividly placing themselves in the situation. This was followed by listening to sad music. After the mood induction, participants read sentences and were instructed to think about and concentrate on the meaning of the sentences. Participants in the distraction condition read sentences such as, "It would be interesting to visit other countries." These participants experienced a greater decline in self-reported sadness compared to participants who thought about self-relevant sentences (Morrow & Nolen-Hoeksema, 1990). Thus, there is preliminary evidence that distraction is an effective strategy for improving mood.

Age differences in distraction. Research on emotion regulation strategies in the context of real-world problems provides evidence that is consistent with increased distraction in old age. In interpersonal problem situations, older adults report using passive emotion-focused strategies more than young individuals do (Blanchard-Fields & Coats, 2007; Blanchard-Fields et al., 2004). Passive emotion-focused strategies include suppressing emotions; passive dependence; and most importantly for the present

purposes, avoiding, denying, and escaping from the negative problem. Older adults report more use of distraction-type strategies when they describe their own real-life problems in interviews (Blanchard-Fields & Coats, 2007; Blanchard-Fields et al., 2004). This age difference also emerges when participants describe how they would handle hypothetical emotional problems (Blanchard-Fields, Jahnke, & Camp, 1995). Further indirect evidence for age differences in moving attention away from negative stimuli comes from research on the positivity effect (Carstensen & Mikels, 2005). Its proponents suggest that the positivity effect may result from an avoidance of negative stimuli (e.g., Mather & Carstensen, 2003). The implication is that older adults strategically move their attention away from negativity.

Cognitive Change

The cognitive change strategy that has received the most attention is reappraisal. Reappraisal refers to “cognitively transforming a situation so as to alter its emotional impact” (Gross, 1998b).

Effectiveness of reappraisal. Reappraisal seems to be an effective strategy according to several criteria. Reappraisal in response to anger-eliciting vignettes was negatively correlated with the Buss-Durkee Hostility Inventory Scales, which include verbal hostility and resentment (Tangney, Hill-Barlow, Wagner, Marschall, Borenstein, Sanftner, Mohr, & Gramzow, 1996). A self-reported tendency to reappraise in real-life experiences was negatively related to depression and anxiety scales (Garnefski et al., 2001). Diehl, Coyle, and Labouvie-Vief (1996) also noted positive aspects of reappraisal. They administered the Defense Mechanism Inventory (DMI) as part of their study on coping and defense strategies in the latter half of life. Two subscales of the

DMI reflect reappraisal. Principalization measures individuals' tendency to view negative events as learning experiences; reversal measures individuals' tendency to reinterpret the negative aspects of events as neutral or positive. Both principalization and reversal were associated with higher ego maturity levels and higher verbal abilities (Diehl et al., 1996).

Looking on the bright side also appears to help people who are regulating emotions elicited by specific life events. College students who wrote about the perceived benefits of traumatic events in their lives visited the health center fewer times than control participants (King & Miner, 2000). Finding benefit in the experience of chronic pain is related to greater subjective well-being (Affleck & Tennen, 1996), and widows who thought about hidden benefits from their loss showed greater adjustment 13 months and 18 months after their husbands' deaths (Davis, Nolen-Hoeksema, & Larson, 1998). Teaching patients to think about upcoming hysterectomies from a more positive perspective led to lower anxiety and pain after the operation as compared to patients who did not receive the reappraisal intervention (Callaghan & Li, 2002; Cheung, Callaghan, & Chang, 2003). Finally, participants who felt threatened by an upcoming electrical shock during an experiment reported less stress when they reappraised the shock as "not so threatening" (Houston & Holmes, 1974).

James Gross has an extensive program of research on the effectiveness of reappraisal, which is one type of antecedent-focused cognitive change-type regulation (as compared to the response-focused, response modulation-type strategy of suppression). For example, participants who watched a disgusting film while being instructed to reappraise the film's images successfully reduced emotion-expressive behavior and

subjective experience of the emotion (Gross, 1998a). Participants who reported using reappraisal often in their everyday lives tended to experience fewer negative emotions. In addition to reappraisal's positive effect on subjective emotional experience, it appears to have fewer cognitive and social side effects than suppression. Participants remembered more details about the information they viewed while reappraising emotions than while suppressing emotions (Richards & Gross, 2000). Reappraisers also had better objective and self-reported memory performance (as compared to suppressors; Richards & Gross, 2000). Finally, participants experienced less physiological stress when interacting with a social partner who is reappraising than with one who is suppressing (Butler, Egloff, Wilhelm, Smith, Erickson, & Gross, 2003). Thus, reappraisal seems to be an effective strategy for maximizing positive affect. In order for it to be a candidate for why older adults experience less negative affect, however, there must also be age differences in use of this strategy.

Age differences in reappraisal. There is some evidence that older adults use more reappraisal than young adults. For example, older adults reported using principalization and reversal, two strategies for looking on the bright side of negative events, more than young adults did (Diehl et al., 1996). Older adults also reported more positive reappraisal than young adults in response to self-reported family and health problems (Folkman, Lazarus, Pimley, & Novacek, 1987).

The question of age differences in reappraisal was also investigated in a sample of women who graduated from Mills College in the late 1950s (John & Gross, 2004). These women were in their early 60s at the time of this study. They reported their reappraisal tendencies on items such as "I control my emotions by changing the way I think about the

situation I'm in." These women also reported their retrospective reappraisal tendencies of how much they felt they used reappraisal when they were in their 20s. Self-reported reappraisal was higher in the current report than in the retrospective report, suggesting that reappraisal use increases with age. Of course, this result is subject to memory biases. Therefore, a cross-sectional approach was also used, and the older adult women in the sample reported more reappraisal than the young adult women (John & Gross, 2004). Positive reappraisal probably also plays an important role in the positivity effect as manifested in autobiographical memory (Kennedy et al., 2004). Older adults remembered the past as more positive than it really was; middle-aged adults did not.

Thus, there is evidence suggesting that late life is a time of increased use of reappraisal and looking on the bright side of negative situations. There is also evidence that older adults focus on positivity instead of negativity, and that these strategies are effective for improving mood. The strategy of averting attention away from negative stimuli toward positive stimuli has special theoretical significance for the adult development literature.

Evidence for the Positivity Effect

The positivity effect refers to a phenomenon in which older adults remember and attend to positive stimuli and avert attention away from negative stimuli (Carstensen & Mikels, 2005). The implication is that older adults strategically move their attention away from negativity, a strategy we might call "distraction" and classify as an attentional deployment strategy in Gross' model. In fact, proponents of the positivity effect wrote, "We propose that it is older adults' increased emphasis on emotional goals that directs

their attention away from information that is not emotionally gratifying” (Mather & Carstensen, 2003, p. 414).

The positivity effect has been demonstrated with emotional faces and emotional pictures (Charles, Mather, & Carstensen, 2003; Mather & Carstensen, 2003). However, many studies confound attention to positivity with attention away from negativity. Thus, it is important for researchers to directly compare the effectiveness of attending to positive information and shifting attention away from negative information. When these two processes can be disentangled, the tendency for older adults to avert attention away from negative stimuli is stronger than their tendency to direct attention toward positive stimuli (Mather & Carstensen, 2003).

Giving young adults instructional sets can lead them to show a positivity effect in the same way as older adults. Demonstrations of this have occurred with perceptions of one’s choices and with autobiographical memory. Older adults remembered their choices as being more positive and less negative than they really were (Mather & Johnson, 2000). Young adults did not show this choice-supportive effect. However, they did demonstrate choice-supportiveness when they were instructed to focus on their feelings about the two options, after making their choices. These results suggest that older adults, and young adults who focus on their feelings, remember their decisions as better than they really were.

Older adults not only remember their choices as more positive than they really were, they may also remember their personal past as more positive than it really was (Kennedy et al., 2004). In one study, researchers took advantage of the fact that a group of nuns completed health, emotion, and loneliness questionnaires in 1987. Fourteen

years later, in 2001, the researchers administered a retrospective version of the questionnaire to some of the nuns. For example, the 1987 question, “How much are you distressed by feeling nauseous” became the 2001 question, “In 1987, how much were you distressed by feeling nauseous?” Older nuns recalled their questionnaire responses from 15 years earlier as more positive than they really were. Middle-aged nuns recalled them as more negative than they really were. In addition to the control group, an emotion-focused group was instructed to focus on how they were feeling as they answered the question. Regardless of age, nuns in the emotion-focused group showed the positivity effect. Thus, the emotion-focused group’s memories resembled the older controls. Importantly, the positivity effect appeared to improve participants’ mood. The older nuns had stronger positive moods after completing the questionnaire than they had at the beginning of the study. Somewhat similarly, the young nuns in the emotion-focused condition had less negative moods after the questionnaire than at baseline (Kennedy et al., 2004). This led the researchers to claim that “the positivity effect appears to be an effective emotion-regulation strategy” (Kennedy et al., 2004, p. 213). It also demonstrated that young adults’ behavior can be made more similar to older adults’ through the use of instructional sets.

Overall, then, there is evidence to suggest that older adults may distract themselves away from negativity and/or direct attention to positive stimuli more than young adults do. This positivity effect may be a strategy for improving emotional outcomes, either by directing attention away from negativity (i.e., distraction) or focusing on positive aspects of negative situations (i.e., positive reappraisal).

Individual Differences in Emotion Regulation

The positivity effect has been extensively studied in the context of young versus older adults, but researchers have yet to examine individual differences in attention to positive and negative stimuli. Some individuals, regardless of age, may have dispositional tendencies to focus on positive or negative information. Indeed, young adults who reported paying attention to positivity in their everyday lives were more optimistic and extraverted (Noguchi, Gohm, & Dalsky, 2006). They also perceived a character in an emotionally ambiguous story to be more happy. Conversely, young adults who showed a preference for negative information were less optimistic and more neurotic (Noguchi et al., 2006). Individual differences in dispositional attention to positive and negative information may play a role in individuals' choice of emotion regulation strategies. Examining this dispositional tendency is also another way to examine the positivity effect. Older adults might show a higher dispositional tendency to attend to positive information and/or a lower dispositional tendency to attend to negative information.

Rumination is another individual difference characteristic that may play a role in emotion regulation. Rumination is defined as "directed attention...to feelings and their consequences" (Gross, 1998b). It is positively correlated with depression and anxiety in young adults (Garnefski, Kraaij, & Spinhoven, 2001) and older adults (Kraaij, Pruyboom, & Garnefski, 2002). In one study, participants who were instructed to ruminate showed a smaller decrease in sad affect than other participants (Morrow & Nolen-Hoeksema, 1990). In completing a questionnaire on their general emotional tendencies, young adults reported significantly more rumination than middle-aged and older adults (McConatha & Huba, 1999). Rumination is ineffective, and older adults

engage in it less than young adults. Thus, individual differences in the dispositional tendency to ruminate may also play a role in age differences in emotion regulation.

The Present Study

A theoretical goal of the present study was to examine the emotion regulation strategies that may partially underlie age differences in emotional outcomes. Specifically, positivity effect proponents (e.g., Mather & Carstensen, 2003) have suggested that older adults direct their attention away from negative stimuli toward positive stimuli. Furthermore, they suggest that this positivity effect is associated with improved emotional experience. However, it is unclear whether the effect is driven by attentional deployment away from negative or toward positive. Methodologically, this has not been examined in an online emotion regulation situation. Thus, the present study examined the strategies of “focusing on the positive” (similar to positive reappraisal) and “avoiding negative” (similar to distraction) as predictors of emotional experience after a mood induction. These strategies are both considered effective and they both differ by age, making them candidates for strategies that underlie age differences in emotional experience. We also will examine the ineffective “strategy” of “focusing on the negative”. Giving instructions to maintain negativity provides a comparison condition in which less emotion regulation is expected.

A related theoretical goal is to test the generalizability of the positivity effect in an emotion-regulation task, beyond attention- or memory-related tasks. Research on how older adults process positive and negative information has shown that older adults focus on positivity or, more commonly, avoid focusing on negativity. The present study will examine how this tendency translates into emotion regulation. The methodological goal is

to move beyond hypothetical vignettes and retrospective reports of emotion regulation, and instead examine online strategy use in controlled conditions. In this present study, we examined emotion regulation in young and older adults with multiple assessment points after a mood induction. This moves beyond past research by allowing us to examine strategies directly, instead of inferring them from retrospective emotional outcomes.

To achieve these goals, young and older adults were assigned to one of four conditions prior to showing a sad film clip. In the positivity condition, participants received instructions to focus on the positive aspects of the film. Participants in the avoid negativity condition focused on avoiding the negativity in the film. Participants in the negativity condition focused on the negativity in the film. Finally, participants in the no strategy instructions condition were told to simply watch the film. Sadness ratings were obtained several times throughout the study in order to observe emotion regulation outcomes as they unfolded. Participants also completed a surprise memory test and questionnaires relevant to their usual emotion regulation styles.

The first hypothesis was that giving young adults instructions to focus on positivity and/or to avoid negativity would lead to better mood outcomes and more positive memory as compared to young adults who did not receive instructions. We did not expect these instructions to affect older adults, who presumably use these strategies spontaneously. Instead, older adults might be detrimentally affected by instructions to focus on negativity, showing less mood improvement and more negative memories in this condition as compared to the other three conditions. We expected older adults' spontaneous regulation to the film clip to be more effective than young adults'

spontaneous regulation. Finally, the individual difference variables of dispositional tendencies to focus on positive stimuli, to focus on negative stimuli, and to ruminate were explored as possible explanations for older adults' positive emotional outcomes.

CHAPTER 2

METHOD

Participants

One hundred seven young adults (ages 18-30) and 94 older adults (ages 60-80) were recruited from a southeastern university and from the metropolitan area of a large southeastern city to participate in exchange for psychology extra credit or a small monetary sum. Three young adult participants were excluded because they had seen the mood induction film before, leaving 104 young adults included in the final sample. Table 1 contains demographic information about the sample.

Table 1

Demographics of Sample

	<u>Young Adults</u>	<u>Older Adults</u>
Females	44%	54%
Race		
White	61%	90%
Black	20%	7%
Asian	17%	0%
Hispanic	0%	2%
Other	2%	0%
Education	5.78 (1.56)	6.59 (2.52)
Health	3.85 (.88)	3.66 (.90)
Comp Span	4.14 (1.39)	2.26 (1.10)
Letter Sets	22.86 (3.87)	17.31 (4.93)
Vocabulary	16.97 (4.53)	23.33 (7.49)

Note. Education: 5 = 1 year college; 6 = 2 years college. Health: self-rated health, 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent. Comp Span: Audio Computation Span. All age differences are significant, $ps < .05$, except self-rated health.

Design

This study employed a 2 (age) X 2 (gender) X 4 (emotion regulation instructions) between-subjects design. The levels of the emotion regulation condition were instructions to focus on the positive aspects of the film (positivity condition), avoid the negative aspects (avoid negativity), focus on the negative (negativity), and watch the film (no instructions group). The dependent variables were mood ratings, positivity of film recall, and negativity of film recall. The individual difference measures of rumination, attention to positive stimuli, and attention to negative stimuli were tested as mediators in regression analyses.

Mood induction

Short scenes from the motion picture *21 Grams* were used as the mood induction. The scenes have successfully induced sadness in young and older adults (M. Shiota, personal communication, May 2006). The clip was extended for the current study by adding happy scenes to precede the sadness-inducing scene. This was important for two reasons. The first purpose was to provide material for the positive reappraisal strategy (e.g., at least the woman had wonderful times with her family). The second purpose was to allow a memory assessment of positive as well as negative information.

The first scene in the induction shows a mother making dessert with her two young daughters. They are laughing and having fun. The second scene shows a father with the same daughters in a café, laughing together. Then the clip shows the mother in a support group, praising her husband for his support of her. Finally, the longest scene shows the mother at home alone. She receives a phone call and it is clear that something is wrong. She drives to the hospital, where the doctor slowly breaks the news that her

daughters have died and her husband is brain-dead. The woman is hugged by her sister and father.

Procedure

Individuals participated in a laboratory at a southeastern university or at an off-site testing facility in sessions with 1-4 participants. After giving informed consent, participants completed a baseline mood assessment based on the PANAS (Positive and Negative Affect Scale; Watson, Clark, & Tellegen, 1998) with added emotion items (Time 1). They then received one of four sets of emotion regulation instructions (See Appendix A). The positivity group received instructions to focus on positive aspects of the movie and think about possible positive consequences of the events in the film (Rusting & DeHart, 2000). The avoid negativity group received instructions to avoid focusing or dwelling on the negative aspects of the film clip. The negativity group received instructions to focus on negative aspects of the movie and think about possible negative consequences of the events in the film. The no instructions group received instructions to watch the film carefully (Gross, 1998a). After receiving oral and written instructions, all participants (except those in the no instructions condition) were asked to write down the instructions from memory onto a blank sheet of paper. The experimenter checked all participants' writing to ensure comprehension of the instructions. If the instructions were not accurate or complete, the experimenter repeated the instructions and asked the participant to again write them from memory. All participants then watched the film clip.

The PANAS was administered again after the film clip viewing (Time 2). After this, all participants wrote for four minutes using a thought-listing paradigm. They

received written and oral instructions. The positivity group wrote about the bright side (i.e., “focus on the positive”) and possible positive consequences of the events in the film clip. The avoid negativity group were instructed to write about the film but to avoid writing about the negativity in the film. The negativity group wrote about the negativity in the film and the possible negative consequences of the film events. Finally, the no instructions group were instructed to simply write about the film.

After the writing and a subsequent PANAS mood assessment (Time 3), participants completed questions to assess the emotion regulation strategies they actually used. The instructions assured participants that they should be honest about what they did, regardless of what they were instructed to do. They were modeled after strategy assessments from memory strategy research (Hertzog, 2005) and include the reassurance, “We know it is sometimes hard to follow the experimenter’s instructions exactly. Please be honest in answering the following questions.” Questions included open-ended questions including, “What did you focus on and think about while watching the movie?” and “What, if anything, did you do to make yourself feel better?”

After these open-ended questions, participants rated the degree to which they used several strategies to regulate their emotions during and after the film clip. This questionnaire assesses a wide range of emotion regulation strategies and has a reliable factor structure (Coats & Blanchard-Fields, in press). Participants then completed an additional mood assessment (Time 4). The cognitive tasks of computation span, Letter Sets, and Advanced Vocabulary (Ekstrom, French, Harman, & Derman, 1976) were then administered. Following these timed tasks, participants completed several individual

difference measures, a demographics questionnaire, and memory of the film assessments at their own pace. A subset of participants completed a fifth mood assessment (Time 5).

Individual Difference Measures

Trait rumination and distraction. The Ruminative Responses Scale (RRS) is a 22-item scale assessing individual differences in tendencies to ruminate. It was recently revised in response to criticism that it confounds physical symptoms of depression with rumination (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). For the present study, the focus was on the brooding subscale. This subscale assesses passive dwelling on one's negative situation and includes items such as, "I think, 'Why can't I handle things better?'". One-year test-retest reliability for the brooding subscale was $r = .44$. The alpha coefficient for the scale as a whole was .90.

Attention to positive and negative scale. This 22-item scale assesses the extent to which individuals attend to positive and negative information in their lives (Noguchi et al., 2006). The reported alpha values of the attention to positive information (APIR) and the attention to negative information (ANIR) scales are .84 and .72 respectively. An example item is, "I pay attention to things that lift me up." Appendix B contains the complete scale.

Assessing memory for film clip. Participants received instructions to retell in writing the story depicted in the film clip. This measure provided an indication of the impact of instructions condition on the positivity of participants' actual memory for the film. Participants also completed a memory questionnaire to test their explicit memory of details from the film. Questions assessed memory for positive, negative, and neutral information. Appendix C contains this memory questionnaire.

CHAPTER 3

RESULTS

The primary research interest was to examine the effects of age and emotion regulation instructions on the degree to which participants reported sadness and remembered emotional content of the film. After preliminary analyses, age differences in emotional reactivity to the film, emotion regulation after the film, and emotional free recall are presented. A secondary research interest was in the relationship between sadness ratings and negativity of writing, which is presented next. Finally, the results of exploratory analyses into the role of individual difference variables in changes in sadness over time are described.

Preliminary Analyses

Compliance with instructions. To determine whether any participants did not follow instructions, responses to the prompt of what the participant really focused on were coded. Clear examples of noncompliance were noted. For example, one participant who was instructed to focus on the positive wrote, “When she was told about her family’s accident, I immediately thought about my own family and how I would feel if that happened to me.” All young adults in the avoid negativity and negativity conditions showed compliance. Three young adults in the positivity condition showed noncompliance. Older adults had higher rates of noncompliance than young adults, but rates were still relatively low (2 in avoid negativity, 2 in negativity, and 5 in positivity). The pattern of results for mood and memory analyses remained the same when

noncompliant participants were excluded. Thus, the analyses reported here include both compliant and noncompliant participants.

Gender. The effect of gender on sadness ratings was examined by conducting a 2 (gender) X 2 (age group) X 4 (instructions condition) X 4 (time) repeated measures ANOVA. Women ($M = 2.27$, $SE = .07$) reported more sadness than men ($M = 1.96$, $SE = .07$), $F(1,182) = 8.87$, $p = .003$, $\eta^2 = .05$. A gender X time interaction showed that this gender difference was present at Times 2-4, but not at Time 1, $F(3,180) = 4.13$, $p = .007$, $\eta^2 = .06$. No interactions of gender with condition or with age group were significant. Gender was not associated with the memory or thought-listing variables. Therefore, gender was excluded from further analyses.

Cued recall. A 2 (age group) X 4 (instructions condition) ANOVA on cued recall performance was also conducted. Not surprisingly, young adults ($M = 6.94$, $SE = .16$) demonstrated better recall than older adults ($M = 5.25$, $SE = .17$) for the 9 questions about negative movie content, $F(1,190) = 54.86$, $p < .001$, $\eta^2 = .22$. This was also the case for the 9 questions about positive movie content, $F(1,190) = 52.60$, $p < .001$, $\eta^2 = .22$ (YA: $M = 5.24$, $SE = .15$, OA: $M = 3.69$, $SE = .16$). The instructions main effect and age group X instructions interaction did not reach significance. Furthermore, cued recall was not related to mood, mood change, or positivity/negativity of writing. In addition, the negative and positive memory scales were not reliable (average $\alpha = .52$). Thus, cued recall performance was not analyzed further.

Age Differences in Emotional Reactivity to the Film

An important first step in analyzing emotion regulation is to examine initial emotional reactivity to the film. Thus, a 2 (age group) X 4 (instructions condition) X 2

(time points: 1 and 2) repeated measures ANOVA was conducted on sadness ratings before the film and immediately following the film. Age group and instructions condition were the between-subjects variables, and time was the within-subjects variable. There was a significant main effect for age group such that young adults ($M = 2.03$, $SE = .07$) reported less sadness overall than older adults ($M = 2.39$, $SE = .07$), $F(1,190) = 13.22$, $p < .001$, $\eta^2 = .07$. There was also a significant main effect for time such that participants were sadder at Time 2 (immediately after film; $M = 3.15$, $SE = .08$) than at Time 1 (baseline measure before instructions; $M = 1.27$, $SE = .04$), $F(1,190) = 476.39$, $p < .001$, $\eta^2 = .72$. Most importantly, the age group X time interaction was significant, $F(1,190) = 39.75$, $p < .001$, $\eta^2 = .17$. Follow-up simple effects showed that at Time 1, young adults ($M = 1.36$, $SE = .06$) reported somewhat more sadness than older adults ($M = 1.18$, $SE = .06$), $F(1,190) = 4.44$, $p = .036$, $\eta^2 = .023$. However, a large age difference was seen at Time 2 such that older adults were much more sad than young adults after the movie, $F(1,190) = 29.98$, $p < .001$, $\eta^2 = .14$ (YA: $M = 2.69$, $SE = .11$; OA: $M = 3.60$, $SE = .12$). Neither the main effect of instructions condition nor any interactions with condition were significant. Thus, across the instructions conditions, older adults reacted to the movie with more sadness than young adults did.

Emotion Regulation as a Function of Instructions Condition and Age Group

A 2 (age group) X 4 (time) X 4 (instructions condition) on sadness ratings was conducted. The age group X time X condition interaction was not significant, $F(9,457.7) = 1.22$, $p = .28$, $\eta^2 = .02$. The age group X time interaction was significant, $F(3,188) = 13.75$, $p < .001$, $\eta^2 = .18$. Specifically, older adults had a steeper slope of mood

improvement from Time 2 (immediately after the film) to Time 3 than young adults did, $F(1,196) = 6.40, p = .012, \eta^2 = .04$.

Because older adults responded to the mood induction with more sadness than young adults, emotion regulation after the film was also examined separately for each age group.

The effect of instructions on young adults' sadness ratings. A 3 (time points: 2, 3, and 4) X 4 (instructions condition: focus on positive, avoid negative, focus on negative, no instructions) repeated measures MANOVA was conducted on young adults' sadness ratings. Time was a within-subjects variable and condition was a between-subjects variable. There was a significant main effect for time such that sadness decreased from Time 2 (immediately after film; $M = 2.70, SE = .11$) to Time 3 ($M = 1.97, SE = .09$) to Time 4 ($M = 1.61, SE = .08$), $F(2,99) = 51.67, p < .001, \eta^2 = .51$. The condition main effect was also significant, $F(3,100) = 2.69, p = .05, \eta^2 = .08$. Young adults in the avoid negativity condition ($M = 1.80, SE = .15$) reported significantly lower sadness than young adults in the negativity condition ($M = 2.36, SE = .14$). Sadness ratings for the positivity condition ($M = 2.06, SE = .16$) and the no instructions condition ($M = 2.15, SE = .15$) were in between the other conditions and did not differ significantly from them or from each other.

As shown in Figure 1, the time X condition interaction was also significant, $F(6, 198) = 2.10, p = .05, \eta^2 = .06$. Simple effects analyses showed that condition differences in sadness were significant at Time 3 (after participants wrote about the movie), but not at Times 2 and 4. To test the hypothesis that instructions help young adults improve their mood after the movie relative to the no instructions condition, planned contrasts were

conducted on Time 3 sadness ratings. As expected, young adults in the avoid negativity condition ($M = 1.54$, $SD = .65$) reported less sadness than young adults in the no instructions condition ($M = 2.15$, $SD = 1.12$), $\Psi = .62$, $t(100) = 2.53$, $p = .013$. On the other hand, young adults who heard instructions to focus on the positive ($M = 1.87$, $SD = .82$) did not have different sadness ratings compared to the no instructions group, $\Psi = .28$, $t(100) = 1.13$, $p = .26$. Thus, giving young adults instructions to avoid negativity led to lower sadness ratings compared with young adults who did not receive instructions.

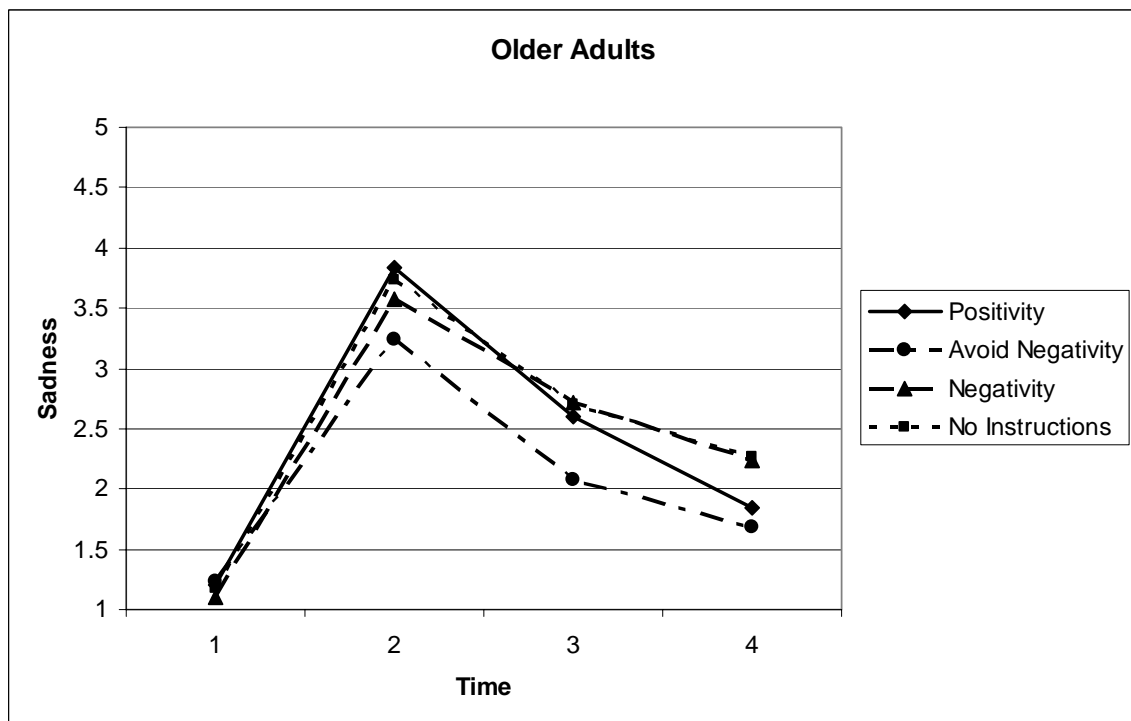
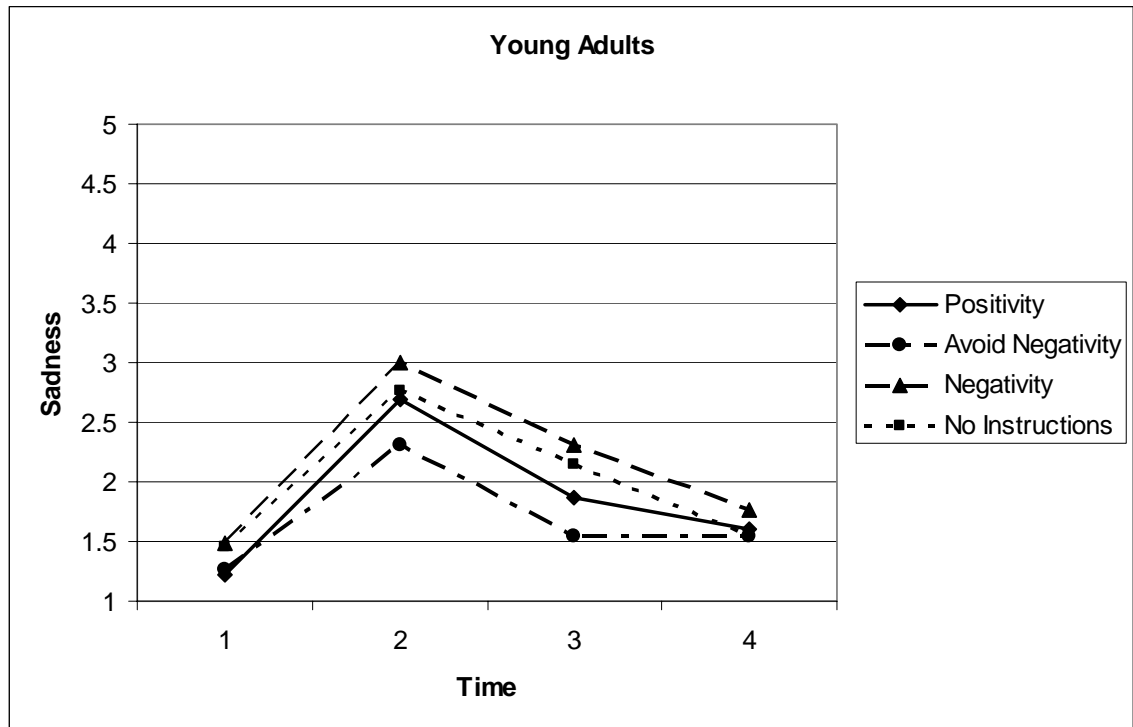


Figure 1. Sadness ratings of young and older adults in each condition over time.

The effect of instructions on older adults' sadness ratings. We expected older adults in the no instructions, positivity, and avoid negativity conditions would show decreased sadness after the movie as compared to the negativity condition. This would signal that older adults' mood outcomes are the same regardless of whether they spontaneously use strategies or are instructed to use effective strategies. A 3 (time points: 2, 3, and 4) X 4 (instructions condition) repeated measures MANOVA on the older adults' sadness ratings showed only partial support for this hypothesis. Not surprisingly, there was a main effect of time such that sadness decreased from Time 2 ($M = 3.60$, $SE = .13$) to Time 3 ($M = 2.52$, $SE = .13$) to Time 4 ($M = 2.01$, $SE = .11$), $F(2,89) = 79.94$, $p < .01$, $\eta^2 = .64$. The condition main effect, $F(3,90) = 1.56$, $p = .21$, and the time X condition interaction, $F(6,178) = .79$, $p = .58$, were not significant (see Figure 1). Thus, older adults in the no instructions, positivity, and avoid negativity conditions reported the same amount of sadness (consistent with the hypothesis). However, sadness reports in the negativity condition also did not differ from the other conditions, which was inconsistent with the hypothesis. Thus, no matter what instructions older adults received, they down-regulated sadness similarly.

Spontaneous Responding to the Film

The no instructions condition had special importance in this study because it allowed an examination of young and older adults' spontaneous emotion regulation after viewing the film. Thus, a 4 (time) X 2 (age group) ANOVA was conducted on sadness ratings for participants in the no instructions condition. Time was a within-subjects variable and age group was a between-subjects variable. The Greenhouse-Geisser correction was applied to within-subjects effects because the sphericity assumption was

violated. Because this analysis only included one-fourth of the participants (i.e., those in the no instructions condition), there were not enough participants to use the multivariate approach to repeated measures analysis. As expected, there was a main effect for time such that sadness increased immediately after the movie (Time 1: $M = 1.32$, $SE = .10$; Time 2: $M = 3.25$, $SE = .15$) and decreased as time passed (Time 3: $M = 2.43$, $SE = .17$; Time 4: $M = 1.90$, $SE = .15$), $F(2.39, 112.16) = 67.10$, $p < .01$, $\eta^2 = .59$. There was also an age group main effect. Young adults ($M = 1.98$, $SE = .16$) reported less sadness overall than older adults did ($M = 2.47$, $SE = .17$), $F(1,47) = 4.51$, $p = .039$, $\eta^2 = .09$.

Most importantly, the time X age group interaction was significant, $F(2.39, 112.16) = 7.38$, $p < .01$, $\eta^2 = .14$. As suggested by Figure 2, the interaction contrasts of age with all polynomial trends of time (linear, quadratic, cubic) were significant at the .05 level. To interpret this interaction, the simple effects were examined. At Time 1 (immediately before the movie), there were no age differences in sadness ratings. At Time 2 (immediately after the movie), older adults were significantly sadder than young adults. By Time 3, the age difference in sadness ratings was eliminated, suggesting that older adults accelerated their regulation so that they were no longer more sad than the young adults. Curiously, older adults were again sadder than young adults at Time 4. In fact, older adults never returned to their baseline sadness levels; they were significantly sadder at Time 4 than at Time 1. Young adults did return to their baseline sadness levels, such that there was no significant difference between their sadness ratings at Time 1 and at Time 4.

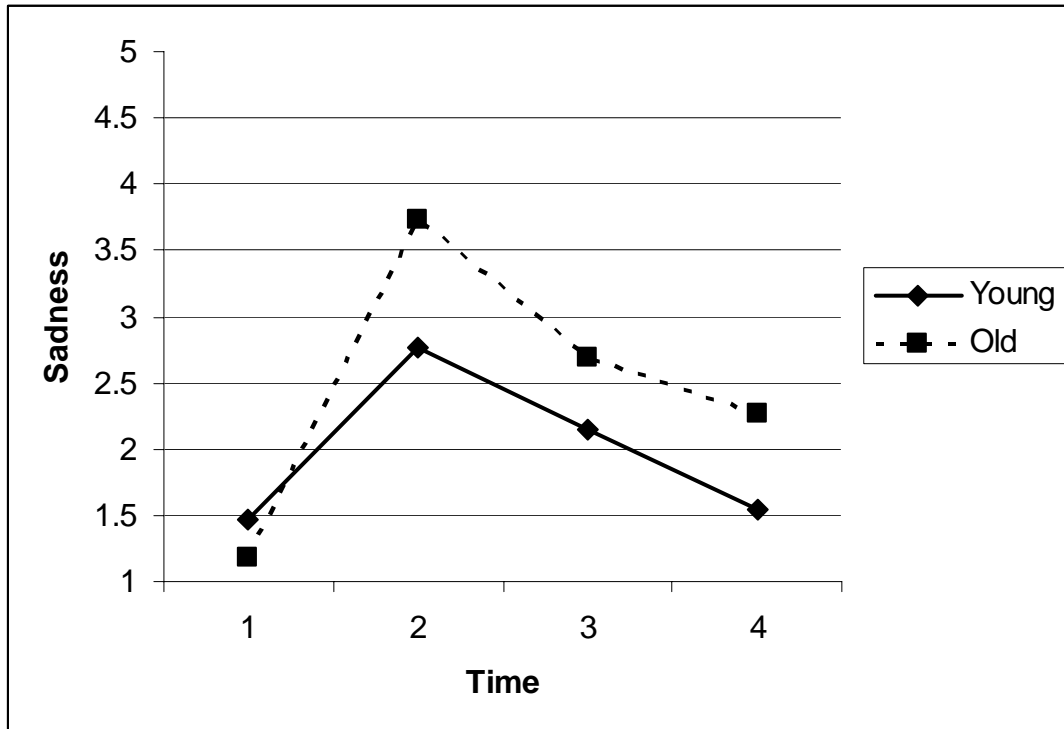


Figure 2. Sadness ratings of young and older adults in the no instructions condition. Time 1 = pre-mood induction; Time 2 = post-mood induction; Time 3 = after writing task; Time 4 = at end of emotion-regulation section of study.

To further examine this unexpected finding of older adults feeling sadder than young adults at Time 4, a 2 (negative writing: high amounts vs. low amounts) X 2 (Time points 3 and 4) ANOVA was conducted with older adults' sadness ratings in the no instructions condition as the dependent variable. Only the time main effect was significant, with participants feeling sadder at Time 3 ($M = 2.69, SE = .27$) than at Time 4 ($M = 2.25, SE = .25$), $F(1,21) = 8.17, p = .009, \eta^2 = .28$. Although the negative writing X time interaction was not significant, simple effects showed that older adults with a high amount of negative emotion words in their writing after the film did not significantly reduce their sadness from Time 3 to Time 4. Older adults with a low amount of negative writing did significantly improve their mood from Time 3 to Time 4. Thus, individual differences in amount of negativity spontaneously written in the no instructions condition played a role in whether older adults successfully improved their mood. It did not play a role for young adults. Overall, though, there is not enough evidence to conclude that older adults' spontaneous emotion regulation led to steeper mood improvement immediately following the movie than young adults' spontaneous emotion regulation did.

Emotional Content of Participants' Writing about the Film

The emotional content of participants' writing about the film was examined to determine the amount of positivity and negativity in participants' writing immediately after the movie and their free recall at the end of the study. The LIWC (Linguistic Inquiry and Word Count) computer program was used for this purpose (Pennebaker, Francis, & Booth, 2003).

Positivity of free recall. To determine whether instructions to avoid negativity or focus on positivity led young adults to retell the story using more positive words, a 2 (age

group) X 4 (instructions condition) between-subjects ANOVA was conducted. The dependent variable was the percentage of words in the final participant-written narrative that were positive. Older adults ($M = 2.56$, $SE = .15$) wrote a higher percentage of positive words than young adults ($M = 1.79$, $SE = .14$), $F(1,188) = 14.46$, $p < .01$, $\eta^2 = .07$. There was also a condition main effect, $F(3,188) = 4.10$, $p = .008$, $\eta^2 = .06$. Participants in the avoid negativity condition ($M = 2.65$, $SE = .20$) wrote significantly more positive words than participants in the negativity condition ($M = 1.73$, $SE = .20$), whereas the positivity condition ($M = 2.34$, $SE = .20$) and the no instructions condition ($M = 1.97$, $SE = .21$) were in between the other conditions and did not differ significantly from them or from each other.

The age group X condition interaction did not reach significance, $F(3,188) = 1.55$, $p = .20$, but planned contrasts were conducted to test the a priori hypothesis. As shown in Table 2, there were condition differences in positive words in young adults but not in older adults. As expected, young adults in the avoid negativity condition wrote more positive words than those in the no instructions condition, $\Psi = .89$, $t(100) = 2.59$, $p = .011$. Contrary to the prediction, positive words were equally common among young adults in the positivity and no instructions conditions.

Table 2

Mean (SD) Percentage of Words Written in Retell Task that were Positive and Negative as a Function of Age Group and Instructions Condition

	<u>Positive Words</u>		<u>Negative Words</u>	
	Young	Older	Young	Older
Instructions Condition				
Positivity	1.61 (1.03)	3.06 (1.39)	3.20 (2.60)	3.17 (1.77)
Avoid Negativity	2.52 (1.30)	2.77 (1.86)	2.24 (1.20)	2.99 (2.08)
Negativity	1.38 (1.23)	2.08 (1.62)	2.84 (1.42)	4.53 (2.60)
No Instructions	1.64 (1.34)	2.31 (1.39)	2.59 (1.18)	3.14 (1.54)

Negativity of free recall. A similar 2 (age group) X 4 (instructions condition) ANOVA on the percentage of words in the final re-telling that were negative was conducted. There was again an age main effect such that older adults ($M = 3.45$, $SE = .19$) wrote proportionally more negative words than young adults ($M = 2.72$, $SE = .18$), $F(1,188) = 7.78$, $p = .006$, $\eta^2 = .04$. Thus, older adults' re-telling of the story was more emotional (both positive and negative) than young adults'. The condition main effect was also significant, $F(3,188) = 3.10$, $p = .028$, $\eta^2 = .05$. Participants in the avoid negativity condition ($M = 2.61$, $SE = .26$) wrote significantly fewer negative words than participants in the negativity condition ($M = 3.68$, $SE = .26$). Negative emotion words in the positivity ($M = 3.18$, $SE = .27$) and no instructions groups ($M = 2.86$, $SE = .27$) did not differ from any other conditions.

Although the age group X condition interaction did not reach significance for the percentage of words that were negative, $F(3,188) = 1.82$, $p = .15$, planned contrasts showed that there were condition differences in older adults but not young adults. Older adults in the negativity condition wrote significantly more negative words than those in the no instructions condition, $\Psi = 4.29$, $t(88) = 2.84$, $p = .006$. As expected, the avoid negativity, positivity, and no instructions conditions did not differ from each other in percentage of words that were negative emotions.

Writing immediately after the film and writing at end of the study. Negativity of writing was also examined as a function of time (i.e., writing immediately after the movie compared to writing at the end of the study). Although the writing task was not identical at the two time points, examining writing immediately after the mood induction and at the end of the study provided an opportunity to examine how participants' thoughts and

reconstructed memories differed. A 2 (time of writing) X 2 (age group) X 4 (instructions condition) repeated measures ANOVA revealed a significant time X age X condition interaction that is depicted in Figure 3, $F(3,188) = 2.59, p = .05, \eta^2 = .04$. Follow-up analyses showed that in young adults, the negativity and no instructions conditions followed the same trajectory from Time 1 to Time 2 of writing. The avoid negativity and positivity conditions did not differ from each other but differed from the other two conditions. In older adults, negative words in the negativity condition were significantly higher than in the other conditions. The 2 X 2 X 4 ANOVA was repeated with positivity of writing as the dependent variable, but no interactions with age group were significant.

Overall, analyses of the emotional content of participants' writing showed that instructions to avoid negativity led young adults to write more positively in their free recall compared to young adults without instructions. Instructions to focus on negativity led older adults to write more negatively compared to older adults without instructions.

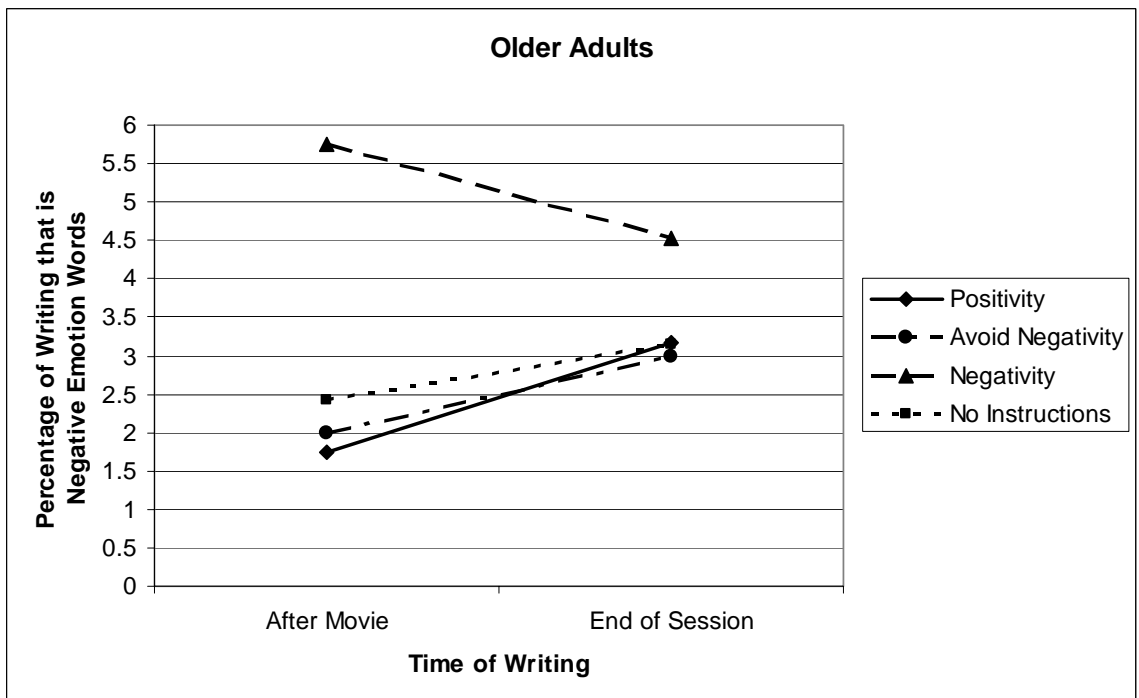
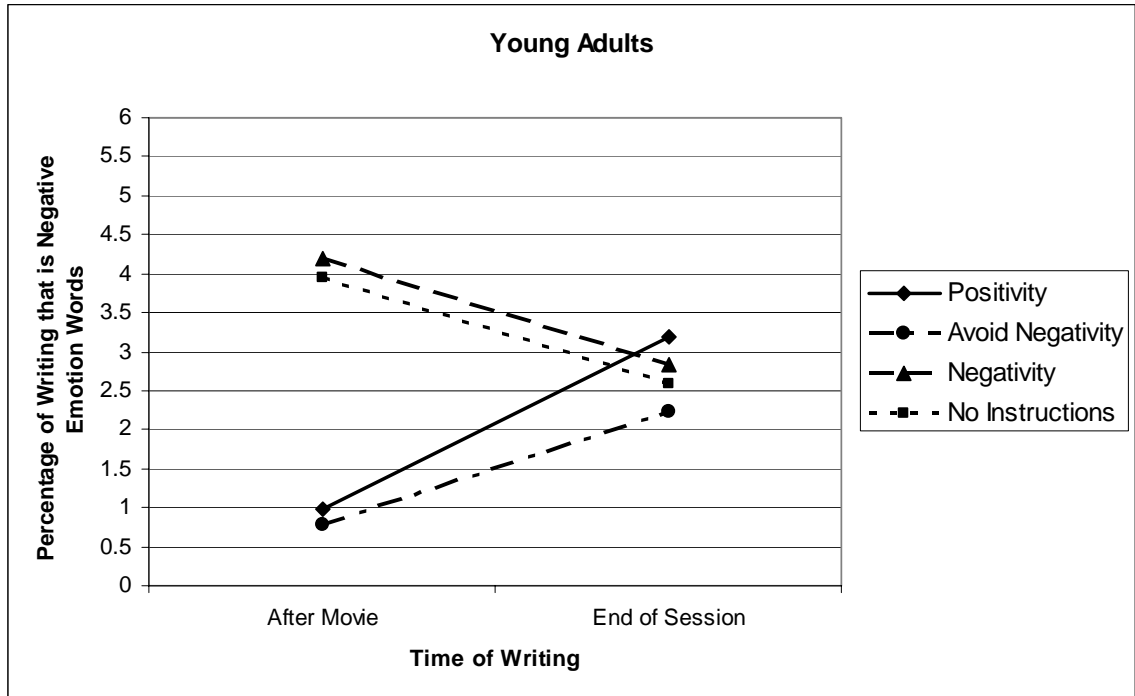


Figure 3. Percentage of writing that was negative emotion words in young and older adults in each condition at two time points.

Relationship Between Sadness Ratings and Emotional Content of Re-Telling Story of Film

Individuals who felt the saddest after the movie might be particularly motivated to focus their thoughts on positivity in order to improve their mood. To determine if this was the case, correlations between sadness ratings at Time 2 and the percentage of words that were positive in the written re-telling at the end of the study were computed. These variables were positively correlated in the older adults ($r = .39, p < .001$); this correlation was significant in all four instructions conditions. This suggests that the older adults who were most saddened by the movie wrote the most positive emotion words when they re-told the story of the film. In young adults, this correlation was not significant ($r = -.06, p = .57$). The correlation in older adults was significantly larger than the correlation in young adults, $p < .05$. However, there were condition differences in the magnitude of this correlation in young adults. Specifically, the correlation was significant only in the positivity condition, $r = .43, p = .04$ (avoid negativity: $r = -.14$; negativity: $r = -.01$; no instructions: $r = -.07$). Thus, when young adults are instructed to focus on the positive, the relationship between these variables is the same as it is for the older adults. Older adults and young adults in the positivity condition showed mood-incongruent free recall at the end of the study.

The Role of Individual Difference Variables in Emotion Regulation

Rumination. We hypothesized that individual differences in the tendency to ruminate could also mediate age differences in mood improvement. Step 1 of mediation was met because older adults showed greater mood improvement from Time 2 to Time 5 than young adults did (Kenny, Kashy, & Bolger, 1998). Step 2 was also met, as shown by

older adults' lower rumination scores than young adults, $\beta = .50, p < .001$. However, step 3 was not met. Although the zero-order correlation between rumination and mood change was significant ($r = -.21, p = .005$), rumination was not significantly associated with mood change when controlling for age, $\beta = .08, p = .35$. Step 4 was also not met; age group still related to mood change when controlling for rumination, $\beta = .258, p = .01$. Thus, rumination does not explain older adults' larger mood improvement as compared to young adults.

Attention to Positive and Negative Stimuli. The individual difference variable of Attention to Positive stimuli was tested as a mediator of age differences in mood change. The difference score of Time 2 sadness minus Time 5 sadness was regressed onto age group (a dummy variable in which 0 = young and 1 = old). Older adults demonstrated significantly more mood change than young adults, $\beta = .29, p < .001$. Thus, step 1 of the mediation was met. To test step 2, Attention to Positive was regressed onto age. Older adults had higher scores on Attention to Positive than young adults, $\beta = .22, p = .002$. Step 3 showed that Attention to Positive was positively associated with mood change even when controlling for age, $\beta = .16, p = .042$. Step 4 was not met; age group still related to mood change when controlling for Attention to Positive, $\beta = .26, p = .001$. Thus, older adults' larger reduction in sadness from Time 2 to Time 5 (compared to young adults) is partially explained by older adults' higher scores on the Attention to Positive stimuli scale.

Attention to Negative stimuli is also a potential mediator of age differences in mood improvement. The Attention to Negative scale is negatively correlated with the Attention to Positive scale, but the relationship is small, $r = -.12$. Thus, the two scales

assess different constructs and are not two ends of a unidimensional construct. Step 1 of testing this mediation was described above; older adults had greater mood improvement than young adults. Step 2 of testing this mediation was also met; older adults had lower scores on Attention to Negative than young adults, $\beta = -.32, p < .001$. Attention to Negative was negatively associated with mood change when controlling for age, $\beta = -.16, p = .05$, so Step 3 was met. Finally, Step 4 was not met; age group still related to mood change when controlling for Attention to Negative, $\beta = .24, p = .003$. Therefore, older adults' greater mood improvement compared to young adults is also partially explained by older adults' lower scores on the Attention to Negative stimuli scale.

Path model. The three individual difference variables (rumination, Attention to Positive stimuli, and Attention to Negative stimuli) were also examined simultaneously as mediators of age differences in mood change. As seen in Figure 4, only Attention to Positive stimuli mediated age differences in mood change. Older adults reported paying more attention to positive information in their everyday lives, and individuals with higher Attention to Positive scores reported more mood change. Attention to Positive only partially mediated these age differences; there was still a significant direct effect from age to mood change. Overall, the model only explained 18.8% of the variance in mood change, $X^2(5) = 41.97, p = .000$, RMSEA = .24, CFI = .60.

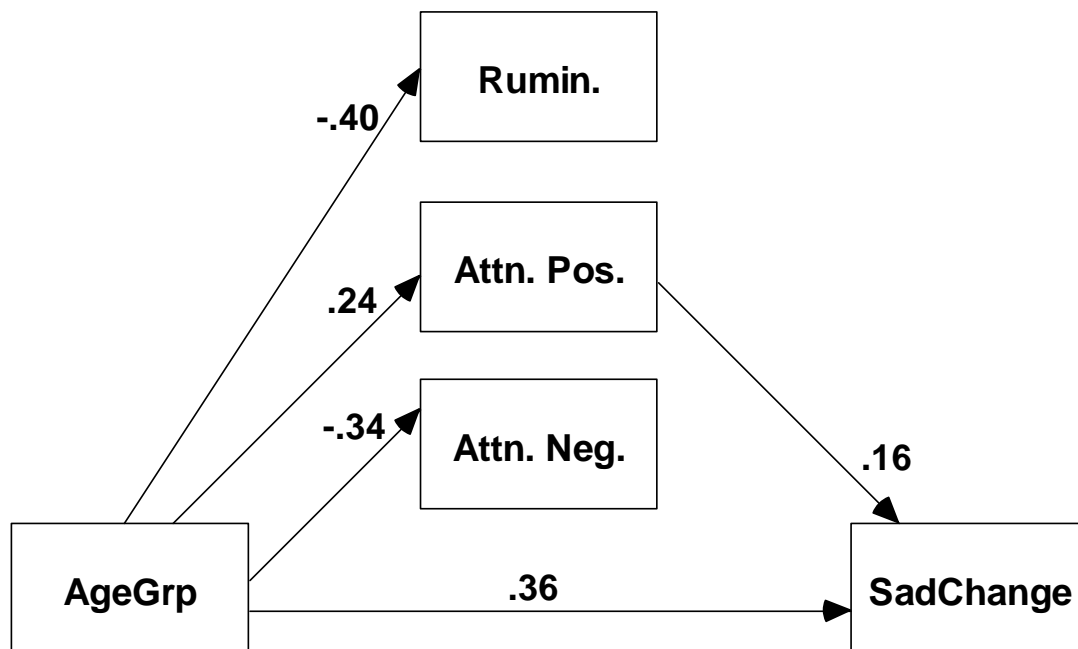


Figure 4. Path model of rumination, attention to positive stimuli, and attention to negative stimuli as mediators of age differences in mood change. $X^2(5) = 41.97$, $p = .000$, RMSEA = .24, CFI = .60. The model explains 18.8% of the variance in mood change.

CHAPTER 4

DISCUSSION

The findings from this study indicate that instructing young adults to avoid focusing on the negativity they see in a sad film clip leads them to have lower sadness ratings and more positive memory for the film. Such instructions do not affect older adults' sadness ratings and positivity in memory, possibly because older adults use the avoid negativity strategy spontaneously. Examining responses to the film revealed a steeper mood improvement immediately following the movie in older adults as compared to young adults. This was consistent with previous research (Mienaltowski & Blanchard-Fields, 2005). Across conditions, older adults (and young adults instructed to focus on positivity) who reported the most sadness in response to the film had the most positive re-telling of the film from memory. This is consistent with studies examining mood-incongruity as an emotion regulation strategy (Rusting & DeHart, 2000). Finally, older adults' increased attention to positive stimuli in their everyday lives partially explained their greater mood improvement over time.

The Effects of Emotion Regulation Strategy Instructions

The effect of positivity and avoid negativity instructions. Giving young adults instructions to avoid negativity resulted in better mood outcomes and more positive memory for the film as compared to young adults who did not receive strategy instructions. This is consistent with previous research in which giving young adults emotion-based instructions led them to behave like older adults. For example, older nuns recalled their past questionnaire answers as more positive than young nuns did (Kennedy

et al., 2004). Young nuns who received instructions to focus on their current feelings, however, showed the same positivity effect in autobiographical recall as the older nuns. Similarly, young adults instructed to focus on their emotions rated their past choices favorably in the same way that older adults did (Mather & Johnson, 2000). In the present study, this finding was extended to free recall of a film and to sadness ratings. Providing instructions to use an effective emotion regulation strategy led young adults to resemble older adults in their free recall and experience of sadness. Presumably, this occurs because older adults spontaneously use effective emotion regulation strategies such as avoiding negativity. Young adults use this strategy only when they receive instructions to do so, possibly because their open-ended time perspective leads them to focus less on emotional goals (Carstensen et al., 1999).

Further evidence for older adults' use of effective strategies comes from the relationship between sadness after the mood induction and the positivity of re-telling the film. Those older adults who felt the saddest after the mood induction had the most positivity in their free recall of the film. This suggests that the older adults were using mood-incongruent memory (i.e., recalling positivity) to improve their mood (Lyubomirsky et al., 1998). Retrieving positive memories after a sad mood induction is often motivated by the desire for mood repair (Josephson, Singer, & Salovey, 1996). Mood-incongruent recall is especially likely to occur after a time delay, when emotion regulation has presumably affected the emotional content of recall (Sedikides, 1994). This is consistent with the present study, in which recall occurred much later in the session than the mood induction. Theorists suggest that mood-incongruent recall is motivational in nature (Josephson et al., 1996; Sedikides, 1994). Thus, consistent with

socioemotional selectivity theory (Carstensen et al., 1999), older adults in the present study might have written more positive words during free recall because they were focusing on emotion regulation.

Young adults did not show evidence for mood-incongruence in free recall overall; there was no relationship between young adults' sadness after the mood induction and the positivity of their free recall. However, young adults in the positivity condition did show evidence of using memory for mood repair. Young adults in this condition who were most sad after the movie wrote the most positive words during free recall. Thus, giving instructions to young adults again led to similar behavior as what the older adults did spontaneously.

Comparing the effectiveness of positivity and avoiding negativity. As described above, giving young adults instructions to avoid negativity led to effective emotion regulation. Positive emotions and negative emotions are not two ends of the same continuum (Reich, Zautra, & Potter, 2001), so it is important to directly compare the effectiveness of focusing on positivity and avoiding negativity. Based on Gross's classification of emotion regulation strategies (Gross, 1998b), avoiding negativity (or distraction, an attentional deployment strategy) and focusing on positivity (or reappraisal, a cognitive change strategy) might be equally effective for repairing mood. Distraction and reappraisal are both effective and are more common in older than young adults (Blanchard-Fields et al., 2004; Gross, 1998a; John & Gross, 2004; Thayer et al., 1994). Thus, directly comparing the effectiveness of these two strategies is an important contribution of the present study.

The avoid negativity strategy was more effective at reducing sadness than the positivity strategy in both age groups. Participants in the avoid negativity condition reported the lowest levels of sadness both immediately following the movie and a few minutes later. These participants also wrote more positive and fewer negative words while re-telling the story of the film. Thus, avoiding negativity is a promising strategy for future research in emotion regulation and memory. This is especially important because the effectiveness of positive reappraisal has been studied extensively (Gross 1998a; Richards & Gross, 2000), while distraction or avoiding negativity has received much less attention.

It should be noted that the increased effectiveness of avoiding negativity as compared to focusing on positivity for improving mood may be specific to the task used in the current study. Focusing on the bright side of the events in the sad film was difficult for participants, as shown by the relatively high number of individuals who were not able to follow the instructions to focus on positivity. Reappraisal is most effective when individuals have an opportunity to engage in antecedent-focused regulation (Gross, 1998a). Regulating one's emotions at an early time point in the emotion-generation process (i.e., antecedent-focused regulation) is theorized to lead to better outcomes. In the present study, we attempted to induce antecedent-focused regulation by providing strategy instructions before participants watched the film clip. However, there was a very short time period between receiving emotion regulation instructions and being confronted by extremely negative scenes of a mother losing her children. Thus, future research should compare the effectiveness of avoiding negativity and focusing on positivity in

other tasks to examine the generalizability of the finding. In particular, a negative mood induction that does not contain death would lend itself better to positive reappraisal.

Although instructions to avoid negativity led to better mood outcomes than instructions to focus on positivity, one of the memory outcomes showed a different pattern. In particular, young adults who were instructed to focus on positivity showed more evidence of mood-incongruent recall than other young adults. In this subset of young adults, those who felt the most sad after the film wrote more positive words in their recall of the film. This effect did not emerge among young adults who were instructed to avoid negativity. Thus, the effectiveness of avoiding negativity and focusing on positivity depends somewhat on the outcome that is assessed.

The effect of instructions to maintain negativity. As hypothesized, older adults' mood and memory outcomes were not affected by receiving avoid negativity or positivity instructions. This suggests that older adults may spontaneously use these strategies, because the outcomes were generally similar whether they received these instructions or whether they received no instructions. Older adults were affected by instructions to focus on negativity, however. These older adults wrote significantly more negative emotion words during free recall than older adults in the other three conditions. Thus, older adults are capable of maintaining negativity when instructed to do so. This is consistent with research on emotional amplification, in which older adults expressed negative emotions more when they received instructions to amplify their emotions than when they did not receive such instructions (Kunzmann, Kupperbusch, & Levenson, 2005). Older adults in the negativity condition did not differ from the other conditions in sadness ratings, however. Perhaps older adults were so saddened by the film clip that a ceiling effect

prevented the negativity instructions from affecting their sadness ratings. Future research with other mood induction procedures should examine why the negativity of older adults' recall is more affected by instructions than emotion ratings are.

Emotional Reactivity to the Sadness Induction

Older adults reported more sadness after the mood induction than young adults did, regardless of the instructions received. This is consistent with previous research in which older adults responded with more sadness to films about an execution and a woman with Alzheimer's disease than young adults did (Kunzmann & Gruhn, 2005). Other studies have shown no age differences in subjective emotion ratings following mood inductions (e.g., Tsai, Levenson, & Carstensen, 2000) or greater reactivity in young adults (Kunzmann et al., 2005). One factor that might underlie these differing results is participants' familiarity and identification with the events in the film. When a film elicits disgust by showing medical procedures, older adults do not feel as much disgust as young adults because they are more familiar with and desensitized to such procedures (Kunzmann et al., 2005). The present study elicited sadness by portraying a woman's reaction to the death of her children. Older adults, who were more likely to be parents than the young adults in this sample, probably identified with the main character more than the young adults did. This was also the case in a previous study in which older adults were likely to identify with an Alzheimer's patient more than young adults (Kunzmann & Gruhn, 2005). Future research should examine individual difference characteristics such as identification with the characters and experience with the film's events as predictors of emotional reactivity and subsequent emotion regulation. In the present study, the importance of individual differences in thoughts after the film emerged. Older adults who

wrote the most negative words after the film engaged in the least mood repair. Future research should investigate what variables predict the occurrence of these negative thoughts. Researchers should also examine emotion regulation in young and older adults who have shown equal reactivity to a mood induction. This would provide a cleaner and more straightforward test of age differences in emotion regulation.

Emotional Enhancement in Older Adults' Free Recall

Older adults showed evidence of emotional enhancement when they re-told the story of the film at the end of the study. Older adults wrote more emotion words (both positive and negative) than young adults. This is more consistent with early research on the effects of emotional content on age differences in memory than with recent research on the positivity effect. For example, older adults in one study recalled proportionally more emotional information from a narrative than young adults did (Carstensen & Turk-Charles, 1994). Free recall of positive pictures (such as a romantic couple) and negative pictures (such as a famine victim) were more accurate in a sample of older adults than recall of neutral pictures (Hamann, Monarch, & Goldstein, 2000). Older adults also demonstrated more accurate recall and recognition for emotional words than for non-emotional words (Kensinger, Brierley, Medford, Growdon, & Corkin, 2002). The robustness of this finding across different stimuli types (i.e., narrative, pictures, and words) and memory tests (i.e., recall and recognition) points to the importance of the emotional enhancement effect in older adults.

Under what conditions is emotional enhancement (for both positive and negative stimuli) observed instead of a positivity effect? The positivity effect often occurs when the material being remembered is self-relevant. For example, older nuns rated memories

from their own lives as more positive than they really were; younger nuns did not show this positivity effect (Kennedy et al., 2004). In addition, older adults (but not young adults) rated their choices as more positive than they really were (Mather & Johnson, 2000). In both these studies in which a positivity effect was found, participants recalled information about their own actions. In the present study of online emotion regulation, participants were not retrospectively remembering self-relevant information. Future research needs to further examine the conditions in which a general emotional enhancement effect and a positivity effect are observed in older adults.

In the present study, the general emotional enhancement seen in older adults' free recall could be partially due to their greater reactivity to the film. Older adults' high ratings of sadness could lead to negative writing, whereas their motivation to regulate their sadness could lead to positive writing. More investigation of the correlates of negative and positive recall in older adults is required. In the present study, there was no evidence for a memory-related positivity effect.

The Importance of Individual Difference Variables

Attention to Positive and Negative Information. Dispositional tendencies to focus on positive information and negative information were important predictors of mood change in the present study. Individuals who reported focusing on positive information in their everyday life, or who reported not focusing on negative information, showed more mood improvement after the film. Importantly, older adults' increased focus on positivity and decreased focus on negativity partially explained their greater mood improvement compared to young adults. Attention to positive information played a larger role in explaining age differences in mood change than attention to negative information did.

The importance of a dispositional tendency to avoid negativity is consistent with our demonstration of the effectiveness of instructions to avoid negativity. Interestingly, the dispositional tendency to attend to positive information also played a role in predicting effective emotion regulation. Thus, we found evidence for a “focus on positivity” effect in this individual difference variable even though the instructions to focus on positivity did not lead to better emotion regulation. This might have occurred because the positivity instructions while watching the film were difficult for participants to implement. Thus, future research should further examine the effectiveness of focusing on positivity and avoiding negativity. It is also important to examine attention to positive and negative information in its own right, and not just as a mediator of age differences. Future research should examine individual differences within each age group and explore how such differences relate to emotion regulation in real-world contexts, such as marital conflicts or other interpersonal problems. In addition, attention to positive information only partially explained age differences in mood change. Future research should examine the role of other individual difference variables in predicting emotion regulation.

Rumination. Individual differences in ruminating about everyday negative events did not play a role in the present study. Rumination was not correlated with any mood change or memory variables. Perhaps dispositional tendencies to ruminate in response to negative, stressful life events do not relate to mood regulation in a laboratory task. In addition, rumination is often studied in the context of clinical depression (Lyubomirsky et al., 1998). Rumination might play a more important role in emotion regulation tasks for a clinical population than for a healthy population. Furthermore, rumination may affect mood only when it occurs over a prolonged period of time. Instructing participants to

continue thinking about negativity for a few additional minutes after a mood induction is not the same as ruminating about negativity in one's own life for many days. Although rumination did not shed light on age or individual differences in mood in this study, older adults did report substantially lower levels of rumination than young adults. Future research should examine what underlies this age difference. Possibilities include shifting to a limited future time perspective (Carstensen et al., 1999) or increased life experience. For example, individuals who feel they do not have much time left in life may choose not to spend that time dwelling on negativity. Also, increased life experience may teach individuals that focusing on negativity does not help them solve problems.

Limitations and Future Directions

The present study shed light on emotion regulation strategies that might underlie age differences in negative emotions. However, there were several limitations. First, the laboratory setting and somewhat artificial emotion regulation task limits external validity. Participants might avoid focusing on the negative aspects of the film clip, but that does not necessarily translate into avoiding negative situations in real life. For example, do older adults deliberately seek to avoid negative conflict in their interpersonal relationships? Future research should examine this in the context of experience sampling or interviews.

Second, this study did not definitively determine the cause of older adults' decreased reporting of negative emotions in their lives. Making young adults' sadness ratings look like older adults' ratings by instructing them to avoid negativity is suggestive that this strategy might partially underlie emotional age differences. However, alternative

explanations are possible, such as individual differences in motivation to be a “good participant” in the study.

In addition, the cued recall questionnaire results were quite different from the free recall data. The cued recall questions showed no significant differences based on condition and no evidence for a positivity effect. Instead, they simply reflected older adults’ poorer memory than young adults overall. The cued recall questions all related to details and not gist-based information. Focusing on one’s emotions has been shown to impair memory for such contextual details (Mather, Johnson, & DeLeonardis, 1999). Thus, the cued recall questionnaire might not have captured encoding of positive and negative information while watching the film. Coding participants’ free recall for accuracy would provide important information about age differences in attention toward positive and negative information.

Emotional experience in this study was determined by self-reports at several time points, such as after viewing the film clip. Future research should examine emotional experience during the film, when emotion regulation starts to occur. This could be accomplished by asking participants to use a dial to make continuous sadness ratings while they watched the film clip. Physiological measures of emotional responding such as skin conductance and heart rate are also important to obtain. In addition, participants’ facial expressions during the film could be videotaped and coded for emotional displays. Such evidence would provide a more complete picture of emotion regulation because subjective reports, physiological data, and expressive behavior are not strongly correlated with each other (Levenson, 2000).

Another potential limitation is the possibility of demand characteristics. Perhaps participants who were instructed to avoid negativity rated themselves as less sad because they wanted to provide the desired response. Two pieces of evidence argue against demand characteristics as an alternative explanation for the results of the present study. One is that a similar pattern of results emerged in the mood outcomes and in the memory outcomes. Demand characteristics were unlikely to play a role in memory at the end of the session because it would take a great deal of effort to ensure one's writing contained few negative words and many positive words. In addition, if demand characteristics were operating, it would be expected to occur in the focus on positivity condition also. However, the important mood-related results occurred only in the avoid negativity condition. Thus, demand characteristics probably do not explain the results of this study. To further guard against demand characteristics in future research, it would be helpful to include implicit assessments of mood, such as a stem-completion task. If the implicit and explicit assessments of mood converged, that would provide stronger evidence for the hypotheses.

Finally, the present study did not disentangle age differences in motivation to regulate emotions from age differences in ability to regulate emotions. Socioemotional selectivity theory suggests that older adults are motivated by their limited future time perspective to prioritize emotion regulation (Carstensen et al., 1999). However, it is unclear whether older adults would also be more skilled at emotion regulation if motivation could be equated in young and older adults. Future research should examine this by providing an incentive for successful emotion regulation in both age groups (e.g., extra pay) and by providing more specific instructions (e.g., "Focus on the happy times

the woman had with her family). If older adults show more mood improvement than young adults even when the two age groups receive equal incentives for successful emotion regulation, that would provide support for the idea that older adults have better emotion regulation abilities than young adults.

Conclusion

This study demonstrated the importance of avoiding negativity (i.e., distraction) as a strategy for regulating sadness. Avoiding negativity is worth exploring further as a potential explanation for older adults' positive emotional outcomes. This experiment extended the literature on emotion regulation in adulthood by taking it to the level of online strategy use, instead of simply examining retrospectively reported emotional outcomes. By including mood measures in addition to memory measures, this study showed the generalizability of the positivity effect beyond attention- and memory-related tasks.

APPENDIX A

INSTRUCTIONS TO PARTICIPANTS IN EACH CONDITION

Avoid negativity condition. As you watch the film clip, please do NOT FOCUS ON THE NEGATIVE aspects of the movie. Avoid focusing or dwelling on the negative events in the film.”

Negativity condition. As you watch the film clip, please focus on the NEGATIVE aspects of the movie. Think about possible NEGATIVE CONSEQUENCES of the events in the film and what bad things might come from the events.

Positivity condition. As you watch the film clip, please focus on the POSITIVE aspects of the movie. Think about possible POSITIVE CONSEQUENCES of the events in the film and what good things might come from the events.

No instructions condition. Please watch the film clip

APPENDIX B

ATTENTION TO POSITIVE AND NEGATIVE INFORMATION

SCALE

Please circle a number to indicate how much each of the following statements describes you.

1. I pay attention to positive things that other people do.

1	2	3	4	5
Very untrue of me				Very true of me

2. I can't forget the times I have performed poorly at something.

3. I don't forget when others do things that hurt me.

4. I am particularly aware of the bad news that appears in TV news broadcasts.

5. Things that I am not good at are always on my mind.

6. I am highly aware of the many small pleasures that life offers me.

7. I pay attention to things that lift me up.

8. I am quick to notice other people's faults.

9. There are many things I like in my life.

10. It is important to pay attention to negative characteristics I possess.

11. I am especially aware of characteristics of mine that my family and friends praise.

12. I notice when something is not going well even if it's a trivial thing.

13. I pay attention to positive characteristics of myself.

14. It is important for me to remember the good things about others.

15. There are many things about myself I would like to improve.

16. No matter who is smiling, I notice that happy face.
17. I realize and pay attention to moments when everything is going well.
18. I am particularly aware of things that I am successful at.
19. Whenever someone criticizes me, those comments stay in my mind for a while.
20. I easily see the fun side of any activity that I'm in.
21. I always notice obstacles when I perform some tasks.
22. I usually notice situations that made me feel bad in the past.

APPENDIX C

MEMORY QUESTIONNAIRE ABOUT FILM CLIP

Please answer the following questions about the film clip you watched earlier.

Scene in kitchen

1. What did the mother and daughters do together? _____
2. What did the little girl put in the batter? _____
3. Who are the girls waiting for? _____

Scene in restaurant

4. What did the little girl call her drink? _____
5. How much more time with the ice cream did the daughter ask for? _____
6. What does the father try to get his daughters to do? _____
7. What does the father do after putting his coat on? _____

Scene with mother talking to group

8. What does the mother say about her husband? _____

Scene in house

9. What room of the house was the mother in when she received the phone call?

10. Who were the mother's two phone messages from?

Scene at hospital

11. What does the doctor ask the mother to do when he first sees her?

12. What was the name of the doctor? _____

13. What type of accident were the father and daughters in?

14. What procedure did the doctors perform on the husband?

15. What part of the father's body suffered multiple fractures?

16. What did the doctors remove from the father's brain?

17. What condition is the husband in? _____
18. What was the daughter's main symptom when she arrived at the hospital?

19. What is the first thing the mother says when she hears her daughters have died?

20. What do the doctors recommend to the mother?

21. Who did the mother hug at the end?

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