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Emotion and Aging: Experience, Expression, and Control

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Age differences in emotional experience, expression, and control were investigated in 4 studies. A community sample of 127 African Americans and European Americans (ages 19–96 years) was used in Study 1; a community sample of 82 Chinese Americans and European Americans (ages 20–85 years) was used in Study 2; a community sample of 49 Norwegians drawn from 2 age groups (ages 20–35 years and 70+ years) was used in Study 3; and a sample of 1,080 American nuns (ages 24–101 years) was used in Study 4. Across studies, a consistent pattern of age differences emerged. Compared with younger participants, older participants reported fewer negative emotional experiences and greater emotional control. Findings regarding emotional expressivity were less consistent, but when there were age differences, older participants reported lesser expressivity. Results are interpreted in terms of increasingly competent emotion regulation across the life span.

Popular stereotypes suggest that people become less emotional as they age: Out of the exuberance of abundant emotional energy in early adulthood develops the moderation of cooler rationality in middle adulthood and older age (Bromley, 1990; Cumming & Henry, 1961). Pervasive as this stereotype is, relatively little empirical attention has been paid to developmental trends in the domain of emotion beyond late childhood (Thompson, 1990).

There are, however, a number of signs that a life span analysis of emotion may be fruitful. Among emotion researchers, for example, there is widespread agreement that emotional experience is inextricably intertwined with cognitive appraisals of situations (Folkman, Lazarus, Pimley, & Novacek, 1987; Lazarus, 1991; Lazarus & Folkman, 1984) and motivations to realize particular goals (Stein & Levine, 1987; Stein & Trabasso, 1990). Among life span developmentalists, there is growing consensus that there are age differences in the types of cognitive appraisals people make (Blanchard-Fields, 1986; Blanchard-Fields, Camp, & Casper-Jahnke, 1995) and the relative salience of particular motives (Carstensen, 1993). In addition, age differences have been uncovered in both the salience (Carstensen & Turk-Charles, 1994) and the understanding of emotion (Labouvie-Vief & DeVoe, 1991; Labouvie-Vief, DeVoe, & Bulka, 1989; Labouvie-Vief, Hakim-Larson, DeVoe, & Schoeberlein, 1989).

All told, these findings suggest that the second half of life may well involve changes in the domain of emotion. Nevertheless, little research has directly addressed emotion and emotion regulation in adulthood and older age. In the present article, we report findings from four studies in which participants were asked about three domains of potential change in emotion: emotional experience, emotional expression, and emotional control.

Emotional Experience

Studies that have examined emotional experience and age generally suggest that there are decreases in the frequency and intensity of self-reported emotional experience with age. In one study, Diener and associates administered a short form of the Affect Intensity Measure (AIM), which assesses the intensity of positive and negative affect, and five items from the General Behavioral Inventory (GBI), which tap symptoms of mood disturbance, to a predominantly White sample of participants ranging in age from 16 to 68 years (Diener, Sandvik, & Larsen, 1985). Across this sample, age correlated −.26 with the AIM and −.32 with the GBI items, indicating an age-related decline in emotional experience for both positive and negative emotions. In a second study, Lawton and colleagues used a large community sample of three age groups, including younger (ages 18–29), middle-aged (ages 30–59), and older (ages 60+) participants, and reported age-related decreases in emotional intensity (Lawton, Kleban, Rajagopal, & Dean, 1992). Older participants

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were more likely than middle-aged and younger participants to endorse items such as "Others tend to get more excited about things than I do" and "My negative moods are pretty mild" (Lawton et al., 1992, p. 174). Barrick and colleagues also found age-related decreases in emotional intensity, but only for negative affect (Barrick, Hutchinson, & Deckers, 1989). In their community sample of younger (ages 18–25) and older (ages 60+) participants, they found that self-reported incidence and intensity of negative affect were lower in the older participants than in the younger participants but that there were no age differences for positive affect.

Two laboratory studies in which participants were asked to call to mind intense emotional experiences failed to find age-related differences in emotional experience. In a study of 10 women in each of three age groups (ages 24–40, ages 45–60, and ages 65–80), Malatesta and colleagues found no evidence for age differences in the intensity with which three negative emotions were relived under instructions to do so (Malatesta, Izard, Culver, & Nicolich, 1987). Similarly, in a laboratory study of older participants (ages 71–83 years), Levenson and colleagues observed no differences between these participants and younger participants they had studied previously in the intensity of self-reported emotional experience during a task in which participants recalled an intense emotional episode (Levenson, Carstensen, Friesen, & Ekman, 1991).

These studies suggest that a distinction be made between the capacity to experience emotion and the typical level of experienced emotion. Although there is apparently no age-related difference in the ability to recall intense emotional episodes on command, in the ebb and flow of everyday life, older participants generally report feeling less intense and less frequent emotions. In terms of the generalizability of these findings, it appears that age differences may be more reliable for negative than for positive emotions.

Emotional Expressivity

Age-related changes in emotional experience may or may not lead to changes in emotion-expressive behavior, and yet it is the emotion-expressive behavior that may be of greatest significance in shaping social interaction. Is there also evidence for age-related changes in emotional expressivity? Researchers have used self-reports measures and behavioral observations to assess whether emotion-expressive behavior, like subjective experience, decreases over the life span.

The self-report findings on this issue have been mixed. Lawton and colleagues found that older participants were more likely than middle-aged or younger participants to endorse the statement "I seldom cry" as well as the statement "Whether I'm happy or sad inside, I look pretty much the same" (Lawton et al., 1992, p. 175). By contrast, Malatesta and Kalnok (1984) did not find age differences on an inhibition of emotion factor consisting of two general items concerning the likelihood of "saying what one feels" and "acting out one's feelings in behavior" (p. 303), although these items might be considered much broader than emotional expressivity per se (Gross & John, 1997, in press).

Behavioral evidence regarding age-related changes in emotional expressivity has also been mixed. Malatesta et al. (1987) found no main effect for age in the rating accuracy of participants' emotional facial expressions generated when they intentionally recalled an intense emotional episode. Similarly, Levenson and colleagues found no evidence for differences in expressivity between younger and older participants during a relived emotions task: The percentage of trials during which participants showed spontaneous expressive behavior did not differ by age (Levenson et al., 1991). However, using a laboratory paradigm in which spouses interact with each other, Carstensen and colleagues found that compared with middle-aged couples (mean age = 44 years), older couples (mean age = 63 years) showed less interest, humor, anger, disgust, belligerence, and whining than older couples during a conversation about a conflict in their relationship (Carstensen, Gottman, & Levenson, 1995). Interestingly, during these same conversations, they found that older couples showed greater affection than did middle-aged couples, which suggests that some positive emotions may be exempted from the general age-related decline in emotional expressivity.

As with the studies of emotional experience, these studies provide no evidence for differences in the capacity of older participants to recall intense emotions and their concomitant emotion-expressive behavior. However, both in self-reports of everyday emotional expressivity and in a laboratory paradigm with high ecological validity—discussing a problem with a spouse—evidence for decreased emotion-expressive behavior was obtained. Like the subjective experience findings, these results point to the possibility that age-related declines in emotional expressivity may be limited primarily to negative as opposed to positive emotions.

Emotional Control

Usually, people do not stand by idly as emotions come and go. Instead, people attempt to influence which emotions they have, when they have them, and how these emotions are experienced or expressed (Gross & Levenson, 1997). Given how important such attempts at emotion regulation are for psychological health (Gross & Muñoz, 1995), it is essential to consider whether age-related changes in emotional experience and expression are associated with parallel age-related changes in emotional control.

Age-related changes in the broader domain of coping and defensive processes have been described previously (e.g., Aldwin, 1991; Labouvie-Vief, Hakim-Larson, & Hobart, 1987; McCrae, 1982), but to the best of our knowledge, only two studies have directly studied age-related changes in emotional control. In contrast to the age-related declines evident in emotional experience and expression, the single study in which age differences were evident suggests increased emotional control with age. In this study, Lawton et al. (1992) found that compared with younger and middle-aged participants, older participants were more likely to agree with the following items: "I try hard to stay in a neutral state and to avoid emotional situations" and "I try to avoid reacting emotionally, whether the emotion is positive or negative" (Lawton et al., 1992, p. 175), both of which suggest increased emotional control in older age. Labouvie-Vief and colleagues interviewed 12 preadolescent (10–14 years), adolescent (15–18 years), young adult (19–

29 years), adult (30–45 years), middle-aged adult (46–59 years), and older adult (60–77 years) participants about their experiences of anger, sadness, fear, and happiness (Labouvie-Vief, Hakim-Larson, et al., 1989). During the interviews, probes were used to assess how participants experienced and controlled each emotion, and transcripts were later coded as showing one of four levels of experience and modulation. No age-related increases in ratings of modulation emerged among the four adult groups.

Of the three domains in which age-related changes have been documented, emotional control is least well studied. There is some evidence, however, that control may increase with age, although the paucity of studies in this domain limits our confidence in these findings.

The Present Studies

In the present studies, we used an ethnically and culturally diverse set of samples to examine age-related changes in emotional experience, expression, and control. Participants in each of the samples, although recruited for different research projects, responded to items relevant to these three domains. Our rationale for considering these diverse samples together was that they constituted a widely disparate group of participants, thereby allowing us to test the reliability and generalizability of findings about age differences in emotion and emotion regulation.[1] Although all cross-sectional age comparisons—including those described herein—are indubitably limited in their ability to illuminate age change, distinctive characteristics of the samples allowed us to speculate with greater confidence about possible developmental changes in emotional regulation.

We had two major goals in this research. Our first goal was to replicate and to extend previous research on emotion and aging by using a wider array of measures of emotional experience, expression, and control. Our second goal was to assess the possibility that findings in this area stemmed from shared cultural assumptions among White middle-class participants (who have made up the vast majority of samples in this area) rather than from true age-related changes (see McFarland, Ross, & Giltrow, 1992). If shared cultural assumptions about how emotions are supposed to change with age reflect the beliefs of a specific subpopulation and these beliefs are responsible for the findings in the literature, we would not expect these results to generalize widely across ethnic and cultural groups. Conversely, if the findings represented reliable age-related changes, we would expect to find similar effects across diverse cultural samples.

Study 1: African American and European American Community Sample

Our first study drew participants from the San Francisco Bay area, a culturally, socioeconomically, and ethnically diverse geographical region. To begin to explore age-related changes in emotional experience, expressivity, and control, we used global measures of each domain. On the basis of previous research, our expectation was that compared with younger participants, older participants would report lesser emotional experience and greater emotional control.

Method

Participants. One hundred and eighty-five African American and European American participants were recruited from the San Francisco Bay area to participate in a field sampling study of emotional experience (Carstensen, Pasupathi, & Mayr, 1996). Participants were recruited by a survey research firm with the aims of (a) representing the socioeconomic distribution of the San Francisco Bay area, (b) including equal numbers of men and women, and (c) overrepresenting African Americans and limiting remaining participants to White Americans. Sampling constraints were imposed to afford sufficient statistical power to examine ethnic differences. These 185 participants were asked to complete an additional questionnaire packet and of these, 127 (69%) complied. These 127 participants (71 women and 56 men) ranged in age from 19 to 96 years (M = 58.7 years, SD = 20.3); 76% were White, and 24% were African American.

Measures and procedure. A questionnaire packet was administered by mail, and participants who completed the packet received $30 compensation. For the present study, participants completed the Berkeley Expressivity Questionnaire (BEQ: Gross & John, 1995) and a single question concerning emotional control—responses to this question ranged from 1 (*no control*) to 10 (*complete control*)—"Overall, how much control would you say you have over your emotions?"

The BEQ is a 16-item questionnaire assessing individual differences in emotional expressivity. It has three subscales: Impulse Strength (e.g., "I have strong emotions" and "I am sometimes unable to hide my feelings, even though I would like to"), Positive Expressivity (e.g., "When I'm happy, my feelings show"), and Negative Expressivity (e.g., "Whenever I feel negative emotions, people can easily see exactly what I'm feeling"). Impulse Strength refers to intense emotional impulses that the individual finds difficult to control, whereas Positive and Negative Expressivity refer to the expression of positive and negative emotions, respectively. The three-facet structure of the BEQ has been replicated in several large college-student samples for both peer and self-ratings (Gross & John, 1995, 1997). Although the three facet scales tend to correlate about .50 with each other, they show substantial convergent and discriminant validity with peer ratings and differentially predict spontaneous positive and negative emotion-expressive behavior observed in the laboratory (Gross & John, 1997).

Results and Discussion

After a median split on age, 2 × 2 × 2 analyses of variance (ANOVAs, Age [younger vs. older] × Ethnicity [African American vs. European American] × Sex) were conducted for the four emotion measures: impulse strength, positive expressivity, negative expressivity, and emotional control. None of the interactions involving age was significant. As shown in Table 1, compared with younger participants (ages 19–56 years), older participants (ages 58–96 years) reported lesser impulse strength, lesser positive expressivity, lesser negative expressivity, and greater emotional control. These results indicate that age is associated with diminished intensity of emotional impulses, a concomitant lessening of outward signs of both positive and negative emotional expressions, and increased emotional control.[2] Age differences were evident for African American and European American individuals of both sexes.

[1] Unfortunately, minimal information was obtained from participants in these studies regarding participant characteristics such as education level and socioeconomic status. This precludes an analysis that considers the role of such participant characteristics.

[2] In secondary analyses, we also examined nonlinear age trends by entering the age-squared term after the age term in multiple regression

Table 1
Emotional Intensity, Expression, and Control in Two Age Groups in Study 1

Variable	Younger		Older			
	M	*SD*	*M*	*SD*	*t*	*p*
Impulse strength	4.85	1.11	4.45	1.13	1.95	.05
Expressivity						
Positive	5.59	0.98	5.21	0.93	2.18	.03
Negative	3.90	0.99	3.52	1.01	2.13	.04
Control	6.05	1.73	7.07	1.92	2.94	.01

Note. $n = 127$. Younger participants ranged in age from 19 to 56; older participants ranged in age from 58 to 96.

Study 2: Chinese American and European American Community Sample

To assess the robustness of the impulse strength and expressivity findings from Study 1, we examined the BEQ in another group of European Americans as well as an ethnic group traditionally associated with lesser emotional expressivity, namely, Asian Americans (see Gross & John, 1995, in press; Lai & Linden, 1993; Scherer, Wallbott, Matsumoto, & Kudoh, 1988).

Method

Participants. As part of a study on emotion and ethnicity, 96 Chinese American and European American participants from the San Francisco Bay area were recruited to fill two age cells: young (20–35 years) and old (70–85 years; Tsai, Levenson, & Carstensen, 1992). Participants were drawn from a variety of Bay area agencies and resources (e.g., churches and community centers). All were native English speakers. To control for differences in levels of acculturation, we recruited only participants who were second-generation Chinese Americans (i.e., whose parents had been born in China, Hong Kong, or Taiwan).

On completion of the parent study, participants were asked to fill out several additional questionnaires at home and mail them to the experimenter. Of these 96 participants, 82 (85%) complied with this request. These 82 participants included 40 younger adults (49%) and 42 older adults (51%). The younger participants ranged in age from 20 to 34 years ($M = 27$ years, $SD = 4.1$); 19 were Chinese American (10 women and 9 men), and 21 were European American (11 women and 10 men). The older participants ranged in age from 70 to 85 years ($M = 74.7$ years, $SD = 4.1$); 20 were Chinese American (11 women and 9 men), and 22 were European American (11 women and 11 men).

Measures and procedure. As in Study 1, participants completed the BEQ. In addition, participants completed a more differentiated measure of emotional control, the Courtauld Emotional Control Scale (CEC; Watson & Greer, 1983). The CEC contains 21 items that assess control of three negative emotions: anger, anxiety, and unhappiness. Example items include the following: "When I feel angry, I hide my annoyance," "When I feel anxious, I smother my feelings," and "When I feel unhappy, I keep quiet."

Results and Discussion

For each of the six emotion measures, 2 × 2 × 2 ANOVAs (Age [younger vs. older] × Ethnicity [Chinese American vs. European American] × Sex) were conducted. The only interaction involving age was an Age × Ethnicity interaction for impulse strength, $F(1, 73) = 5.40$, $p = .02$. This interaction was attributable to the fact that older European American participants reported lesser impulse strength than their younger European American counterparts (mean impulse strength, older = 4.3 and younger = 5.5), $t(40) = 4.30$, $p < .001$; whereas there was no age difference in impulse strength for Chinese American participants (mean impulse strength, older = 4.7 and younger = 4.9), $t(37) = 0.50$, *ns*. One main effect of age also emerged: Compared with younger participants, older participants reported greater anger control, $t(74) = 3.02$, $p < .01$. There were no other effects involving age, and means by age group are given in Table 2.

These findings extend the results of Study 1 by suggesting that the increased emotional control associated with aging may vary by emotion and be evident for some negative emotions (anger) but not others (unhappiness and anxiety). Of the three BEQ subscales, Impulse Strength seemed to show the most robust age differences across studies. This study also suggests that there may be important ethnic differences in these effects, with age differences evident in European American participants but not in Chinese American participants.

Study 3: Norwegian Community Sample

In this study, we expanded our focus to examine emotion and aging in a non-U.S. sample. Both this study and the next addressed one important limitation of the first two studies; namely, their reliance on the BEQ Impulse Strength subscale. Because this subscale refers to the experience of strong emotional impulses that are difficult to control, it is difficult to tell whether age differences in impulse strength are due to age differences in the strength of emotional experience or in emotional control. We addressed this limitation by asking separately about the experience and control of a range of positive and negative emotions. In addition, we distinguished between the control of inner emotional experience and outer emotion-expressive behavior. We expected age-related decreases in the experience of negative emotions and were most certain of this prediction for anger, which in Study 2 had shown age-related increases in control. Given the lack of replicability of the expressivity findings from Study 1 to Study 2, we expected age differences in the internal control of emotion (i.e., the control of emotional experience) but not necessarily in the external control of emotion (i.e., the control of emotion-expressive behavior).

Method

Participants. Participants were 30 younger (20–35 years) and 19 older adults (70+ years) living in and around Trondheim, Norway. The sample was generated by the Norwegian Data Center following authorization from the Norwegian Data Inspectorate, both of which regulate access to representative samples in Norway. In the younger group, 17 were female participants; in the older group, 12 were female participants.

Measures and procedure. The Carstensen Emotion Questionnaire (CEQ) asks participants to indicate how frequently they experience each of five emotions (happiness, sadness, fear, anger, and disgust) with a 4-point Likert-type scale: 1(*never*), 2(*rarely*), 3(*sometimes*), and 4(*often*). These target emotions were chosen to sample an important positive

analyses. In no case did this lead to a significant increment in proportion of variance explained.

Table 2
Emotional Intensity, Expression, and Control in Two Age Groups in Study 2

Variable	Younger		Older			
	M	*SD*	*M*	*SD*	*t*	*p*
Impulse strength	5.21	1.04	4.51	0.93	3.17	.01
Expressivity						
Positive	5.44	0.98	5.18	0.96	1.21	.23
Negative	3.81	1.05	3.69	0.85	0.59	.56
Control						
Anger	2.17	0.57	2.55	0.52	3.02	.01
Anxiety	2.33	0.59	2.52	0.45	1.51	.13
Unhappiness	2.34	0.60	2.49	0.55	1.11	.27

Note. $n = 82$. Younger participants ranged in age from 20 to 34; older participants ranged in age from 70 to 85.

emotion as well as a range of negative emotions. Because of the natural confounding of intensity and controllability that is evident in the BEQ Impulse Strength subscale, we elected to assess the frequency of emotional experience in this study, believing that this might provide a somewhat more objective measure of experience than intensity reports and might therefore be less susceptible to stereotype reporting effects.

The CEQ also asked participants to indicate their ability to control (a) the inner experience and (b) the external signs of the same five target emotions (happiness, sadness, fear, anger, and disgust) with a 4-point scale: 1 (*not at all*), 2 (*a little*), 3 (*pretty well*), and 4 (*very well*). As described above, our expectations were that we would see age-related changes in internal control rather than in external control and that these effects would be most obvious for anger.

Participants were sent the CEQ by mail. Those who did not answer the first questionnaire were sent one reminder only in keeping with regulations of the Norwegian Data Inspectorate.

Results and Discussion

A 2 × 2 ANOVA (Age [younger vs. older] × Sex) was used to analyze each of the 15 responses to the questionnaire (5 emotions × 3 dimensions). Two Age × Sex interactions were significant. Older women reported a lower frequency of anger experience than younger women, $t(27) = 3.84$, $p < .001$, whereas older and younger men did not differ in the frequency with which they experienced anger. In addition, older women reported a greater ability to control the internal experience of anger than younger women, $t(27) = 2.74$, $p < .02$; older and younger men did not differ in their reported ability to control the internal experience of anger. There were no other interactions with sex, and we provide mean responses by age group in Table 3.

As described above, the single age-related effect for frequency of emotional experience was for anger. This effect was attributable to older women reporting a lower frequency of anger experience than younger women. In the domain of internal emotional control, there were age-related increases in emotional control for each of the five emotions. In one case, as described above, this effect was qualified by an Age × Sex interaction that was due to older women reporting greater internal control for anger than younger women, whereas there were no age differences evident for anger for men. As expected, the domain of external control of emotion did not show age-related changes in emotion.

This pattern of results suggests significantly greater emotional control with aging but, more important, qualifies the findings from the first two studies by suggesting that these effects are evident for internal rather than external control, and when there are sex differences, as with anger, women are more likely to show age-related changes than are men.

Study 4: Nun Sample

One limitation of the first three studies—as well as all others we are aware of in this area—is their reliance on cross-sectional designs, which introduces the strong possibility of cohort effects. Although we were impressed by the consistency of findings across U.S. and Norwegian samples, in Study 4 we relied on a large sample of nuns. This unique sample permitted us to examine the frequency of and perceived control over emotional experience in a population whose members all share a wide range of factors that may be confounded with age in the general population. That is, although cohort differences clearly exist among nuns, many factors, such as diet, work, religious commitment, sexual practices, and other factors that vary widely across age cohorts in the general population are far more constant across age groups. As in Study 3, we measured frequency of emotional experience separately from emotional control and examined both positive and negative emotions.

On the basis of our developing understanding of age-related changes in these three domains, our general expectation was that compared with younger nuns, older nuns would report lesser experience of negative emotion (at least for anger), greater internal control of all emotions, and equivalent external control

Table 3
Emotion Experience, Internal Control, and External Control in Two Age Groups in Study 3

Variable	Younger		Older			
	M	*SD*	*M*	*SD*	*t*	*p*
Experience						
Happiness	3.67	0.55	3.68	0.48	0.11	.91
Sadness	2.73	0.64	2.84	0.77	0.54	.59
Fear	2.16	0.65	2.31	0.82	0.71	.48
Anger	2.86	0.73	2.32	0.75	2.55	.02
Disgust	2.16	0.65	1.84	0.77	1.59	.12
Internal control						
Happiness	2.73	0.79	3.47	0.83	2.70	.02
Sadness	2.60	0.89	3.10	0.66	2.12	.04
Fear	2.63	0.89	3.21	0.86	2.27	.03
Anger	3.03	0.72	3.47	0.61	2.21	.04
Disgust	2.60	0.93	3.37	0.96	2.79	.01
External control						
Happiness	2.63	0.81	2.68	0.75	0.22	.83
Sadness	2.70	0.79	2.95	0.62	1.15	.26
Fear	2.93	0.64	3.00	0.82	0.32	.75
Anger	3.00	0.78	2.89	0.88	0.44	.66
Disgust	2.70	0.79	3.16	1.07	1.72	.09

Note. $n = 49$. Younger participants ranged in age from 25 to 35; older participants were over 70 years. All were representative of their respective age groups in the geographic region of Trondheim, Norway.

of emotion. In addition to testing these hypotheses, the large size of this sample enabled us to test the nature of relations among the three domains more directly than was possible in Study 3. Because negative emotional experience is aversive, and positive emotional experience is enjoyable, we expected that internal emotional control (and, to a lesser degree, external emotional control) should be negatively related to negative emotional experience and positively related to positive emotional experience.

Method

Participants. An entire midwestern community of religious sisters was targeted to participate in a survey of mental and physical health (Carstensen & Burrus, 1996). As noted above, age comparisons within a religious order benefit from commonalities in lifestyle across the age range. None of the sisters was married, had retired, or shared an intimate relationship with another person.[3] Approximately one third of the sisters lived in the same dwelling (viz., the Motherhouse), with the majority of the remaining sisters living in apartments nearby. The sisters all practiced the same religion, and dietary and lifestyle practices were highly homogeneous. Of 1,566 prospective participants, 1,080 (69%) returned completed 34-page questionnaires that included three questions about emotions (described below). The resulting sample ranged in age from 24 to 101 years (M = 66.6 years, SD = 13.6).

Measures and procedure. Participants completed the CEQ indicating how frequently they experienced five emotions (happiness, sadness, fear, anger, and disgust) with a 4-point scale: 1(*never*), 2(*rarely*), 3(*sometimes*), and 4(*often*). Participants also indicated, for the same five emotions, how well they were able to control (a) the inner experience of these emotions and (b) the external signs of these emotions with a 4-point scale: 1(*not at all*), 2(*a little*), 3(*pretty well*) and 4(*very well*).

Results and Discussion

Correlations between age and emotional response domains revealed a differentiated pattern of results.[4] As presented in Table 4, aging was associated with decreased emotional experience of anger, sadness, and fear (but not disgust) and with increased experience of happiness. These findings regarding changes in emotional experience in older age are consistent with a small literature that shows that despite high levels of consistency in rank order on affective dimensions of personality, aging typically is associated with increases in positive traits and decreases in negative traits (e.g., Helson & Klohnen, in press).

Distinctions between two forms of emotional control (internal vs. external) and among emotions also proved important. Aging was associated with increased inner and outer control of happiness and sadness, as well as the inner control of fear and anger. Aging was also slightly negatively correlated with the control of external signs of disgust. Overall, then, this pattern of results suggests a diminution of negative emotional experience as one ages and enhanced control of the inner experience and outer expression of negative and positive emotions.

As described above, we expected that reported emotional control would predict emotional experience and that these relations would be stronger for inner control, which explicitly targets emotional experience, than for external control, which targets expressive behavior. Moreover, we expected that for the negative emotions, these relations would be negative; that is, greater control would lead to lesser experience of negative emotions because control would be exercised in order to lessen subjective experience of negative emotions. By contrast, we expected that for the positive emotion of happiness, the relation between subjective experience of emotion and control would be positive; that is, greater control would lead to greater experience of positive emotion because control would be exercised in order to increase the experience of positive emotion.

To test these predictions, we correlated experience, internal control, and external control for each of the five emotions. As expected, we found that for the negative emotions, both internal and external control were negatively related to emotional experience (rs ranged from $-.25$ to $-.31$ for internal control and from $-.20$ to $-.24$ for external control, all ps $< .001$). For each emotion, the strength of the relation between control and experience was greater for internal than for external control. To test whether these differences were significant, we used Fisher's z transformation and the formula for dependent correlation coefficients. We found that this difference was significant for sadness, $t(1,046) = 1.95$, $p = .05$, and fear, $t(1,030) = 3.23$, $p < .01$. Also as predicted, we found that for the positive emotion of happiness, internal control was positively related to the experience of happiness ($r = .18$, $p < .001$); whereas external control was not ($r = .01$, *ns*). The difference between these two correlations was significant, $t(1,033) = 5.54$, $p < .001$. Although strong causal inferences may not be made on the basis of correlational data such as these, by and large, these findings confirmed our expectations that age would be associated with increased emotional control and, furthermore, that this control would be differentially related to negative and to positive emotions.

Table 4
Correlations Between Age and Emotion Experience and Two Forms of Control in Study 4

Variable	Happiness	Sadness	Fear	Anger	Disgust
Experience	.07	−.31	−.15	−.32	−.05
Internal control	.19	.15	.08	.08	−.01
External control	.20	.16	−.01	.04	−.07

Note. n = 1,080. Participants ranged in age from 24 to 101. Correlations with absolute values ≥ .06 are significant at $p < .05$ (two-tailed).

General Discussion

Using samples of primarily middle-class White participants, researchers have found that aging is associated with decreases in emotional experience (Barrick et al., 1989; Diener et al.,

[3] Catholic sisters do not retire from work at any point in their lives. Rather, contributions are tailored to the abilities of the individual. Even very frail sisters continue to perform some function within the community.

[4] In secondary analyses, we also examined nonlinear age trends by entering the age-squared term after the age term in multiple regression analyses. This lead to a significant increment in proportion of variance explained in only 2 of 15 instances (frequency of happiness and frequency of anger).

1985; Lawton et al., 1992) and increases in emotional control (Lawton et al., 1992). In the present series of studies, we used an ethnically and culturally diverse set of samples to further explore these age-related changes in emotion and emotion regulation. We found that age was associated with (a) decreased impulse strength for European Americans and African Americans but not for Chinese Americans (Studies 1 and 2); (b) decreased subjective experience of anger (Studies 3 and 4), sadness, and fear (Study 4); (c) increased subjective experience of happiness (Study 4); and (d) increased emotional control (Studies 1, 2, 3, and 4), particularly internal control (Studies 3 and 4). In the following sections, we address three interpretative issues and then consider these findings' implications for emotion regulation and aging.

Are Age-Related Changes in Emotion Due to Shared Cultural Assumptions?

One goal of the present research was to assess the likelihood that the findings in this area were due to shared cultural assumptions among the American middle-class White participants who have been overrepresented in prior studies. As McFarland and colleagues have shown, recalled traits are related to individuals' theories of aging (McFarland et al., 1992). Because of the narrow range of cultural and ethnic backgrounds of previous participants, it seemed possible to us that participants might have shared cultural stereotypes concerning emotion and aging that they used in order to describe their own experiences. We worried, therefore, that when participants were asked about emotion and emotion regulation, they might have been responding on the basis of how they thought someone of their age should respond rather than making accurate statements about their actual behavior and experience.

The fact that we obtained similar findings across several ethnically and culturally diverse samples leads us to believe that age-related changes in emotion are not likely to be due to narrowly shared cultural assumptions of White middle-class participants. Of course, we cannot rule out the possibility that these findings are the result of more broadly shared American assumptions, but the results of the Norwegian sample make this seem less likely. Furthermore, when Malatesta and Kalnok (1984) asked participants directly whether they thought their emotions were more or less intense than in previous years, they found no age differences, suggesting that age-related emotional stereotypes may be less robust than commonly supposed. Finally, and perhaps most convincingly, there are important parallels between our self-report findings and the behavioral findings of Carstensen and her colleagues, who have provided behavioral evidence of age-related differences in negative (but not positive) emotion-expressive behavior in older as compared with middle-aged participants (Carstensen et al., 1995).

Are Age-Related Changes in Emotion Due to Cohort Effects?

Even if age-related changes in emotion are reliable across age groups, however, they may nonetheless be due to cohort effects rather than age-related processes. One prediction that a cohort interpretation would make is that these age-related effects should be weaker in a non-U.S. culture, in which any cohort effects that might be present would be unlikely to parallel those in the United States. Study 3, in which a Norwegian sample was used, speaks against this possibility in that it shows a similar pattern of age-related differences in emotion. However, given the cultural similarities between the United States and Norway, as well as the possibility that events of global import such as the World Wars and Great Depression might have produced similar cohort effects in both countries, more evidence is needed to respond effectively to the cohort hypothesis. Such evidence is available from our sample of nuns. A cohort hypothesis would suggest that age-related differences in emotion should be weaker in the nun sample, in which so many features of the environment were shared by individuals of varying ages. It was precisely in this sample, however, that we found some of the most powerful age differences. These findings render a cohort interpretation less plausible, but not entirely untenable, as it is possible that different generations of nuns were socialized differently. For this reason, we believe that a definitive response to the cohort interpretation of these age-related changes will only be possible within the context of longitudinal studies.

How Are Changes in These Three Domains Related?

If these changes in emotion are not the result of stereotypes about aging, and are truly age-related rather than the result of cohort differences, we are left with the question as to how the changes in these three domains relate to one another. One possibility, which might be called the *environmental change* model, is that to the extent that aging means leaving the workplace and its attendant hassles, as well as dramatic changes in the nature of interactions with adult children as well as acquaintances, we might expect to see age-related decreases in negative emotion and age-related increases in perceptions of emotional control (Folkman et al., 1987). A second possibility, which might be called the *maturational change* model, is that aging per se rather than environmental factors produce these changes, possibly by physiological changes that directly diminish the strength of emotion. This model suggests that we should see decreases in both negative and positive emotion and a concomitant increase in perceived emotional control for both. However, what if the causal arrow points the other way? A third model, which might be called the *emotional control* model, suggests that increasingly effective emotional control is the cause of the other changes in emotion. This leads to the expectation that a more fine grained assessment of these changes should reveal decreases in negative emotional experience and maintenance or increases in positive emotional experience. Although these three models are not necessarily mutually exclusive, we believe our data favor (but do not conclusively establish) the emotional control model over the other two models.

In terms of the environmental change model, it is unclear how this model would explain the fact that age-related changes in emotion were strongest in the sample of nuns. Here, there is no sudden release from the workplace on retirement, with a consequent decrease in the number and severity of workplace hassles, nor are there dramatic changes in relations with adult children, and yet there are still substantial age-related changes in negative emotion. In terms of the maturational change model,

there is indeed some evidence that the physiological strength of emotion declines somewhat with age. Lawton and colleagues have found that older participants were less likely than younger participants to endorse statements such as "When I get emotionally excited, my heart beats fast and hard" (Lawton et al., 1992, p. 175), and Levenson and colleagues found lesser physiological changes in older participants as compared with younger participants during a laboratory-based emotion-induction procedure (Levenson et al., 1991; see also Levenson, Carstensen, & Gottman, 1994). We believe such changes do occur but think it unlikely that these changes account for the selective decreases in negative emotional experience and selective increases in emotional control. For if diminished biological strength of emotional impulses were the reason for these changes, we would expect to see changes in experience and control across the full range of negative and positive emotions. This is not what we observed. In the nun sample, we found selective decreases in the experience of three of the four negative emotions (sadness, fear, and anger but not disgust) and increases in happiness. Even more difficult to explain for this model is the positive relation between experience and control for happiness in this sample, as this model would predict age-related increases in perceptions of emotional control to be associated with decreases rather than increases in emotional experience.

Of the three models, we believe that the emotional control model may provide the best fit to these data. Age-related decreases in experience were evident in anger for the women in Study 3, and, in Study 4, age-related decreases in experience were evident in sadness, fear, and anger as were increases in the experience of happiness. This pattern of selective decreases in negative emotion, with some increase in positive emotion, seems most consistent with the view that emotional experience is being selectively managed rather than forcibly diminished by changes in the physiological strength of emotion. The emotional control model is also consistent with the positive relation between experience and control of happiness and with the negative relation between experience and control for the negative emotions. Finally, this model fits comfortably with the evidence that regulatory efforts are most evident in the domain of internal rather than the external control of emotion and suggests that what may be learned over a lifetime of experience is how to regulate effectively the inner experience of emotion.

Implications for Emotion Regulation and Aging

Older age frequently is portrayed as a time of decreasing abilities, but in the domain of emotion, it appears that aging is associated with equivalent or even greater gains rather than age-related declines. When older participants are asked to vividly recall past emotional events, they show the same capacity for recalling such events as younger participants, as evidenced by comparable levels of emotional experience and expression. In addition, older participants consistently report greater control of their emotions than younger participants.

Our preferred interpretation of these findings is that older participants' greater control of emotion permits them to selectively enhance positive emotions and selectively dampen their experience of aversive negative emotions such as sadness, anger, and fear. If we define emotion regulation as individuals' attempts to influence which emotions they have, when they have them, and how these emotions are experienced or expressed (Gross & Levenson, 1993, 1997), this line of argument suggests that older participants may be better at certain forms of emotion regulation than younger participants or, at the very least, may be better at matching their regulatory efforts to environmental exigencies.

As Carstensen (1992, 1993, 1995) has described, older individuals restrict their social circles to small but emotionally satisfying groups of friends and family members, thereby regulating their emotions by influencing the interpersonal situations they will experience. One perspective on this shift is provided by Gross's distinction between antecedent-focused versus response-focused emotion regulation. Antecedent-focused emotion regulation involves attempts to alter the course of emotion before the emotion has begun to unfold, either by changing the environment or by cognitive means such as reappraisal, in which an individual actively reconstrues the environment. Response-focused emotion regulation, by contrast, involves attempts to manage the emotion after it is already underway, such as suppression, in which one tries to hide ongoing emotion-expressive behavior. It now has been demonstrated that antecedent-focused emotion regulation such as reappraisal effectively reduces the subjective experience of negative emotion; whereas response-focused emotion regulation such as suppression not only fails to diminish the subjective experience of negative emotion but also has demonstrable physiological costs as well (Gross, in press). These differences among emotion regulatory strategies suggest that how people regulate their emotions has profound adaptive consequences, and it may be that the experience of aging brings a shift toward increasingly effective forms of antecedent-focused emotion regulation so that in older age, individuals more effectively regulate their emotions.

Although speculative, this notion is consistent with the results of Folkman et al.'s (1987) study of younger (mean age, women = 40 years and men = 41 years) and older (mean age, women = 69 years and men = 68 years) participants whose coping styles were examined across a variety of stressful contexts. Compared with younger participants, older participants reported lesser confrontative coping and greater distancing and positive reappraisal, and, as these authors suggested, it seems possible that older participants' "use of emotion-focused forms of coping such as distancing and positive reappraisal helped short circuit the stress process, so that incidents that might otherwise have been hassles were neutralized" (Folkman et al., 1987, p. 182). Our speculation is also consistent with Lawton et al.'s (1992) finding that compared with middle-aged or younger participants, older participants were more likely to endorse the statement "I choose activities carefully so as to give me just the right amount of emotional stimulation, neither too much nor too little" (p. 175).

With age, then, individuals report greater emotional control and lesser negative emotional experience. We have suggested that these (albeit relatively modest) age-related changes are due to better regulation of emotion, possibly the result of older participants adopting increasingly effective antecedent-focused strategies to influence their emotions.

Directions for Future Research

One direction for future research is to clarify the role of ethnicity and sex in these three emotion-relevant domains. The

present series of studies indicated that both ethnicity (Study 2) and sex (Study 3) may interact with age in determining emotional experience and emotional control. We believe that future studies should carefully examine the interplay of age, sex, and ethnicity in determining emotional experience, expression, and control.

A second research direction is suggested by the emotional control model. Clearly, to test competing models of the relations among domains of age-related change, it will be necessary to continue to distinguish between the experience and expression of a wide range of positive and negative emotions: Global measures of emotion will be unable to provide the resolution necessary to understand age-related changes in these domains (see Ekman, 1992). In addition, further distinctions among emotion regulation strategies may be necessary, and participants should be asked directly about their emotion regulatory goals. Our general expectation is that individuals of all ages are motivated to decrease negative emotional experience and enhance positive emotional experience, but the relative strength of these as compared with other motives may change with age (Carstensen, 1993). We further expect that with age, individuals may become increasingly adept at regulating emotions (particularly the experiential component), possibly by shifting to antecedent-focused as opposed to response-focused emotion regulatory strategies. Together, these expectations yield a rich set of testable hypotheses, and with time, we hope to further refine these distinctions in order to make increasingly sophisticated emotion-specific predictions concerning age-related changes in the domains of emotional experience and expression.

A third direction for future research is to explore the relations between age-related changes in emotion regulatory processes and changes in the broader domain of coping and defensive processes. Research in the stress and coping tradition (e.g., Aldwin, 1991; Folkman et al., 1987; Labouvie-Vief et al., 1987; McCrae, 1982) has amply demonstrated age-related changes in coping, and we believe that it will be profitable to explore links between these changes and those predicted in the more specific domains of emotional experience, expression, and control.

A fourth research direction is to complement self-report studies of emotion and emotion regulation with multimethod assessments that include measures of experience, expression, and physiology. Such studies not only will address concerns about the role of socioemotional stereotypes in this domain but also will provide a greater understanding of the inner workings of emotion regulation. For example, multimethod laboratory studies could provide emotion regulatory challenges to younger and older participants, with the expectation that under certain conditions, older participants might be expected to show superior regulatory abilities. This would permit more direct tests of our present speculation that aging typically brings increased competence at emotion regulation, thereby allowing more precise statements regarding the nature of this hypothesized age difference in competence. More specific hypotheses may also be tested. Thus if, as we have suggested, age-related changes in emotional experience and control are due to a shift in motives for and modes of emotion regulation, these age differences should disappear if younger participants are instructed to regulate their emotions in equally effective fashions. By testing these and related hypotheses, we hope to better understand the causes and consequences of age-related changes in emotion and emotion regulation.

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