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**Expressive, Physiological, and Subjective Changes
in Emotion Across Adulthood**

Robert W. Levenson

University of California, Berkeley

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Requests for reprints should be addressed to Robert W. Levenson, Ph.D., Department of Psychology, 3210 Tolman Hall #1650, University of California, Berkeley, CA 94720-1650.

Introduction: Aging and Psychological Processes

In much of the early writings about the psychology of late life, loss was the dominant theme: loss of psychological flexibility, loss of physical strength and endurance, loss of memory and other cognitive abilities, loss of friends and partners, and loss of health. More recent work has managed to separate the impact of age from the impact of illness. Thus, whereas much earlier research in gerontology studied the frail elderly (e.g., residents of nursing homes), recent work has increasingly focused on healthy elders living in community settings. Removing the often profoundly devastating effects of late-life illness has produced a more multifaceted picture of the psychological functioning of the elderly. Nonetheless, losses still loom large as a very salient part of old age.

Much of the diminishing of function, strength, adaptability, and health that occurs with age is directly predictable from the changes that occur at the biological level--encompassing cellular, neural, endocrine, and immunologic systems--as we age. Social changes and losses are similarly predictable by demographic changes that occur as cohorts age and members die. Thus, in these cognitive, social, and health realms, lay opinion and empirical data are consistent with what we know about the biology and sociology of aging.

In contrast, in the realm of emotion, clear predictions about what kinds of age-related changes should occur are not so easy to make. Emotion is subserved by brain areas that are quite different than those that serve the cognitive processes that are typically studied by psychologists (e.g., explicit memory, association, computation). Accordingly, we know far less about what happens to these emotional processes and their underlying neural substrates as we enter late life. Further, although a significant portion of the human emotional apparatus appears to be hard-wired, there is also much about emotion that is learned. In realms such as emotional competency, emotional refinement, and emotional control, learning occurs as we attempt to cope with life's challenges. Many new emotionally-relevant challenges appear in late life; thus, there is good reason to expect emotional learning to continue throughout this stage of life as well.

Emotion: The "loss" theme

What is known about the nature of emotion in old age? Like so much about aging, there is much opinion, not enough data, and a great deal of disagreement and controversy. Similar to other aspects of aging, early views of emotion and old age were dominated by the theme of loss. Old age was seen as a time of dampened, rigid, and flat emotionality, with the lives of old people characterized as having low levels of affective energy, little "enthusiastic zest", and little emotional concern (e.g., Banham, 1951; Jung, 1933; Looft, 1972). According to this view, a central task of old age is disengagement, which includes removing emotional attachments to people, places, and objects in preparation for the end of life. Thus, according to these early depictions, the landscape of emotion in old age is bleak, desolate, and topographically impoverished.

Emotion: The "gain or same" theme

Another viewpoint that has been advocated increasingly in recent years regards emotion as a psychological realm that is relatively spared from the losses and ravages of age (e.g., Carstensen & Charles, in press). According to this view, at the very least, we hold our own emotionally as we age. What's more, we may even manifest emotional gains as we enter late life, encounter new experiences, and continue the life-long process of emotional learning with its attendant increases in emotional refinement and competency. For example, in stark contrast to the loss theme, Malatesta and Kalnock (1984), found no evidence of decreasing salience of emotion with age. Similarly, Diener and Suh (1997) found that older individuals show greater life satisfaction than their younger counterparts. According to the gain theme, the landscape of emotion in old age is rich, complex, and topographically variegated.

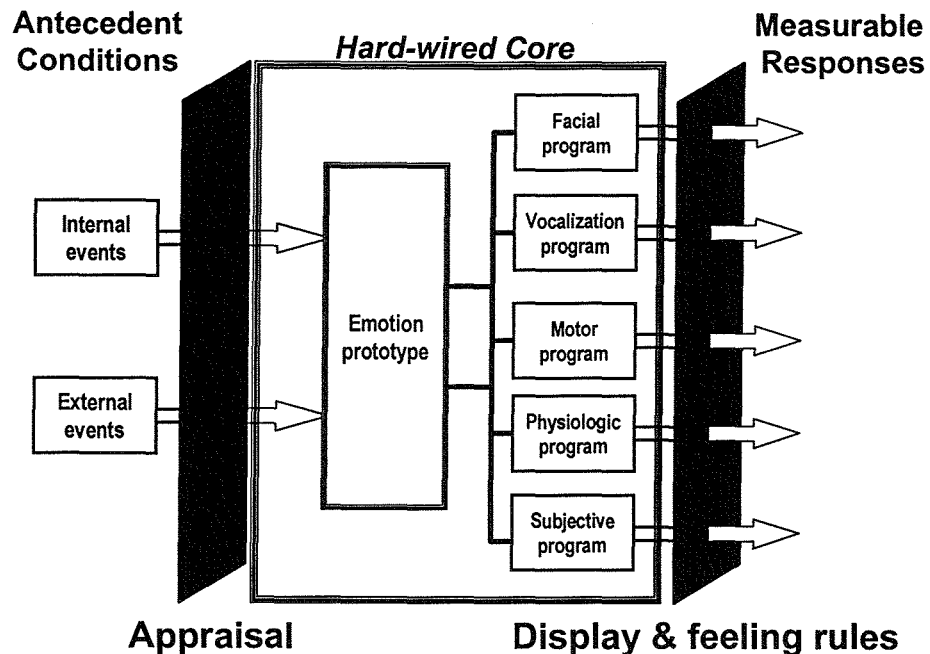
Loss or gain?

Which theme best captures the nature of emotion in late life: Loss or gain? Straddling mind and body, occurring in solitary and interpersonal contexts, and encompassing aspects of the human condition as diverse as language, memory, thought, expression, behavior, physiology, subjective experience, and coping, a full accounting of emotion in old age would be a formidable undertaking. As is the case with so many questions involving emotion, the answer we arrive at may depend in large part on how and where the question is pursued. It is certainly possible that age-related emotional losses will be found in some areas, maintenance of the status quo in others, and emotional gains in yet others.

How Does Age Influence Emotion?

Before reviewing the findings derived from our empirical studies of emotion and age, it might be useful to present the model of emotion (Levenson, 1988; Levenson, 1994) that underlies our research. Using this model, I will illustrate some of the ways that age might exert an influence on emotion, thus making the logic and scope of our research program more clear. In this schematic model (Figure 1), emotion is envisioned as having a hard-wired core (the area within the box), which is embedded on both the "input" and "output" side between learned frames.

Figure 1: Model of Emotion



The hard-wired core

The inner core of emotion consists of a mechanism that continually scans perceptual input from the outside world and mental input from the internal world in search of matches to a small set of templates that represent prototypical situations that are meaningful to the individual's well-being. These prototypical situations are ones that have been encountered by the species throughout its history. When a prototype situation is matched, the appropriate emotion is activated. The emotion is comprised of those time-tested responses that are most likely to enable the organism to deal successfully with this particular kind of situation. Thus, prototypical situations involving "threat", "taking away what is mine", "loss", or "gain" are detected and appropriate emotional responses such as "fear", "anger", "sadness", or "happiness" are activated.

Each of these emotions activates a set of bodily and psychological adjustments (referred to as response tendencies in the model) that act to adjust facial expression, voice tone, posture, autonomic nervous system activity, perceptual focus, behavioral strategies (e.g., "flee", "fight", "be nurtured", "play") in ways that produce the optimal response for dealing with the prototypical situation. This hard-wired system is rapid, efficient, and does not require much in the way of conscious intervention—it picks the response that is most likely to deal successfully with situations of this type. Of course, this highly generalized response may not be the best response given the nuances of the specific situation, but this hard-wired core emotional system is not about nuances.

The impact of age. Age can impact this core-emotional system in a number of different ways, most prominently in altering the thresholds that

antecedent conditions must reach in order to activate a given emotion, and, once an emotion is activated, in altering the strength of the impulses that go out to the various physiological and psychological response systems. These changes are ultimately biological in nature, reflecting age-related changes in the efficiency of neural transmission and in other operating characteristics of the nervous systems.

The learned frames

The core emotional system is quite automatic in operation, requiring little, if any, conscious intervention. However, in humans (and arguably in other species as well), this core hard-wired system is enveloped by control systems, which are shaped by learning and which greatly impact both the final input to the core system and the final output or resultant behaviors and actions.

On the input side, we engage in elaborate processes of appraisal (e.g., Lazarus, 1991; Scherer, 1982) by which we process both our perceptions and our thoughts in ways that profoundly influence their meaning and thus their capacity to elicit emotion. For example, if we consider the template of "threat", many of the events that we consider to be threatening (as well as many of the things we consider to be safe) reflect things that we have learned (e.g., beliefs about whether such things as strangers, oceans, or failures are dangerous).

On the output side, the core system produces tendencies to respond in certain ways (e.g., to cry when we are sad), but we can exert a great deal of influence over these tendencies so as to conform to learned emotional display and feeling rules (e.g., rules about when it is appropriate for people of a certain age, gender, and culture to cry). These rules often involve the inhibition of emotional response, but they may also involve the exaggeration or sustaining of emotional responses as well.

The impact of age. Age greatly impacts both the input-side and output-side frames. As we age, we appraise the world differently--situations (e.g., social rejection) may be seen as more or less threatening than they did at other times in our lives. With age, things are appraised against a much deeper store of pertinent experiences, which can lend quite different perspectives on emotionally-relevant matters involving such considerations as losses and gains. Also as we age, our inclinations to exert control over our emotional response tendencies may change in significant ways as may our abilities to impose these controls effectively.

Implications for our empirical studies of emotion and age

In keeping with this model, our empirical work has searched for age-related changes on both the "input" and "output" side of emotion, targeting both appraisal process and measurable emotional responses. Because the antecedents of emotion can originate either outside of the person (e.g., environmental events) or inside the person (e.g., thoughts and memories), we have studied emotions elicited in both ways. The model emphasizes that multiple

response systems are involved in emotion; thus, we have attempted to sample broadly from psychological, behavioral, and physiological (primarily autonomic and somatic) systems. And lastly, because all emotional learning and development occurs in a cultural context, we have been very interested in the impact that culture has on emotion. Cultures differ greatly in their conceptions and dictates concerning emotion. They also differ in the ways they view the aging process, as well as in the public and private roles that are sanctioned and prescribed for the elderly. For this reason, we have recently started to study the ways that culture and age interact in shaping human emotions.

In this chapter, I will review what we have learned from our research on emotion in late life, using these findings to address the overarching question posed at the start of this chapter, namely, what best describes the nature of emotion in old age--loss or gain?

Making people emotional

One defining characteristic of our research program is that we study emotion "in vivo". That is, we expose our subjects to experimental manipulations or place them in naturalistic situations that maximize the likelihood that emotions will occur. Then we study the psychological, behavioral, and physiological aspects of the emotions that ensue--often measuring emotional response systems continuously, so that we can characterize how patterns of response unfold moment-by-moment, in real time. Observational research on the nature of emotion in healthy elders has been quite rare (especially observational research studying emotion in social contexts and involving the measurement of multiple emotional response systems). Thus, much of what we know about normative emotion in old age is based largely on surveys, questionnaires, and demographic data. In our view, questionnaire and observational approaches to the study of emotion each have their own strengths. Questionnaire research is particularly useful for revealing peoples' beliefs and judgments about emotion. Observational research is particularly useful for revealing the magnitude, timing, and coordination of the various aspects of emotion and for elucidating the influence of contextual factors.

Ironically, in life we spent a great deal of effort trying not to become emotional. To conduct laboratory research on emotion and aging, we have had to spend a great deal of time and effort finding ways to get people to become emotional, and not just one emotion, but rather a wide range of emotions. Our labors in this area have yielded several different kinds of emotion elicitors that are useful for producing emotions in the laboratory. We have used four of these eliciting tasks in our studies of aging and emotion: (a) directed facial actions, (b) relived emotions memories, (c) emotional films, and (d) marital interaction. I will briefly describe each of these tasks before reviewing the results they have produced.

Directed facial actions

On each trial subjects are given one of several sequences of simple instructions for moving facial muscles (e.g., "wrinkle your nose", "move your tongue forward in your mouth"). A observer in another room gives corrective feedback as necessary (e.g., "try to wrinkle your nose without raising your eyebrows"). When subjects have complied with these instructions to the best of their ability, they are asked to hold the resultant facial configuration for 10 seconds. Although no emotion is ever mentioned to the subject, each sequence of instructions will, if followed correctly, produce a facial configuration that resembles the facial expression associated with a particular emotion (we typically use configurations for anger, disgust, fear, happiness, sadness, and surprise as well as a control configuration that does not have any particular emotional meaning). Physiological responses are measured during the 10-second period when the configuration is held; subjects are asked after each trial to rate the intensity of any emotions they experienced; and the facial configuration is coded (Ekman & Friesen, 1978) to determine which facial muscles were actually contracted.

Relived emotions

On each trial subjects are asked to remember a time in their lives when they experienced a particular emotion very strongly and then to relive that memory. When subjects do begin experiencing the memory, they signal us and we have them continue the experience for 15 seconds. During that 15-second period, physiological responses are measured and facial expressions are coded. After each trial, subjects are asked to rate the intensity of the emotions they experienced.

Emotional films

Subjects view short (approximately 3-minute) films that have been selected for their ability to produce particular emotions (Gross & Levenson, 1995). During the film, physiological responses are measured and facial behavior is coded. In some studies, subjects also indicate their moment-to-moment emotional reactions to the films using a rating dial (Levenson & Gottman, 1983). After each film, subjects are asked to rate the intensity of emotions they experienced.

Marital interaction

In this task, subjects engage in three unrehearsed 15-minute conversations, each about a topic related to their marriage (i.e., "events of the day", "marital problem", "pleasant plan"). During the conversations, physiological responses are measured and emotional behavior is videotaped and coded (Gottman, 1996). Following the interactions, spouses view the videotapes and provide moment-to-moment ratings of their emotional experience using a rating dial (Levenson & Gottman, 1983).

Emotion in Late Life: Loss or Gain?

To do justice to this important question, we have tried to examine age-related changes in a number of different aspects of emotion. As even a simple model such as the one presented above should make abundantly clear, human emotions are complex and multifaceted and it is quite possible that the answer to this question may differ as a function of which aspect of emotion is being examined and under what conditions.

Autonomic differences among emotions

In the evolutionary view of emotion that I (e.g., Levenson, 1994) and others hold, autonomically-mediated physiological changes exist primarily to support the behavioral adaptations that emotions call forth to deal with prototypical challenges to the organism's well-being and survival. To the extent that different emotions reliably involve different behaviors, and to the extent that these behaviors require different kinds of autonomic support, then autonomic differences among emotions should be expected (e.g., if anger begets fighting behaviors, this will require different kinds of cardiovascular support than would sadness, if it begets nurture-receiving behaviors). Although most people would probably agree that the physiological changes that occur when they are angry appear to be quite different than those that occur when they are sad, establishing the reliability of autonomic nervous system differences among emotions has proved to be very difficult and it remains a controversial part of the empirical and theoretical literature on emotion.

In our research on aging, we have addressed the question of whether the same patterns of autonomic activity accompany different emotions when we are young as when we are old. Another way of framing this question is whether the autonomic changes that accompany emotion are built to last for a lifetime. An alternative model would be that autonomic distinctions among emotions are present throughout our prime reproductive years and then become more blurred as we become older.

To attempt to answer this question, we focused on a small set of autonomic differences among negative emotions that we found to be most reliable in a series of studies conducted with young subjects (Levenson, Ekman, & Friesen, 1990) and that had been found by other investigators as well (for a review, see Levenson, 1992). These autonomic changes involved three differences in heart rate between negative emotions (faster in anger than in disgust, faster in fear than in disgust, faster in sadness than in disgust) and one difference in skin temperature (warmer in anger than in fear). We then asked whether these four differences were as likely to be found in older subjects (age 71-83) as they had been in young subjects (age 18-30).

The answer was quite clear: (a) the autonomic differences were found at significantly greater than chance levels in both older and younger subjects; and (b) there were no significant differences between older subjects and younger

subjects in how often these autonomic differences were found. Importantly, these findings held regardless of whether the emotions were produced using the directed facial action task or the relived emotions task (Levenson, Carstensen, Friesen, & Ekman, 1991). Thus, it appears that these particular autonomic differences among emotions are not changed qualitatively by age--in other words, our hearts are just as likely to accelerate when we are angry when we are 75 as when we are 25. The capacity of these emotions to produce these differentiated patterns of autonomic activation appears to be built to last for a lifetime.

Magnitude of autonomic response

Whereas the patterning of autonomic responses appears to be unchanged with age, examination of the magnitude of autonomic responses during emotion reveals a quite different story. Here autonomic responses clearly show diminution with age, particularly in the cardiovascular system (but much less so in the electrodermal system). We have found evidence for this in a number of different studies using our full range of emotion-eliciting tasks. In the studies of autonomic differences among emotions mentioned in the preceding section, heart rate changes during negative emotions in the directed facial action task were approximately twice as large for young subjects as for old subjects, and this difference was even greater in the relived emotions task (Levenson et al., 1991). In a recent study using emotional films as stimuli (Tsai, Levenson, & Carstensen, 1998), older subjects (age 70-85), had significantly smaller cardiovascular responses (heart rate, vasoconstriction, finger temperature) than younger subjects (age 20-35) to both sad and amusing films. And in our studies of interaction in long-term marriages, older couples (age 60-70) had smaller cardiovascular responses (heart rate, pulse transmission time) than middle-aged couples (age 40-50) across three 15-minute conversations (Levenson, Carstensen, & Gottman, 1994). Thus, no matter how emotions have been elicited, we have found consistent evidence of diminution in cardiovascular reactivity with age.

There are several issues raised by these findings. First, given that the magnitude of the autonomic response is likely to be proportionate to the magnitude of the emotional response elicited by a given stimulus, it is possible that our manipulations are producing smaller magnitude emotions in older subjects and thus the autonomic responses merely reflect this. In later sections, we will present data based on subjective and behavioral responses that suggest that this is not generally the case. More directly to the point, in our marriage research, when we statistically controlled for age-related variation in the intensity of reported emotional experience, the age-related diminution in cardiovascular response still obtained (Levenson et al., 1994). A second issue is the question of whether age-related diminution in cardiovascular reactivity is specific to emotion or rather reflects age-related changes in the general reactivity of the cardiovascular system (e.g., Frolkis, 1977). With currently available data, we cannot answer this question definitively, but we are engaged in collecting additional data that should enable us to determine whether there is age-related diminution in cardiovascular reactivity that is specific to emotion or whether these

differences are more general. Regardless, in the cardiovascular realm, it is clear that old age brings with it a loss of response magnitude.

Subjective emotional experience

In all of our studies, we obtain reports of subjects' emotional experience in one or more ways. Although early theoretical accounts suggest that we should predominately find evidence of emotional blunting in the realm of self-reported emotion, this has not been the case. Rather, the picture that has emerged is more complex, with some evidence that emotional experience actually increases in old age, some that it decreases, and some indicating no change.

In our study using emotional films (Tsai et al., 1998), we obtained measures of subjective experience in two ways: (a) subjects adjusted a rating dial while watching each film to provide continuous "on-line" ratings of their emotions (on a "positive-negative-neutral" scale); and (b) subjects provided retrospective self-reports using conventional rating scales to rate four positive (amusement, contentment, happiness, pleasant), four negative (anger, disgust, fear, sadness), and one neutral (interest) emotion after watching each film. There were no age differences found for either the sad or amusing film using the continuous on-line ratings. Similarly there were no age differences in the retrospective reports following the sad film and no age differences in retrospective reports of negative or neutral emotions following the amusing film. However, there were age-related differences in the retrospective reports of positive emotions following the amusement film, with older subjects reporting experiencing less amusement, contentment, and happiness.

Our study of interaction in long-term marriages revealed that some aspects of emotion might actually increase with age. Based on rating dial data, across all three conversations, older couples reported experiencing more positive affect than middle-aged couples (Levenson et al., 1994).

There was only one area where we found clear cut evidence of a decrease in subjective emotional experience and that was using the directed facial action task. In this task, young subjects report experiencing the emotion associated with the emotional configuration at greater than chance levels when their facial configurations conform closely to the prototypical expression for that emotion. For older subjects, reports of the associated emotion during the directed facial action task were quite rare (Levenson et al., 1991). In contrast, when these same subjects participated in our relived emotions task, we found no age-related differences in the intensity of reported emotional experience (Levenson et al., 1991).

Emotional behavior

Visible emotional behavior provides an important avenue for assessing emotion in old age because it is not as ambiguous in meaning as autonomic nervous system responses (which can reflect any of a number of psychological and biological processes other than emotion) and it is arguably not as amenable

to response and presentation biases as is self-report. In all of our studies of emotion and aging we have measured some aspect of emotional behavior, either facial expressions (in our studies using directed facial actions, relived emotions, and films) or a more global measure making use of facial expressions and other expressive behavior (during the marital problem conversation in our study of marital interaction). Each of these has revealed different aspects of age-related changes in emotional behavior.

In the relived emotions task, subjects are not instructed to produce facial expressions but these occur spontaneously on 15-20% of trials. We found no differences in the frequency of occurrence of these expressions between old and young subjects (Levenson et al., 1991).

In response to emotional films, facial expressions often occur. When viewing a sad film, we found no differences between old and young subjects in the frequency of facial behavior; when viewing an amusing film, old subjects smiled less than young subjects (Tsai et al., 1998).

Our study of marital interaction revealed an interesting set of age-differences. Controlling for differences in the rated severity of the problem being discussed, older couples showed more affection than middle-aged couples, while middle-aged couples showed more interest, humor, and disgust (Levenson et al., 1994).

We also coded expressive behavior during the directed facial action task, but these data are difficult to interpret. In this task, facial behavior is the manipulated variable and thus expressive data may not be directly relevant to the overarching question of age-related changes in emotion. Nonetheless, it is worth noting that we found the facial configurations produced by older subjects to be of lesser quality (i.e., they did not conform as closely to instructions) than those produced by younger subjects (Levenson et al., 1991).

Emotional appraisals

As indicated earlier, most of our research is observational in nature. Nonetheless, we do make use of questionnaires, especially in our studies of marriage. These questionnaires provide a measure of age-related differences in certain emotion-relevant appraisals. Two areas that we regularly assess are how much conflict and pleasure couples perceive in different areas of their relationship. Here our findings consistently indicate that older couples report less conflict and more pleasure than middle-aged couples across a broad range of areas in their marriages including less conflict about children, recreation, religion, and money and more pleasure with vacations, dreams, things they have done together, and children and grandchildren (Levenson, Carstensen, & Gottman, 1993).

Conclusion: Loss, gain or same?

Our empirical studies of emotion and age reveal a complex picture of the nature of emotion in old age as befits data derived from four quite different emotion-eliciting tasks and reflecting measurement from the domains of self-report, expressive behavior and autonomic physiology. The findings from this series of studies are summarized in highly simplified form in terms of "loss", "gain", or "same" in Table 1 below.

Table 1: Summary of Findings

	Self-report: <i>Retro-spective</i>	Self-report: <i>On-line</i>	Behavior	Cardio-vascular Physiology: <i>Pattern</i>	Cardio-vascular Physiology: <i>Magnitude</i>
Directed Facial Actions	Same	---	Loss	Same	Loss
Relived Emotions	Same	---	Same	Same	Loss
Sad Film	Same	Same	Same	---	Loss
Amusing Film	Loss	Same	Loss	---	Loss
Marital Interaction	---	Gain	Gain and Loss	---	Loss
Marital Appraisals	Gain	---	---	---	---

As can readily be seen, the kinds of pervasive losses that one sees in other domains of psychological functioning in old age are clearly not present in the realm of emotion. Cardiovascular reactivity during emotion is really the only area in which we have reliably found losses associated with old age and, as we indicated earlier, we do not currently have the data that would enable us to determine whether this diminished reactivity is more, less, or the same as would be expected given well-documented age-related changes in non-emotional cardiovascular reactivity¹. In contrast, in most of our findings concerning subjective emotional experience and emotional expression (as well as in the non-cardiovascular autonomic findings), the predominant theme appears to be one of "same or gain" in emotional functioning in older individuals.

"Same or Gain": Other Indicators

The findings I have reported so far have focused primarily on the more quantitative aspects of emotion (i.e., How frequent? How large?). Having

¹ Transposing the comparison from losses and gains to benefits and costs, one could argue that reduced cardiovascular activation during negative emotions actually is beneficial to older individuals, insofar as excess cardiovascular reactivity is generally viewed as having negative health consequences (e.g., Kaplan, Pettepson, Manuck, & Olsson, 1991).

considered the evidence suggesting that, in many ways, these quantitative aspects of emotion are preserved with age, we will now consider briefly some evidence that more qualitative aspects of emotion are also maintained or improve with age.

Emotional ecology of relationships

Whereas, the amount of specific emotions at various points in the life span is clearly an important parameter to consider, the balance among emotions is also quite meaningful. Studying late-life relationships, we have found several indications of actual gains in emotional balance that are associated with age. As indicated earlier, in appraisals concerning marriage, older couples appear to derive more pleasure while experiencing less conflict in their marriages. Handling conflict is arguably one of the most important and most challenging tasks confronting any marriage. Our findings indicate that, when discussing conflictual topics, older couples show a much more favorable balance of two emotions very important to perceived marital quality and actual marital stability--showing greater affection and less disgust than middle-aged couples. Affection appears to play a very important role in maintaining marital quality whereas disgust is one of the more corrosive judgmental emotions, associated with marital instability and dysfunction (e.g., Gottman & Levenson, 1992). Interestingly, both of these emotions can be used to de-escalate conflict during marital interaction, however, with quite different consequences. Affection is a very effective way of backing away from an escalating conflict, providing a soothing action that causes spouses to feel closer to each and to increase their confidence that they can deal with future marital conflict in a constructive manner. Disgust also causes spouses to back away from an escalating conflict, but here the dominant mode of action is "withdrawal", with spouses feeling hurt, judged, and abandoned and losing confidence in their ability to work effectively on marital conflicts in the future. Looking at hundreds of hours of videotape of couples dealing with marital conflicts, I have been struck by the virtuoso qualities that many older couples have in managing their emotions in ways that are constructive rather than destructive.

Emotional competency, control, and refinement

Humans are not born with a complete set of emotions, but rather more complex emotions seem to come on-line as part of normal social development. For example, self-conscious emotions such as pride, shame, guilt, and embarrassment appear later in childhood than emotions such as happiness and distress. Although most of the emphasis on emotional development in the psychological literature has been on childhood, there is good reason to believe that emotional development is a lifelong process, with certain aspects not reaching their apex until quite late in life. Consistent with this view are findings that emotions becomes increasingly salient with age (Carstensen, 1992; Carstensen & Charles, in press; Fredrickson & Carstensen, 1990) and that older individuals show increased emotional understanding (Labouvie-Vief, DeVoe, & Bulka, 1989a; Labouvie-Vief & DeVoe, 1991; Labouvie-Vief, Hakim-Larson, DeVoe, & Schoeberlein, 1989b). Further indication of this increasing level of

emotional competence is found in reports that elders actively structure their environments in ways that maximize positive and minimize negative emotion (Carstensen, 1993; Lawton, 1989).

Another area of increasing emotional competency is in the realm of emotional control. Here again, much has been written about early life, especially how infants and children learn to achieve some modicum of skill in emotional regulation and control. But clearly, this is an area where development continues throughout adulthood and into old age, as supported by findings of age-related improvement in the control of emotion (e.g., Gross, Carstensen, Pasupathi, & Tsai, 1997; Lawton, Kleban, Rajagopal, & Dean, 1992). These improvements in emotional competence may contribute to the finding that older people experience lower rates of all psychiatric disorders than do younger people (Lawton et al., 1992).

Finally, I believe it is reasonable to argue that our emotional repertoire becomes more refined with age. There are some emotions, such as poignancy, that it is hard to imagine our having earlier in life (e.g., imagine a teenager experiencing poignancy). Poignancy may be a quality of our emotional apparatus that takes a lifetime of feeling and experience to develop. Similarly, there are ways of accessing emotional experience, such as reminiscence, that appear to become much more powerful and more effective in eliciting emotion as we move through adulthood and into late life.

Summary and Conclusions

In this chapter I have presented data from our laboratory and from the work of others suggesting that emotion represents one of the few psychological domains where functioning is well-preserved and even improves with age. In considering the larger implications of these findings, having an organism that can remain emotionally competent throughout life has clear advantages both for the individual and for society. For the individual, emotions can continue to serve their essential role in helping us cope with challenges to our well-being and survival. This always important role may become even more critical as we age and the challenges that confront us increase in number and severity, at the same time as our other physical and psychological resources weaken. For society, there are enormous advantages in having a cohort of emotionally-competent elders who can participate in the emotional education of younger people and provide models for successful emotional aging. In cultures such as ours where critical social institutions such as marriage are in great crisis, the opportunity to learn from older couples who have weathered the early storms of marriage and have achieved mastery of the emotional aspects represent an extremely valuable and regrettably underutilized resource.

There is a great need for additional research on emotion and aging, especially observational research that examines emotion in the kinds of social contexts where most human emotions occur. Similarly, it will be important not to treat emotion as a monolith, but to continue to study the range of human emotions and to include measures of their subjective, behavioral, and

physiological aspects (including central nervous, endocrine, and immunologic systems). Much of what we know about emotion and aging at this point in time (including our own work) is based largely on cross-sectional research, with its known vulnerability to cohort, historical, and survival effects. If we take seriously the notion that emotional development is a lifelong process, then the value of longitudinal research for beginning to document and understand that process should be obvious.

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