

The Effect of Age on Positive and Negative Affect: A Developmental Perspective on Happiness

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The effect of age on happiness, as defined by positive and negative affect, was examined in a survey of 2,727 persons of a broad age range (25–74) conducted by the MacArthur Foundation Research Network on Successful Midlife Development. The age–affect association was examined, controlling for a host of sociodemographic, personality, and contextual influences. Among women, age was related to positive affect nonlinearly but was unrelated to negative affect. Among men, age interacted with 2 key variables in predicting affect: extraversion and marital status. These findings lend support to recent life span theories of emotion and indicate that personality, contextual, and sociodemographic variables, as well as their interactions, are all needed to fully understand the age–affect relationship.

People differ in their level of happiness, also known as *well-being*. For many years, social scientists have attempted to explain these differences. In many of the early, classic studies (Andrews & Withey, 1976; Bradburn, 1969; Campbell, Converse, & Rodgers, 1976; Gurin, Veroff, & Feld, 1960; Veroff, Douvan, & Kulka, 1981) it was assumed that sociodemographic and social structural variables, such as age, gender, marital status, and income, explained the individual differences in happiness. This was known as the “social indicators movement” in well-being research (Ryff, Keyes, & Hughes, 1998), which held that some sociodemographically defined groups (e.g., married people, those with higher incomes, younger people) were happier than others because of differential availability of psychological, physical, and material resources. In essence, individual differences in well-being were thought to be by-products of these group differences.

More recent work, though, has cast doubt on this early perspective. The influence of sociodemographics is modest, explaining only a small portion of the individual differences in happiness (Brim, 1992; Diener, 1984, 1994; Myers & Diener, 1995; Ryff, 1989). This counterintuitive finding has been termed the *paradox of well-being*. Its key feature is the presence of

subjective well-being in the face of objective difficulties or other sociodemographic or contextual risk factors that intuitively should predict unhappiness. In this research we evaluated the relationship between well-being, as defined by affect, and age, an important sociodemographic variable often associated with difficulties that theoretically should create unhappiness.

It is necessary to clarify the relationship between age and well-being because a number of recent reports have documented that older persons do not appear unhappier than middle-aged or younger persons, despite the declines in physical health, the deaths of peers and spouses, and other objective rigors that accompany aging (Baltes & Baltes, 1990; Brandtstadter & Greve, 1994; Filipp, 1996; Staudinger, Fleeson, & Baltes, 1998). As a result of these hardships, we would expect lower levels of happiness among the elderly. Yet, well-being seems to be unaffected by the adverse contexts brought on by the aging process (Borgatta & Foss, 1979; Cameron, 1975; Haug, Belgrave, & Gratton, 1984; Herzog, Rodgers, & Woodworth, 1982; Larson, 1978; Schulz, 1985).

Going one step farther, some theorists have suggested that well-being may even improve with age (Carstensen, 1991, 1995; Carstensen & Turk-Charles, 1994; Labouvie-Vief & Blanchard-Fields, 1982; Lawton, 1989, 1996). Carstensen argued that affective well-being in particular is likely to improve over the course of the life span because of age-graded changes in emotion regulation. Well-being is typically defined in terms of three major constructs—life satisfaction, positive affect, and negative affect (Diener, 1984; Myers & Diener, 1995)—and Carstensen’s (1991, 1995) socioemotional selectivity theory is relevant primarily for the latter two. Carstensen maintained that the role of affect heightens in prominence within people’s lives as they grow older but that emotions become better regulated with age. As people move through adulthood, they shift their orientation toward the future. Younger people see the future as being largely open, whereas older people see the future as being more bounded. This causes older people to gear their lives, especially their social lives, toward maximizing positive and minimizing negative affect. Thus, socioemotional selectivity theory posits an emotion regulation change in later life that predicts an im-

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provement in well-being, specifically toward higher positive and lower negative affect. What Carstensen proposed is similar to the cognitive dampening process discussed by Diener, Colvin, Pavot, and Allman (1991), in which individuals learn to restrict their range of affect frequency or intensity. Although Diener et al. (1991) did not explicitly place this process in a life span context, it may accurately describe the gains in emotion regulation with age (and consequent gains in well-being) that Carstensen predicted.

Other theories also endorse this idea of improved well-being with age. Labouvie-Vief and Blanchard-Fields (1982) claimed that the roles of affect and cognition become restructured with age, permitting greater cohesion between the two. This can bring about greater regulation of emotion in older age, and with it the kind of maturity necessary for effective maximization of positive affect and minimization of negative affect that leads to greater happiness. Additionally, Lawton (1996) advocated the idea that older adults learn to manage their affect more effectively as they age. He argued that these gains in affect management result from both personality factors plus adaptations to changes in social contexts and life events.

The theoretical positions of Carstensen (1991, 1995), Labouvie-Vief and Blanchard-Fields (1982), and Lawton (1996) offer a new view on how emotions change in later life. These theories claim that shifts in social contexts and changing inner states provide the underpinning for the emotion regulation changes that lead to greater happiness in later life. This represents a clear departure from the social indicators movement, which predicted worse well-being in older adulthood and focused not on social context or personality but on membership in particular demographic categories.

These newer theories in and of themselves provide interesting and testable hypotheses about the issue of affect and age. However, another perspective on well-being has emerged in recent years that has great importance for any study of age and well-being. This view argues that personality is the key to understanding happiness, particularly the emotional aspects of well-being.

Personality and Well-Being

This personality-based approach to well-being holds that happiness is determined primarily by personality factors (Costa, McCrae, & Zonderman, 1987; Diener & Diener, 1996; Ormel, 1983). One form of this position is called the "set-point perspective," which holds that personality dispositions are the most potent influences on average levels of happiness. One version of this perspective asserts that individual differences in well-being are highly heritable, particularly with regard to positive and negative affect (Lykken & Tellegen, 1996; Tellegen et al., 1988). If long-standing, stable personality traits account in large part for the individual differences in happiness, then the influence of aging or age cohort may be irrelevant or negligible. Stability in the traits that underlie well-being may overshadow any changes in affect the aging process may bring about.

Indeed, several longitudinal studies of affect bear out this explanation. As mentioned earlier, Costa, McCrae, and Zonderman (1987) found high stability in affect over a 10-year period. Similarly, Watson and Walker (1996) and Headey and Wearing (1992) found considerable stability in both positive and negative

affect in 7- and 8-year longitudinal studies, respectively, but, like Costa, McCrae, and Zonderman, neither study offers clues about the continuity of affect over the whole span of the adult years. Nevertheless, these and other findings give the set-point perspective some appeal, enticing researchers to disregard age and other sociodemographic and contextual influences on well-being. Although these more environmentally based influences may have smaller effects than personality, the effects are indeed present and should not be omitted from investigations of happiness. The most complete explanation of the individual differences in happiness requires the inclusion of all three categories of influences: personality, sociodemographic, and contextual and situational factors. Many recent studies have called for this type of multivariable approach (Brief, Butcher, George, & Link, 1993; Feist, Bodner, Jacobs, Miles, & Tan, 1995; Heidrich & Ryff, 1993; Ryff & Keyes, 1995; Staudinger & Fleeson, 1996), especially those that have considered interactions (Diener, 1996). Such approaches can pinpoint particular syntheses of personality, sociodemographic, and contextual factors that place people at a higher or lower likelihood of being happy.

We took such an approach, considering an array of explanatory variables. Nevertheless, our central question concerned whether age has any effect over and above the myriad of other factors known to influence well-being. Few researchers have considered age in the context of other factors, with most previous work focusing on the straightforward relationship between age and affect. The following review of the age-affect literature highlights these gaps in knowledge concerning this important relationship.

Age and Affect

A number of studies, both cross-sectional and longitudinal, have given attention to the relationship between age and affect. However, the overall picture drawn by these investigations is vague. Considering previous work on exclusively elderly samples, Ferring and Filipp (1995) reported longitudinal declines in intensity of positive affect over a year in a sample of old-old people, but no such decline in a young-old sample. They also reported a similar decline in frequency of positive affect in the old-old group, but not in the young-old group. In another longitudinal study using an exclusively elderly sample, Smith and Baltes (1993) also reported a decline in frequency of positive affect as people aged. Like Ferring and Filipp (1995), this sample used both young-old and old-old, but no one at midlife or in young adulthood. Finally, Vaux and Meddin (1987), in a cross-sectional study using another exclusively elderly sample, found no age differences in positive affect.

With regard to negative affect in these same elderly-exclusive studies, Ferring and Filipp (1995) reported higher frequency among the old-old, but no over-time changes. Smith and Baltes (1993), however, found no change in frequency of negative affect with time. In their cross-sectional study, Vaux and Meddin (1987) reported that their oldest respondents displayed lower levels of negative affect than their young-old counterparts. However, Vaux and Meddin discovered the relationship between negative affect and age disappeared when negative life events were controlled.

These three studies using elderly samples are useful, as they

hint at what may happen to affect in the oldest segment of the life span. Unfortunately, the portrait they collectively paint raises more questions than answers. These three studies do not converge on any single pattern for either positive or negative affect. Do studies that use a wider age range intersect on a common result? Several researchers have examined the age-affect relationship while using a broad age range. Ryff (1989) found that the affect balance (negative affect subtracted from positive) went up across younger, middle-aged, and older cohorts. Younger people were less happy than both middle-aged and older individuals, but those two latter cohorts were not different from one another. In another cross-sectional study, Rossi and Rossi (1990) found that both positive and negative affect showed declines with age in a sample that ranged in age from 19 to 92 years. The decline was steeper for negative affect, however. In addition, Diener, Sandvik, and Larsen (1985) reported age differences in affective intensity, but not frequency, based on a composite positive and negative affect scale. Their sample spanned in age from 16 to 68 years, and they found less intense affect in the older groups. In another report, Malatesta and Kalnok (1984) found negligible age differences in positive and negative affect using a sample that ranged in age from 17 to 88 years. Finally, Costa, Zonderman, et al. (1987), in a 10-year longitudinal study that used multiple birth cohorts born between 1898 and 1947, found that both positive and negative affect were lower in older birth cohorts. They did not find any longitudinal changes over the 10-year period in either positive or negative affect, however.

In a unique cross-national examination, Inglehart (1990) reported levels of happiness across a wide age range using information from two large databases, the Euro-Barometer Survey and the World Values Survey. His summary was based on 169,776 people in 16 countries and assessed happiness via a well-known single-item measure that is generally considered to index the affective component of well-being (Andrews & Withey, 1976; Campbell et al., 1976; Inglehart, 1990): "Taking all things together, how would you say things are these days—would you say you're very happy, fairly happy, or not too happy these days?" The percentage of people who reported they felt "very happy" was relatively constant across an age range that spanned from 15 to 65+. Although this was the general result over all 16 nations, specific findings within countries varied widely (Inglehart, 1990, p. 225). Some nations showed de-

creases in happiness among older cohorts (e.g., France, Japan), some showed increases (e.g., Britain, Ireland), some showed a dip in happiness in midlife (e.g., The Netherlands, Canada), and others showed no difference across age cohorts (e.g., the United States, Greece). The World Values Survey data most relevant for the current study were those from the United States ($N = 2,325$; Inglehart, 1990, p. 221), which, as noted, showed no differences across the age groups. Combined with the cross-national data, these results would indicate that there is no effect of age on happiness, at least when it is measured by this single item.

This same item, with slight modifications, has also been administered in the National Opinion Research Center's General Social Survey (GSS; Davis & Smith, 1995) over the past 25 years to measure the affective component of well-being. Data from 32,029 Americans from 1972 through 1994 are publicly available (Davis & Smith, 1995) and are summarized in Table 1. Note that the percentage of people stating they are "very happy" steadily rises across age cohorts until reaching the oldest cohort, when it then decreases. The percentage choosing "pretty happy" ("fairly happy" in the Euro-Barometer and World Values surveys) steadily declines across cohorts, with a slight increase among the oldest cohort. This decline is a function of the greater number of people choosing "very happy," because a look at the third response option, "not too happy," shows no clear trend across the age groups and also displays less variability than the other two options. These GSS data, as well as those reported by Inglehart (1990), do not separate positive from negative affect, as did many of the other studies reviewed, and are therefore limited. Still, they provide valuable information.

As we have discussed, investigations of exclusively elderly respondents as well as studies using a broad age range have yielded ambiguous conclusions about the relationship between age and affect. Nonetheless, what general portrait of happiness can one draw from the nine studies reviewed and the GSS data? The only consistent conclusion is that negative affect rarely seems to increase, either longitudinally with age or across age cohort groups. Only Ferring and Filipp (1995) reported a rise in negative affect, but that was in an elderly sample. Smith and Baltes (1993) found no change in negative affect, nor did Malatesta and Kalnok (1984) for either affect dimension. However, five other groups of researchers (Costa, Zonderman, et al.,

Table 1
Percentage of Happiness Ratings per Decade by Level of Happiness

Rating	18-27	28-37	38-47	48-57	58-67	68-77	78-89 ^a
Very happy							
%	28.3	30.9	31.7	33.3	36.0	37.9	34.1
<i>n</i>	1,696	2,265	1,785	1,498	1,480	1,050	474
Pretty happy							
%	58.9	58.6	56.6	53.4	51.2	49.9	52.4
<i>n</i>	3,528	4,288	3,191	2,405	2,105	1,382	728
Not too happy							
%	12.8	10.5	11.7	13.3	12.8	12.2	13.5
<i>n</i>	766	767	622	600	524	339	187

Note. The percentages were derived from the National Opinion Research Center's data (1972-1994; Davis & Smith, 1995) from 32,029 adult Americans.

^a This group includes a 12-year span because the sample size ranged up to and including 89-year-olds.

1987; Diener et al., 1985; Rossi & Rossi, 1990; Ryff, 1989; Vaux & Meddin, 1987) reported lower levels of negative affect among their oldest respondents. Is lowered negative affect indicative of greater happiness among elderly people? The cross-national report by Inglehart (1990) does not separate negative from positive affect, but this general finding of greater happiness among older respondents is echoed in several nations. The GSS data certainly seem to point to greater happiness among older Americans, at least up to age 77.

Taken together, these findings raise the possibility that well-being may actually improve with age, lending support to Carstensen's (1991, 1995), Labouvie-Vief and Blanchard-Fields's (1982), and Lawton's (1996) assertions. The results on positive affect are more nebulous, however, and investigators have often drawn the opposite conclusions. Nevertheless, at least some evidence points to an improvement in affective well-being among older people. Our study builds on these previous investigations.

Although age was the prime focus of this study, the results of several studies have suggested that the relationship between age and well-being may differ between men and women. A number of investigations have studied the age-affect association in samples comprised exclusively of women. The results of these studies give one cause to consider the age-affect relationship separately by gender. For example, Glenn (1975) reported results from several national surveys showing generally that women in their 50s were less happy than women in their 40s. Glenn used the same single-item measure of happiness described earlier. White and Edwards (1990), using the same item, found that women were less happy than men in a sample of adults under age 55. They controlled for a number of variables, including age, and still found women to be less happy than men. Adelman, Antonucci, Crohan, and Coleman (1989) found lower levels of well-being on two of their three measures among women from a younger than an older cohort. These studies point to the role of gender in understanding well-being across a wide range of age cohorts. Women appear to be less happy, and this seems to persist across different age groups. One exception to this is the increased rate of suicide among older men (National Center for Health Statistics, 1996), which may indicate greater unhappiness. The studies reported here indicate that the experience of well-being may differ for women and men. If positive and negative affect are differentially influenced by various explanatory variables, analyses should be performed separately by gender to uncover any distinct patterns. This will yield different and potentially valuable information than that obtained via the simple inclusion of gender in the analysis.

The Current Study

Following from the aforementioned literature, several questions stand out as being particularly important about the relationship between age and affect. First, the basic nature of the age-affect association is not clear. Studies show conflicting findings for both affects, especially positive affect. Therefore, a clarification of the relationship is important. Second, most studies documenting an age-affect association have simply considered these two variables by themselves without considering other factors such as personality, which appear to account for much of the individual differences in well-being. To more fully elucidate the

association between age and affect, it is important for researchers to use a variety of other explanatory variables as well, especially personality, sociodemographic, and contextual factors. Only with an array of factors representing different classes of influences can researchers attain a full understanding of the effect of age on well-being.

Third, to our knowledge, no previous study has considered the possibility of nonlinear relationships between age and happiness. Many theories of life span development argue that change in adulthood (or even across age cohorts) often does not follow a linear path (Brim & Kagan, 1980). Fourth, we know of no previous study that has considered whether age interacts with personality, sociodemographic, and contextual variables in influencing happiness. Diener (1996) has recently called for systematic examinations of interactions in the study of well-being. Unfortunately, investigations in this area have tended to focus on only one small set of predictors, neglecting how these sets combine to better explain individual differences in happiness. Fifth, rarely do studies of well-being perform analyses by gender. Gender is often a control variable or predictor, but separate analyses can reveal differences in the total picture painted by a particular analysis.

In the current study we addressed these five issues among a large, nationally representative survey of 25- to 74-year-old Americans recently conducted by the MacArthur Foundation Research Network on Successful Midlife Development. This large sample allowed us to report precise and accurate estimates of the relationship between age and affect. Furthermore, the wide age range allowed us to inspect this relationship across a broad expanse of adulthood.

In addressing the previous five questions, we proceeded in three stages. In the first stage, we examined whether positive and negative affect would be correlated with age in our sample. As noted before, it is not clear from either longitudinal or cross-sectional studies whether the affects differ across age groups or with age. We also tested for nonlinear effects, per Brim and Kagan (1980).

In the second stage, we examined the effects of an array of sociodemographic, contextual, and personality factors on positive and negative affect, but we focused on whether age would add explanatory value over and above these other influences. A hierarchical series of regressions were performed. Sociodemographic variables were entered into the model first. Previous research shows that sociodemographic effects on well-being are not as large as those of personality or contextual variables but are nonetheless influential (Myers & Diener, 1995). Furthermore, many of the sociodemographic factors we consider are related to age, our central variable of interest. For these reasons, we entered the sociodemographic variables first. Personality variables were entered next. We used extraversion and neuroticism, two traits known to be strongly related to affect (Diener, 1996; Myers & Diener, 1995; Watson & Clark, 1992). Moreover, previous research has suggested that personality is associated with some of the contextual variables we consider in this study, particularly stress and physical health. According to some, the experience of stress and illness varies as a function of personality (Costa & McCrae, 1978; Larsen & Kasimatis, 1991; Ormel & Wohlfarth, 1991). Thus, it made sense to enter personality variables before the contextual variables. After three steps in

which sociodemographic, personality, and contextual variables were successively entered in that order, we added age. This allowed us to determine whether linear and quadratic functions of age would be related to positive and negative affect over and above an extensive host of other explanatory variables. To assess the replicability of our findings, we also split our sample into random halves to determine which effects would reproduce across the two sets.

In the third stage, we performed analyses by gender. As noted earlier, in addition to any main effect of gender on affect, women and men may differ in the way explanatory variables are patterned relative to affect. A variable that is a significant correlate of affect for men, the net of other influences, may not be significant for women. Results were examined for such differences, with a focus on whether age would differ by gender in its relationship to either affect variable. Additionally, cross-validations were done using the random halves procedure described earlier.

In the fourth stage, we tested for interactions between age and the host of other predictors to pinpoint nonadditive combinations of factors (moderator effects) that influence affective well-being. These interactions were performed both in the full sample and by gender, although the outcome of the prior within-genders analyses would determine which of the two sets of interactions tests would be emphasized. Although any combination of our explanatory variables may interact in important ways, we tested only interactions between age and the other independent variables. Age was the focus of this study, and an expansive search for moderator effects was deemed beyond the scope of our research.

The four stages of analysis provide a picture of the relationship between age and affect by itself as well as in the presence of other important explanatory variables. They also provide a glimpse at the ways in which the age-affect relationship differs by gender and how it is modified through interaction effects. In their totality, the results paint a broad portrait of the complexity of the age-affect relationship.

Method

Sample

The sample comprised 2,727 participants in the Midlife in the United States Survey (MIDUS), a nationally representative study of Americans sponsored by the John D. and Catherine T. MacArthur Foundation Research Network on Successful Midlife Development (Brim & Featherman, 1998). The survey focused on issues of midlife and older adulthood and was conducted throughout 1995 and early 1996. Participants' ages ranged from 25 to 74 years ($M = 46$, $SD = 13$). All participants were English-speaking residents of the 48 contiguous states, living in a household with telephone service. The sample was 51% female and 49% male. Approximately 6% of the sample were African American.

The survey had two portions. All respondents were initially contacted by phone using a random-digit dialing procedure. Those agreeing were administered a 30-min telephone survey and asked to complete another survey that would be sent to them. Of those contacted by phone, the response rate was 70%. The mailed questionnaire was sent to these respondents within a week of completion of the phone interview. Eighty-seven percent returned the mail survey. Thus, the combined response rate was 61% ($.70 \times .87 = .61$). Only respondents with data on all measures were included in this study (except for some scales on which mean substitution was used), resulting in a final sample size of 2,727.

Measures

All measures were from the Midlife Development Inventory (MIDI; Brim & Featherman, 1998), an instrument specially designed for the MIDUS survey. This inventory contains a wide array of measures related to various aspects of midlife and aging. Part of the MIDI was included on the phone portion of the MIDUS survey, and the rest was on the mail portion.

Affect. Positive and negative affect were considered separately, per Watson and Tellegen's (1985) argument that the two are different dimensions. Frequency measures of positive and negative affect were included in MIDI (on the mail portion of the MIDUS survey), in keeping with Diener, Sandvik, and Pavot's (1991) and Diener and Larsen's (1993) contention that happiness is more related to frequency, not intensity, of affect. In developing these MIDI affect scales, items were culled from the following array of well-known and valid instruments: the Affect Balance Scale (Bradburn, 1969), the University of Michigan's Composite International Diagnostic Interview (Kessler et al., 1994), the Manifest Anxiety Scale (Taylor, 1953), the Health Opinion Survey (MacMillan, 1957), the General Well-Being Schedule (Fazio, 1977), and the Center for Epidemiological Studies Depression Scale (Radloff, 1977). With these scales, pretests for the MIDUS survey were used to choose two 6-item scales, one each for positive and negative affect. The Appendix displays these scales and their reliabilities. Note that, despite their brief length, both scales have high alphas: .87 and .91 for negative and positive affect, respectively. Summed scores were created from these items. Nearly every participant responded to all six items for each scale, but, among those who did not, mean substitution was used (within scales) only if the participant responded to at least four items on that scale. Scores ranged from 6 to 30 for both positive and negative affect.

A 30-day response frame was used for both affect measures to capture more generalized affect than a format that asked respondents to rate immediate or daily mood. Such a molecular measure would largely reflect immediate situational and contextual influences on affect, and we did not want this. Conversely, the 30-day format was also expected to capture a more specific level of affect than more general formats that ask respondents to rate themselves on how they usually feel. Such a molar time format would largely reflect personality influences on affect, which we also did not want. We wanted a measure that was sensitive to both contextual and personality factors, and the 30-day response frame seemed appropriate.

Sociodemographic measures. In addition to age, sociodemographic variables included gender, marital status, and education, three variables that have often been shown to influence affect in both the classic studies (e.g., Campbell et al., 1976) and more recent inquiries (e.g., Ryff, 1989). Respondents reported education by indicating the level of schooling they had attained. The variable consisted of 12 levels anchored on the low end by *some grade school* and at the high end by *graduate or professional degree*. Marital status was assessed with a single item simply asking whether one was married, never married, separated, divorced, or widowed. The item was dichotomized with one representing currently married people and zero representing all others.

Personality. Two personality dimensions known to be related to positive and negative affect, extraversion and neuroticism (Costa & McCrae, 1980; Emmons & Diener, 1986; Watson & Clark, 1992), were included in analyses. Short measures of these traits were created for the MIDI (Lachman & Weaver, 1997) using items culled from various personality scales such as Goldberg's (1992) Big Five markers. Summed scales were created from these items, after appropriate reversals. Scores ranged from 4 to 16 for neuroticism and from 5 to 20 for extraversion. The alphas were .75 and .79, respectively.¹

¹ One item from the neuroticism scale was redundant with one item on our negative affect scale ("nervous") and was similar to an item on our positive affect scale ("calm" and "calm and peaceful," respec-

Table 2
Zero-Order Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	—													
2. Age ²	.99	—												
3. Pos Affect	.10	.10	—											
4. Neg Affect	-.11	-.11	-.64	—										
5. Gender	.03	.03	-.06	.10	—									
6. Education	-.10	-.10	.04	-.11	-.10	—								
7. Married	.04	.03	.08	-.10	-.14	.01	—							
8. Neuroticism	-.19	-.19	-.37	.47	.09	-.08	-.04	—						
9. Extraversion	-.04	-.04	.34	-.20	.07	-.02	-.02	-.03	—					
10. Occ stress	-.22	-.23	-.17	.14	-.03	.12	-.04	.13	-.02	—				
11. Relat stress	-.04	-.04	-.11	.09	.06	-.02	-.03	.03	-.04	.03	—			
12. Phys hlth	-.13	-.13	.27	-.30	-.04	.27	.05	-.14	.17	.02	-.06	—		
13. Heart attack	.21	.22	-.08	.08	-.03	-.10	.04	.02	-.05	-.07	-.01	-.22	—	
14. Cancer	.21	.21	-.02	.02	.05	-.01	.00	-.02	-.02	-.03	.01	-.11	.08	—
<i>M</i>	46.94	2,377	20.18	9.43	0.51	6.63	0.64	9.91	15.94	0.46	0.04	3.46	0.12	0.07
<i>SD</i>	13.17	1,283	4.47	3.87	0.50	2.53	0.48	2.06	2.86	0.66	0.25	1.00	0.33	0.26

Note. $N = 2,727$. All correlations of magnitude .04 or higher are significant. Interpretations of dichotomous variables are as follows. Gender: 1 = women; 0 = men. Married: 1 = married; 0 = not married. Heart attack: 1 = has had; 0 = never had. Cancer: 1 = has had/does have cancer; 0 = never had cancer. Pos = positive; Neg = negative; Occ = occupational; Relat = related; Phys hlth = physical health.

Contextual measures. Stress and health were both chosen to represent the contextual category because of their well-documented relationships with affect and for their special relevance for the study of adulthood and aging (Aldwin, Levenson, Spiro, & Bossé, 1989; Delongis, Folkman, & Lazarus, 1988; Larsen, Diener, & Emmons, 1986; Mroczek, Spiro, Aldwin, Ozer, & Bossé, 1993). Work and finance and relationship strains were assessed with four items each asking about various stressful events and situations taken from different sections of the MIDI. The four work/finance questions asked whether a person had recently been laid off, was experiencing serious ongoing problems with someone at work, was undergoing other serious stress at work, or felt no control over finances. The four relationship questions asked whether a person was in the worst possible marriage or relationship, felt no control over his or her relationship, described his or her relationship as poor, or reported serious marital or partner relationship problems in the past 12 months. Dichotomized, these stressors were summed to create the two stress variables. Each had a possible range of 0–4. Physical health was assessed with a single-item, global self-rating of general physical health at present, which was Likert scaled and ranged from 1 to 5. Higher scores indicated better self-reported health. Supplementing the global health rating were two simple yes–no self-reports of whether the respondent had ever had a heart attack or cancer.

Results

Table 2 shows the matrix of correlations among all study variables, with means and standard deviations. In our first step, we tested whether age and well-being were related in this sample by regressing the two affect variables on age. It is often desirable when performing regressions to split a sample in half and cross-validate (Pedhazur, 1982). We attempted such a cross-validation

tively). This could have artificially raised the correlation between the two constructs. Consequently, the analyses were performed both with and without these items on the two affect scales. The results were identical. The analyses reported here included the two overlapping adjectives, taking advantage of the higher reliabilities that the extra items yielded.

by dividing the sample into two random halves and running each regression twice. The results we describe are based on the full sample, but we indicate which effects replicated across the random halves of the sample in the tables. If a coefficient or R^2 change was either significant or not significant in both random halves, it was considered cross-validated. Quadratic and cubic models were also fitted to test for nonlinear effects. Models using centered and uncentered age were run, and both yielded the same results. For ease of interpretation, statistics from uncentered variables are reported.

In the case of positive affect, the equation fitting the quadratic model was significant, $F(2, 2725) = 18.81, p < .001$, as were the regression coefficients for both age, $t(2724) = 2.84, p < .01$, and age², $t(2724) = 3.57, p < .001$. The R^2 change between the quadratic and simple linear models was also significant, $F(2, 2724) = 13.80, p < .001$. The cubic model, however, was not significant. Thus, it appears that a quadratic function best describes the relationship between age and positive affect ($R^2 = .014$). These findings also cross-validated. This nonlinear relationship was significant in both random halves of the sample, and the R^2 change between linear and quadratic models was also significant in both random halves. We plotted this significant nonlinear association in Figure 1. As one can see, it is an accelerating function, with positive affect at its lowest levels among the youngest respondents (the nadir point roughly at age 35) and then increasing at an increasing rate from age 45 to 75. Our oldest respondents had higher levels of positive affect than any other age group in the sample. We must emphasize, however, that we could not tell from these cross-sectional data whether this was an aging or cohort effect.

In the case of negative affect, neither the quadratic nor cubic models were significant, but the simple bivariate regression of negative affect on age was significant, $F(2, 2725) = 33.02, p < .001, R^2 = .012$. This relationship cross-validated, as it was significant in both random halves. Thus, the relationship be-

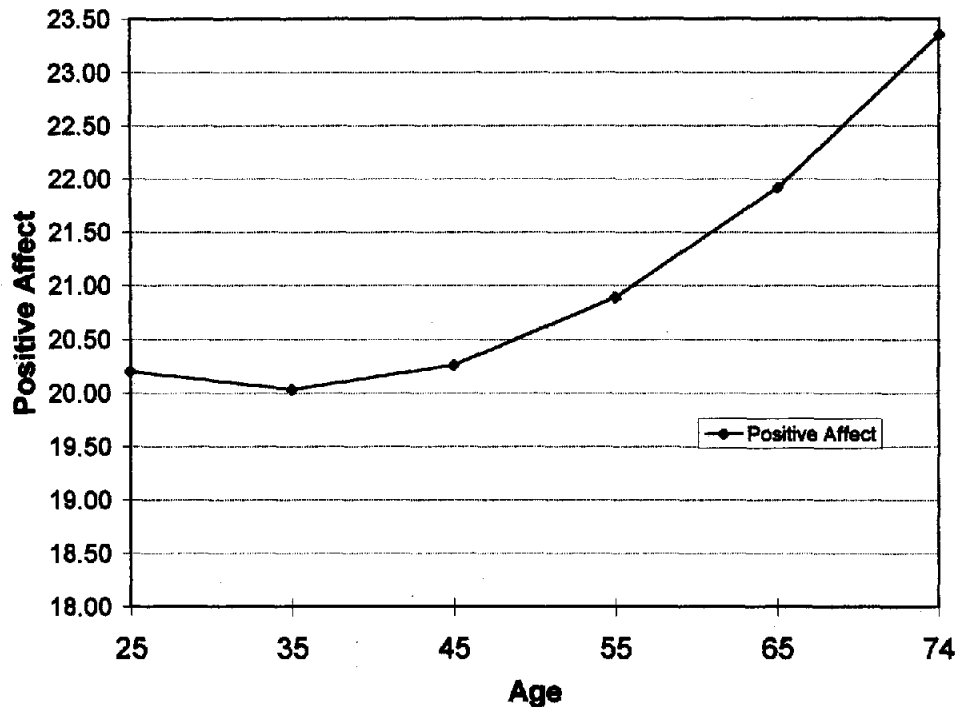


Figure 1. Plotted regression line between age and positive affect. Positive affect scores ranged from 6 to 30. The regression line is based on the following equation: positive affect = $22.38 + \text{age}(-.14) + \text{age}^2(.002)$.

tween age and negative affect was best described by a relatively straightforward linear and negative function. The regression line is plotted in Figure 2. Note that the youngest people in our sample reported the most negative affect, the oldest people reported the least, and there was no increase or decrease in the rate of this function.

Having identified the functional forms (the shape of the curves) of the two age-affect associations, we then proceeded to hierarchically test for the effects of other variables to better understand how other variables influenced affect directly and to possibly account for either of the two age-affect relationships. Tables 3 and 4 show the results of hierarchical regressions of affect on explanatory variables. At each step, we display the coefficients for all variables in the equation even as new variables are added. Except for the final model, only metric (unstandardized) regression coefficients are reported to allow comparability between coefficients across the consecutive models. The final model in both tables show both metric and standardized coefficients.

In hierarchical regression, an order of entry is predetermined, but simultaneous regressions are calculated at each step. Usually, the effects of variables previously entered into the model are not shown in later steps. However, it is often useful to show what happens to these effects in the later phases. Therefore, we show full models at each step. This means the coefficients for each variable in a given column are exactly those that would be if that variable had been entered last into the model. This is the definition of a simultaneous regression, and, as noted earlier, hierarchical regressions are nothing more than prespecified se-

ries of such simultaneous models. Displaying the full models at each step also has the advantage of showing which variables are rendered insignificant as new variables are entered into the model. We also show the R^2 , R^2 change, and F for R^2 change for each step.

As discussed earlier, the sociodemographic variables (i.e., gender, education, and marital status) were entered first. The personality variables—neuroticism and extraversion—were entered next. The contextual variables, occupational stress, relationship stress, and the physical health variables were entered in the next step. We entered age last to determine whether it added significant explanatory value net of all other study variables. Finally, we performed all regressions within the full sample as well as in the two randomly split cross-validation halves. Results shown in Tables 3 and 4 are based on the full sample, but we show those effects that displayed agreement (either significance or no significance) across both halves of the cross-validation. This provides a sense about which significant effects (and zero effects) are the strongest and most likely to replicate, although power is certainly decreased by splitting the sample into halves.

Positive Affect

Table 3 shows the regression of positive affect on successively larger collections of explanatory variables. In the first step, the sociodemographic factors were entered. It indicates that women reported lower positive affect (gender is coded 0 for men and 1 for women), that better educated people reported higher positive

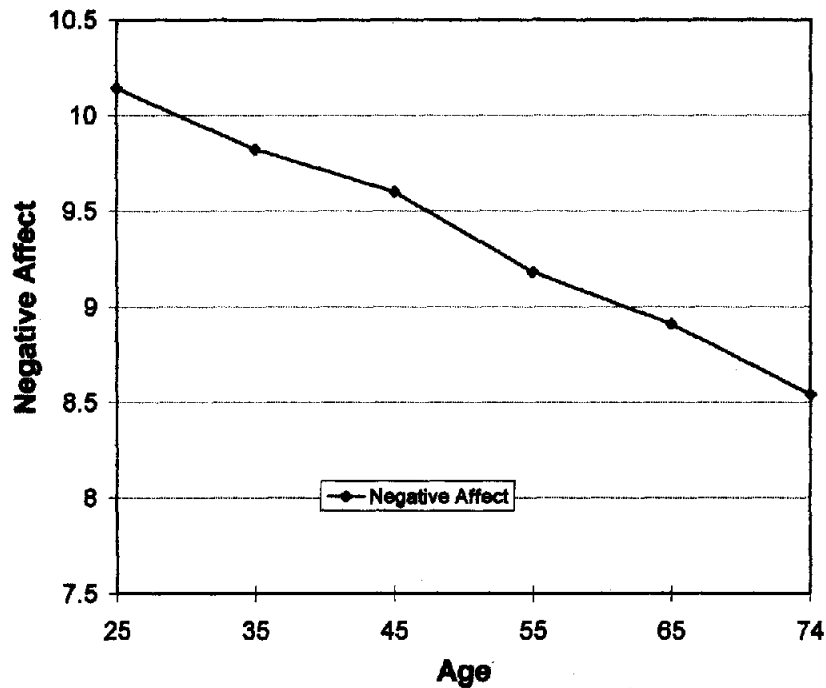


Figure 2. Plotted regression line between age and negative affect. Negative affect scores ranged from 6 to 30. The regression line is based on the following equation: negative affect = 10.94 + age (-.03).

affect, and that married respondents reported higher positive affect than unmarried participants. However, none of these effects were significant in only one of the cross-validation samples (and thus are not indicated in Table 3). In the next step, we

introduced the personality variables. Both neuroticism and extraversion were significant in the full sample as well as in both random halves. The addition of these factors also produced a large and significant increase in R^2 . Next, the contextual vari-

Table 3
Hierarchical Regression of Positive Affect on Sociodemographic, Personality, and Contextual Variables and Age

Variable	Step 1		Step 2		Step 3		Step 4		β
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	
Gender	-.41	.17*	-.37	.15*	-.38	.15*	-.39	.15*	-.04
Education	.05	.03*	.02	.03	-.04	.03	-.03	.03	-.02
Married	.64	.18*	.58	.16*	.45	.15*	-.46	.15*	.05
Neuroticism			-.76	.04*	-.68	.04*	-.66	.04*	-.30
Extraversion			.53	.03*	.47	.03*	.47	.03*	.30
Occupational stress					-.87	.11*	-.78	.11*	-.11
Relative stress					-1.31	.29*	-1.28	.29*	-.07
Physical health					.74	.08*	.76	.08*	.17
Heart attack					-.58	.23*	-.74	.29*	-.05
Cancer					-.01	.28	-.21	.29	-.01
Age							-.07	.04	-.20
Age ²							.001	.0004*	.26
R^2	.009		.254		.304		.307		
R^2 change			.245		.050		.003		
<i>F</i> for R^2 change			453.70*		38.46*		5.77*		
<i>df</i>			2, 2720		5, 2715		2, 2713		

Note. Boldface coefficients and *F* values indicate agreement between both halves of the cross-validation split sample. If a coefficient or R^2 change was either significant (or not) in both halves, it is in boldface. Those not in boldface indicate a discrepancy between results (significance in one random half, nonsignificance in the other). Standardized regression coefficients are shown only for the final model.

* $p < .05$ (at minimum).

Table 4
Hierarchical Regression of Negative Affect on Sociodemographic, Personality, Contextual Variables, and Age

Variable	Step 1		Step 2		Step 3		Step 4		β
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	
Gender	.63	.15*	.45	.15*	.45	.13*	.47	.13*	.06
Education	-.16	.03*	-.12	.03*	-.05	.03*	-.06	.03*	-.04
Married	-.72	.15*	-.64	.13*	-.53	.13*	-.52	.13*	-.06
Neuroticism			.84	.03*	.78	.03*	.76	.03*	.40
Extraversion			-.26	.02*	-.21	.02*	-.21	.02*	-.16
Occupational stress					.53	.10*	.47	.10*	.08
Relative stress					.75	.25*	.72	.25*	.05
Physical health					-.74	.07*	-.75	.07*	-.19
Heart attack					.34	.19*	.45	.20*	.04
Cancer					-.02	.24	.13	.24	-.06
Age							.02	.01*	
R^2	.030		.271		.316		.319		
R^2 change			.245		.050		.003		
F for R^2 change			457.09*		40.00*		12.00*		
<i>dfs</i>			2, 2720		5, 2715		1, 2714		

Note. Boldface coefficients and F values indicate agreement between both halves of the cross-validation split sample.

* $p < .05$ (at minimum).

ables were entered. All were significant except for cancer, and all were significant in both random halves. The addition of these variables also produced a significant increment in R^2 . Finally, the linear and quadratic functions of age were added. The quadratic term was significant, indicating a significant curvilinear effect, as well as a significant R^2 change. Age added significant explanatory power over and above the wide array of influences already in the model, many of which were age related. However, the R^2 change for the age increment was significant in only one of the cross-validation halves. Because of a lack of full cross-validation, we must be cautious in interpreting this effect.

We must make another important point here: The addition of the two personality variables created a large jump in R^2 . This may be interpreted as support for Costa and McCrae's (1980) and Lykken and Tellegen's (1996) arguments that happiness reflects nothing more than personality. However, nearly all of our variables remained significant even after introducing personality. Personality had a large impact on positive affect, but it did not nullify the effects of most of the other predictors. This supports the contention that positive affect is influenced by more than just personality.

Negative Affect

Regressions of negative affect on the successively larger sets of explanatory variables are shown in Table 4. Variables were entered in the same order as those for positive affect: sociodemographics first, personality second, contextual factors third, and (linear) age last. All variables entered were significant except for cancer. Furthermore, all sets of variables produced significant increases in R^2 , including age. In addition, all variables were significant in both halves of the randomly split sample except for education and relationship stress. All R^2 changes between

steps also cross-validated; each was significant in both random halves. Age produced the smallest R^2 change of the three, but it was nonetheless significant and replicated across both cross-validation halves.

In summary, the linear decrease in negative affect across our 25- to 74-year-old age range remained even when controlling for gender, stress, education, marital status, personality, and physical health. As was the case with positive affect, the personality variables accounted for the largest proportion of variance in negative affect. Despite this, when the full host of variables were entered, most variables remained significant, even in the presence of the personality factors. Personality was highly influential in explaining negative affect, but other contextual and sociodemographic variables, including age, also contributed substantial explanatory power.

Analyses Performed by Gender

After establishing the basic pattern of relationships between our explanatory variables and affect, we performed analyses by gender. Gender was a significant explanatory variable for both positive and negative affect in the full-sample results, although it did not cross-validate for positive affect. However, performing the regressions by gender allowed us to determine whether different patterns of relationship would hold for men and women among the explanatory variables and affect. This yielded different information than that obtained from the simple inclusion of gender in the model. As shown in Tables 5 and 6, it does appear that different patterns hold for men and women. The hierarchical regressions reported in Tables 3 and 4 were run by gender, and final models are reported for positive affect in Table 5 and negative affect in Table 6.

Table 5
Regressions of Positive Affect on Age and Explanatory Variables by Gender

Variable	Men (<i>n</i> = 1,337)			Women (<i>n</i> = 1,386)		
	<i>b</i>	<i>SE</i>	β	<i>b</i>	<i>SE</i>	β
Education	-.09	.04*	-.05	.04	.05	.02
Married	.45	.22*	.05	.43	.21*	.04
Neuroticism	-.64	.05*	-.30	-.67	.05*	-.30
Extraversion	.47	.04*	.31	.48	.04*	.30
Occupational stress	-.76	.16*	-.18	-.81	.16*	-.12
Relative stress	-1.61	.53*	-.07	-1.18	.35*	-.08
Physical health	.72	.11*	.16	.78	.11*	.17
Heart attack	-.55	.31	-.04	-.92	.34*	-.06
Cancer	.23	.44	.01	-.45	.37	-.03
Age	.02	.01*	.07	-.11	.06	-.33
Age ²				.001	.00*	.37
R ²		.298			.317	

Note. Boldface coefficients indicate agreement between both halves of the cross-validation split sample. The quadratic relationship between age and positive affect was significant only for women.

* $p < .05$ (at minimum).

Table 5 reveals three important differences between men and women in explaining positive affect. First, education was related to positive affect in men, but not women. Higher levels of education were associated with less positive affect among men, controlling for all other variables in the model. Education was unrelated to positive affect in women. Second, having experienced a heart attack was a significant and negative correlate of positive affect for women but was unrelated to the outcome in men. Third, and perhaps most important, the previously reported nonlinear (positively accelerating) effect of age on positive affect held only for women. The nonlinear effect was not significant for men. Rather, a simple positive linear relationship characterized the relationship between age and positive affect for men. Of these three differences, only the heart attack effect replicated across both random samples for men and women. Thus, we must interpret these differences with caution.² Nonetheless, it raises the possibility that the variables that predict positive affect for men are not the same as those for women.

Table 6 shows the regression of negative affect on the study variables by men and women. Again, three important differences appear. First, education was a significant predictor for women, but not men. Women with higher education had lower negative affect, but not men, who showed no relation between these two variables. Both of these cross-validated. Second, relationship stress was associated with greater negative affect for women, but not men. Among men, relationship stress was unrelated to negative affect, and this lack of effect held across both of the cross-validation samples. Finally, the relationship between age and negative affect differed for men and women. The linear and negative relationship found in the general sample held only for men. Older men had lower negative affect than younger men, although this relationship did not cross-validate. Age was unrelated to negative affect among women, and this held across both cross-validation samples. Again, although not all of these associations and nonassociations replicated, our findings raise the possibility that the combination of variables that best ex-

plains the individual differences in affect is not the same for men as for women. Furthermore, age appears to be central to these patterns of difference. Men and women showed different patterns for both positive and negative affect.

Interactions

In the final series of analyses we probed for interactions between age and the other significant study variables on positive and negative affect. Interactions were tested within gender groups, as the previous set of analyses showed that age may influence affect differently by gender. Few hypotheses regarding interactions have been advanced in the well-being literature. However, Diener (1996) has encouraged the search for interactions among variables known to influence well-being, arguing that the understanding of happiness will likely deepen via such explorations.³

As can be noted in Table 5, a quadratic relationship best described the association between age and positive affect for women. Therefore, among women, we tested for interactions between both linear and quadratic functions of age and the other explanatory variables on positive affect per the procedure described by Aiken and West (1991). All other interactions tested used linear rather than quadratic functions of age. Although age was not a significant associate of negative affect among women (see Table 6), we nonetheless tested for the presence of interactions in influencing negative affect among women, as interactions can occur even in the absence of main effects. All nondichotomous variables were centered per Aiken and West's recommendation, and centered main effect terms were entered along with interaction terms. Exponentiated variables (e.g., age²) were centered first before squaring. *F* tests for R^2 change were

² The R^2 change for the effects of age on affect by gender groups mirrored the results shown in Tables 5 and 6. Among men, the linear effect of age on positive affect, the net of all other variables in the model, replicated in one cross-validation sample but not the other. Thus, the coefficient for the full sample (reported in Table 5) is not written in boldface type. For women, the R^2 change associated with the quadratic effect of age on positive affect, the net of other variables, similarly replicated in only one random half. With regard to negative affect, the R^2 change associated with the linear effect of age did not replicate in one of the random halves. However, the nonsignificant effect of age on negative affect among women was not only nonsignificant in the full sample, but it also was so in both random halves. This was the only age effect to display a consistent significance pattern across the full and random half samples. Essentially, the various linear and quadratic effects of age (again, the net of all other influences in the model) on the two affects across the sexes were fragile effects. Thus, although they are important to document, they should not be overinterpreted.

³ Because age was the focus of this research, we report interactions between age and the other explanatory variables rather than interactions between all variables. We performed these tests by gender, but in analyses not reported we also performed these tests in the full sample. Only one interaction was significant in these full-sample analyses. This was between quadratic age and neuroticism on positive affect. The positive quadratic relationship between age and positive affect (accelerating at an accelerating rate) that was identified for the full sample appeared to hold only for people high in neuroticism. Those at low or medium levels of neuroticism did not show any relationship between age and positive affect.

Table 6
Regressions of Negative Affect on Age and Explanatory Variables by Gender

Variable	Men (<i>n</i> = 1,337)			Women (<i>n</i> = 1,386)		
	<i>b</i>	<i>SE</i>	β	<i>b</i>	<i>SE</i>	β
Education	.03	.03	.02	-.14	.04*	-.08
Married	-.52	.18*	-.07	-.52	.18*	.06
Neuroticism	.69	.04*	.40	.83	.05*	.41
Extraversion	-.16	.03*	-.13	-.26	.03*	-.18
Occupational stress	.52	.13*	.10	.42	.14*	.07
Relative stress	.52	.44	.03	.80	.31*	.06
Physical health	-.74	.09*	-.20	-.74	.10*	-.18
Heart attack	.26	.26	.02	.73	.30*	.06
Cancer	-.46	.37	-.03	.52	.33	.03
Age	-.02	.01*	-.07	-.01	.01	-.04
<i>R</i> ²		.291			.340	

Note. Boldface coefficients indicate agreement between both halves of the cross-validation split sample.

* $p < .05$ (at minimum).

performed between models containing only main effects and those containing the full models (with interaction terms) to determine whether any model containing an interaction term added significant explanatory value (as recommended by Jaccard, Turrisi, & Wan, 1990).

Only two age interactions were significant, and both occurred among men. The first was between age and extraversion, $F(1, 1333) = 10.00$, $p < .001$. This indicated that the relationship between age and positive affect interacted with extraversion. The nature of this interaction is illustrated in Figure 3. Per Aiken

and West's (1991) recommendation, we plotted the regression line (using centered values) at three levels of neuroticism: its (centered) mean and at 1 *SD* above and below that point. These points are labeled high, medium, and low extraversion in Figure 3. Note that the interaction lies in the varying slopes of the three regression lines. For men high in extraversion, the slope is not as steep as for the other two. Men low in extraversion (introverts) have the steepest slope. Men who are introverted showed a stronger association between age and positive affect than either of the other levels. Older introverts had higher levels of positive affect than younger introverts, whereas older extraverts had levels of positive affect not much different from their younger counterparts. There were also intercept differences between the three regression lines, with male extraverts showing the highest overall level of positive affect and male introverts the lowest.

We performed this analysis another way, in the manner recommended by Jaccard et al. (1990). We divided the sample into thirds based on high, medium, and low extraversion and regressed positive affect on age within these groups. This analysis yielded the same results as those shown in Figure 3. Thus, two approaches to probing the age-extraversion interaction on positive affect yielded the same conclusion. Additionally, the interaction held when controlling for all other study variables. However, when we attempted to cross-validate this finding by testing the R^2 change associated with the interaction across the random halves, it was significant in only one of the two halves. The lack of full cross-validation may have been affected by a loss of power. Power was substantially decreased by the cross-validation attempt, as the combination of only men plus the random split cut the sample size down to a quarter of the full sample size. Nonetheless, the fact that this effect was significant

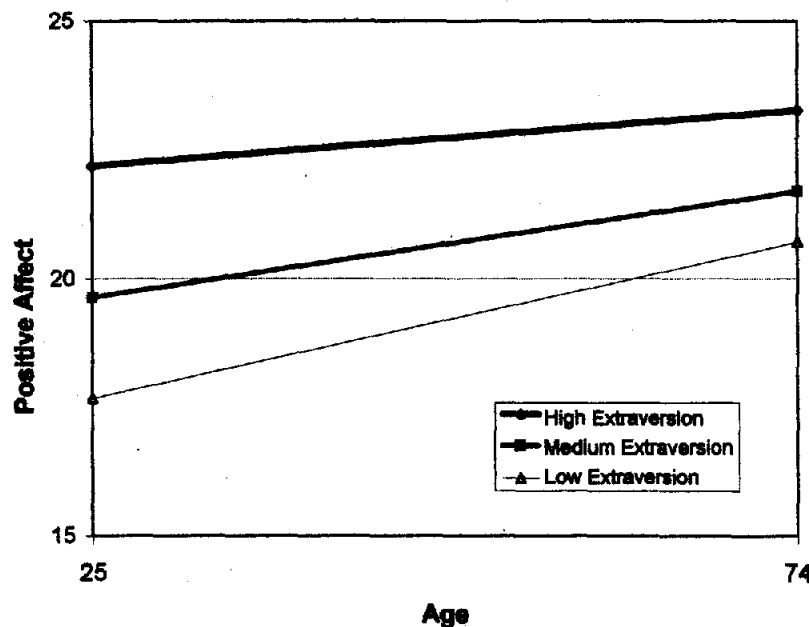


Figure 3. Interaction between age and extraversion on positive affect among men. Positive affect scores ranged from 6 to 30. The regression lines are based on the following equation (using centered variables): positive affect = 20.55 + age (.04) + extraversion (.53) + Age \times Extraversion (-.007).

at the full sample level and endured when other explanatory variables were controlled shows some degree of robustness.

The other interaction among men was between age and marriage on negative affect, $F(1, 1333) = 4.29, p < .05$. Figure 4 shows this moderator effect. Among unmarried men, there was basically no relationship between age and negative affect. The regression line was essentially flat, as shown in Figure 4. Negative affect remained at a generally high level across the age range for these unmarried men. On the other hand, for married men, the regression line sloped sharply downward, as can be seen in Figure 4. Younger married men had relatively high levels of negative affect, comparable to those of their unmarried counterparts. However, among the middle-aged married men negative affect was lower, and among older married men it was lower still. Again, we tested the interaction using the technique recommended by Jaccard et al. (1990), in which we ran the regression for both married and unmarried men. This effect was not significant for unmarried men but was strong among married men, $F(1, 1031) = 28.52, p < .0001$. The R^2 for the model was .027. This is more than twice the size of the R^2 obtained for the overall effect of age on negative affect, which was .012 (reported earlier).

This interaction indicates that the negative linear relationship between age and negative affect held mainly for married men. Unmarried men of all ages in the 25- to 74-year-old age range show elevated levels of negative affect. Only younger married men show levels of negative affect comparable to those of unmarried men of any age. Middle-aged and older men showed markedly less negative affect, indicating higher well-being. Because age and negative affect were not related among women (net of the other variables in the model; see Table 6), and

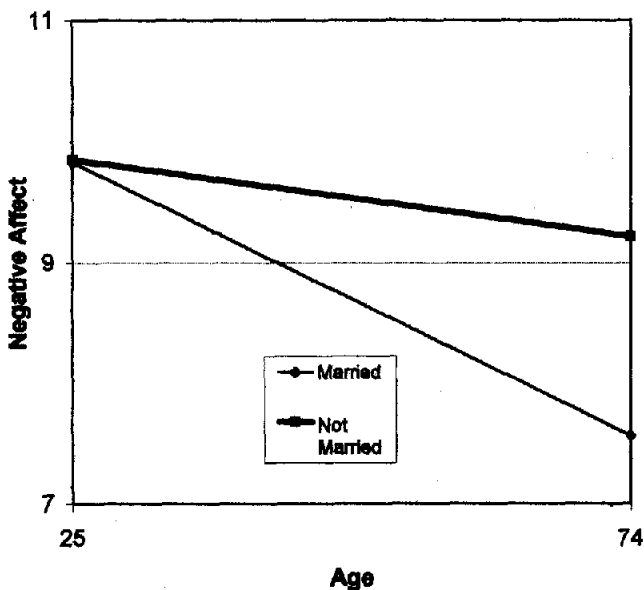


Figure 4. Interaction between age and marriage on negative affect among men. Negative affect scores ranged from 6 to 30. The regression lines are based on the following equation (using centered variables): negative affect = $9.56 + \text{age} (-.01) + \text{married/not married} (-.75) + \text{Age} \times \text{Married/Not Married} (-.033)$.

were not related among unmarried men, we must conclude that married men were driving the entire relationship between age and negative affect that we found in the full sample. Indeed, the large R^2 for the effect of age on negative affect among married men bears this out. It was a large enough effect that it created a detectable association in the full sample. By probing for interactions, we pinpointed the specific group that propelled the association between age and negative affect. In this case, married men drove the effect.

As a caveat, however, we must point out that the interaction term was not significant when controlling for the other study variables. Furthermore, the interaction replicated in only one of the two random cross-validation halves. Therefore, although the effect was impressive in the full sample, when other variables were controlled, or when the sample was split in half, the effect was less resilient. Again, power was diminished when the sample was split, and the significance tests may have been affected.

In summary, we were able to pinpoint specific groups of individuals on the basis of gender, extraversion, and marital status for whom the age-affect relationship was modified. The positive association between age and positive affect was different across the sexes, with a linear function characterizing the association for men and a nonlinear function describing it for women. Furthermore, among men, extraversion moderated the linear relationship, with introverts showing a stronger link between age and positive affect than the more extraverted men. Finally, the inverse relationship between age and negative affect appeared to be driven by one group of people—men who were married.

Discussion

We examined the relationship between age and happiness, with a focus on clarifying the effects that personality, context, and sociodemographics exert on positive and negative affect. We also considered differential patterns of association. We used a large, nationally representative sample of Americans with a wide age range, which allowed us to report statistics that are more precisely estimated than in other, smaller studies. However, per Brim and Kagan (1980), we first needed to identify the correct functional form of the basic association between affect and age. Thus, linear and nonlinear (polynomial) models were tested.

With regard to negative affect, we obtained a result that several other investigators have also found. Like Costa, Zonderman, et al. (1987), Diener et al. (1985), Ryff (1989), and Vaux and Meddin (1987), we found that negative affect was highest among young adults and lowest among older adults. This relationship cross-validated when we randomly split our sample into two halves, and it held when controlling for a host of other influences. However, when we delved deeper into these data and divided our sample into men and women, it became clear that the negative association between age and negative affect held only for men, again the net of other influences. Age and negative affect were unrelated among women.

Delving even further into these data, we discovered that age and negative affect were unrelated among unmarried men as well. Younger unmarried men had the same relatively high amount of negative affect as middle-aged or older men. Keep

in mind that our unmarried group of men included divorced, widowed, and separated men, along with those who were never married. Thus, it may be that younger men have higher negative affect because they have never been married, whereas the older men have higher negative affect because they are divorced, separated, or widowed. Whatever the underlying cause, both younger and older unmarried men have relatively high levels of negative affect. Among married men, on the other hand, age was inversely related to negative affect. Older married men reported less negative affect than younger married men and presumably were happier. Furthermore, this relationship was strong enough to create an association in the full sample, which included women and unmarried men. Performing our analyses by gender and testing for interactions allowed us to uncover this important nuance in these data. This clarified the relationship between age and negative affect and showed how this association was modified by gender and marriage. To summarize, age and negative affect were unrelated, except among married men.

With regard to positive affect, our investigation again yielded several strata of findings. First, in the full sample the function that best described the association between age and positive affect was nonlinear, taking the form of an accelerating curve (see Figure 1). This nonlinear function held even when controlling for many other variables, but it did not replicate across the random cross-validation halves. Second, when the sample was divided into men and women, the nonlinear relationship held only for women, whereas a simple linear function best characterized the association for men. These differential relationships held when controlling for many other variables, but it did not cross-validate. The third layer of findings involved an interaction. The strength of the association depended on the level of extraversion, but this interaction held only for men. Age and extraversion interacted such that introverted men displayed a stronger (linear) relationship between age and positive affect. Older introverted men had higher levels of positive affect than younger introverted men. The relationship was not as strong among extraverted men. Older extraverted men were not much higher on positive affect than their younger counterparts, although both younger and older extraverted men reported much more positive affect than introverts, reflecting the strong main effect for extraversion on positive affect (see Figure 3). To summarize, positive affect was associated with age among women in a nonlinear fashion and was linearly associated among men, although extraversion moderated the strength of the relationship.

It is not surprising that so much ambiguity surrounded previous findings on age and affect because this study uncovered a host of complex factors that influence the associations. These findings imply that subsequent investigations should ask *for whom* does affect rise or fall with age. Age and affect do appear to be related, but only for certain groups as opposed to for the entire population. Particular combinations of age, personality, and sociodemographic categories may maximize or minimize happiness. Although our findings certainly need to be independently replicated, we believe interactions of the type we found are important to parse out, as Diener (1996) has also suggested. The identification of particular groups for whom the age-affect relation is magnified or eliminated renders the full-sample results less relevant. The pinpointing of specific combinations of

variables, on the other hand, can lend a deeper understanding of the factors that give rise to individual differences in well-being.

These results also support a number of recent theories that have suggested that well-being may improve with age (Labouvie-Vief & Blanchard-Fields, 1982; Lawton, 1996). They especially support Carstensen's (1991, 1995) socioemotional selectivity theory, which contends that older adults regulate their emotions more effectively than younger or middle-aged adults. Older individuals, through years of life experience, know what kinds of external events increase and decrease their positive and negative emotions. Thus, they achieve a better "affect balance" by selecting people and situations that will minimize negative and maximize positive emotion.

Our key results generally support this idea. First, across the 25- to 74-year-old age range, positive affect increased at an accelerating rate for women and went up at a linear rate for men, except for extraverts, who reported high levels of positive affect at all ages. Second, although negative affect did not appear to differ across the 25-74 age range for women and for unmarried men, it did decrease for married men. This result regarding marriage has particular relevance for Carstensen's (1991, 1995) theory. She argued that social contexts, especially relationships, play a major role in determining the extent to which people gain greater regulation over their emotions as they age. The social context created by marriage, or even marriage itself, may be the catalyst by which men learn how to minimize negative affect. However, even if this speculation were correct, it would still leave the question of why older women do not report less negative affect than younger women. Again, it is not clear whether any of these associations are attributable to aging or cohort effects. Nevertheless, positive affect generally goes up across our age range, although at differing rates by gender, and negative affect either stays the same or goes down depending on gender and marital status. Overall, the results draw a portrait of greater or unchanged affective well-being among older individuals and thus lend support to the theories of Carstensen (1991, 1995) and others.

Seldom does a theory describe the feelings or behavior of everyone, however. Although the aforementioned theories are valuable and may describe general patterns of well-being and age, they are likely limited as mechanisms for explaining the full extent of individual differences in affective well-being. Our findings can refine those recent theories that argue well-being should improve with age. We propose that age-related improvements in happiness may differ depending on the person's status on certain third variables. We identified three such third variables: gender, marriage, and extraversion. Findings such as these can allow researchers to build and cultivate theories of affective well-being such as Carstensen's.

Our results also have implications for theories maintaining that well-being reflects nothing more than personality (e.g., Lykken & Tellegen, 1996). The two personality dimensions included in our analyses certainly are influential. They accounted for a larger portion of the individual differences in both affect indicators than any of the other explanatory variables, including age. Furthermore, it is possible that personality could have been acting in indirect ways through our contextual and sociodemographic variables. For example, people high in neuroticism may

select themselves into more stressful life situations of the type we measured in this study. We do not believe our results support this notion, however. Our analyses show that most of our sociodemographic and contextual explanatory variables had significant effects even when personality was in the equation. Personality is important in explaining well-being, as our findings attest, but it is not the whole story. Other factors are also needed for the fullest explanation.

Caveats

Several caveats must be considered in interpreting our findings. First, the age effects for both positive and negative affect were generally small. In each case, the direct age effect accounted for little more than 1% of the variance in affect. Furthermore, the effect for positive affect did not cross-validate in the full sample or in either gender sample. The effect for negative affect did cross-validate in the full sample, but it did not among men (the nonsignificant effect did cross-validate among women). However, among men, we did learn that marriage amplified the effect strongly: The R^2 was double that for the full sample. Most of these age effects remained when potential confounding variables were introduced, but some of them did not cross-validate. With regard to cross-validation, the effects for negative affect appeared to be more resilient than those for positive affect. Additionally, our small age effects fit with most of the previous literature in that few previous investigators have ever found large age effects. Stressing the modest magnitude of the age effect, we consider the aforementioned points strong enough to warrant interpretation and future attention.

Furthermore, in this study we used a number of nonstandard measures. The MIDUS survey used a new and specially designed inventory, the MIDI. Although carefully developed by the MacArthur Midlife Network, the MIDI measures of affect and personality are not yet well-known scales. Although both sets of measures yield high alphas and show relationships to other variables that are congruent with the prior findings of many studies (e.g., neuroticism and negative affect correlate highly, physical health and positive affect correlate significantly and positively, etc.), they are still nonstandard instruments and may have unknown flaws that more well-established scales have corrected. On the other hand, the items making up all affect and personality scales were drawn from other well-known and well-established measures. Thus, despite the possibility that unknown defects may exist in our scales, it is unlikely that they have tarnished the results.

Our measures of work and relationship stress may also be problematic. They included only fairly major stressors and perceptions of stress and leave out many more subtle influences that might have explained away the age-affect associations. Our stress measures certainly capture some of the big events that happen to people, such as divorce, separation, job loss, and lack of control over finances and relationships. However, we did not include minor stressors or daily hassles. The events and perceptions we used did indeed have a direct effect on both affect variables, but they do not explain away the age effect. The addition of other types of stressors might account for the age-affect association. An interesting future study might ex-

plore stress in more depth and with better measures of stressful events, roles, and perceptions.

Furthermore, we must again emphasize that it is impossible to determine from these data whether our age results are a cohort phenomenon or an aging effect. It may be that the older generation of adults alive today report greater happiness but that future generations will not. It may be a happier cohort than past or future generations. To determine whether we have unclocked a true aging phenomenon, a sample would have to be followed longitudinally from ages 25 to 74.

Finally, some of our findings may be a product of a problem similar to the cohort versus aging issue, involving the type of people who survive into their 60s and 70s. It is conceptually possible that unhappy people die earlier than happy people. For example, people high in negative affect and low in positive affect may be at greater risk for serious health problems, making early mortality more likely. This would create a group of survivors within older age strata who have higher levels of well-being than those in younger strata. If so, levels of well-being in samples of older people may be higher simply through attrition of unhappy people.

Conclusion

In summary, when well-being was defined by positive affect, older people are happier than other adults. This relationship held when a host of potential confounding variables were controlled, including gender, marital status, education, stress, personality, and physical health. Among women, this relationship was characterized by an accelerating curve. Among men, the effect was linear, but extraversion moderated the relationship, such that men who were introverted showed a stronger relationship between age and positive affect than did extraverted men. When well-being was defined by negative affect, there was no association among women or unmarried men, the net of other explanatory variables. Among married men, the relationship was negative and linear.

The results obtained in the present investigation lead us to state with some confidence that neither the early, classic studies on happiness that emphasized sociodemographic explanations (Andrews & Withey, 1976; Bradburn, 1969; Campbell et al., 1976; Gurin et al., 1960) nor more recent work that ascribes happiness primarily to genetically determined person factors (Costa & McCrae, 1980; Lykken & Tellegen, 1996) are adequate for fully explicating the causes of individual differences in well-being. In this study, we took into account sociodemographic, contextual, and personality factors and found that each of these have important explanatory power, even if some had greater weight than others. In this sense, we provide empirical evidence for Diener's (1996) recent contention that traits are not enough to explain all the variability in well-being. However, what may be even more important is the differential impact of these explanatory variables within specific groups, such as gender, marriage, and extraversion. A shift by well-being researchers toward such interaction models may more fully elucidate the puzzle of what makes some people happier than others.

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Appendix

Positive and Negative Affect Scales

The response options for the affect scales were as follows:

- 1 = *none of the time*
- 2 = *a little of the time*
- 3 = *some of the time*
- 4 = *most of the time*
- 5 = *all of the time*

Directions: "During the past 30 days, how much of the time did you feel . . ."

Negative affect ($\alpha = .87$)

- 1. so sad nothing could cheer you up?
- 2. nervous?
- 3. restless or fidgety?

- 4. hopeless?
- 5. that everything was an effort?
- 6. worthless?

Positive affect ($\alpha = .91$)

- 1. cheerful?
- 2. in good spirits?
- 3. extremely happy?
- 4. calm and peaceful?
- 5. satisfied?
- 6. full of life?

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