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Philip Q. Yang
Texas Woman's University, pyang@twu.edu

Erica Leone
Texas Woman's University, eleone@twu.edu

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Philip Q. Yang, *Texas Woman's University*
Erica Leone, *Texas Woman's University*

Abstract: In recent years, many media reports have claimed that older people are happier than younger people. We question the total validity of this claim. Analyzing data from General Social Surveys 1972-2016, this study reveals that the happiness of older adults depends on their health status and economic status, and it also detects a significant J-shaped relationship between age and happiness over a lifetime. Additionally, we find significant differences in happiness across generations and over time. Our findings challenge the popular claim in the media reports and the U-shaped and inverted U-shaped patterns detected in the academic literature and provide a more complete picture of the relationship between age and happiness.

Keywords: Happiness; Age; Health status; Economic status; Moderating effect; Nonlinear effect

In recent years, many media reports (e.g., Bratskeir 2016; Gregiore 2015; Isaacowitz 2012; Leland 2017; MacMillan 2018; Netburn 2016; Oaklander 2016; Tanner 2008) have claimed that older people are happier than younger people. Although there may be some evidence to support this claim, we have serious doubt about its unconditional validity. Some scholarly studies (Deaton 2008; Rodgers 1982) also reported counter evidence of a negative relationship between age and happiness or life satisfaction. Other researchers (e.g., Blanchflower and Oswald 2004, 2008; Clark and Oswald 1994; Easterlin 2006; Fritjers and Beaton 2012; van Landeghem 2012; Yang 2008) provide evidence that the relationship between age and happiness is nonlinear but uncover different patterns of curvilinear relationship between age and happiness. There exists another argument that happiness does not vary with age (Cantril 1965; Costa et al. 1987; Dear, Henderson, and Korten 2002; Palmore and Luikart 1972). As of now, whether older people are happier than younger people remains an unresolved issue with inconclusive evidence. The reality may be more complex than what has been offered. Using data from General Social Surveys (GSS) 1972-2016, this study seeks to join this discourse and to provide more complete and cogent answers to this question. Findings of this study will have significant practical implications for improving life satisfaction over the life span.

The central research question of this study is: Are older people really happier than younger people? Specifically, this study examines two real possibilities: (1) Does economic and health status moderate the effect of age on happiness? (2) Is there a nonlinear effect of age on happiness? We define "happiness" as an individual's feeling of contentment or positive well-being. This study treats "older" and "younger" as relative concepts on a continuum, in addressing research question 2. To avoid ageist implications, we also use the discrete concept of "older adults" or "elder" (for space efficiency) in the place of "the elderly" to refer to those aged 65 or older in our analysis of the moderating effect of economic and health status on the relationship between age and happiness. The remainder of this article reviews the literature, proposes hypotheses for

testing, describes data and methods, presents the results, and discusses the implications of the findings.

Literature Review

There is a large and growing body of literature on the age-happiness relationship. A popular argument from media reports maintains that older people are happier than younger people (e.g., Bratskeir 2016; Gregiore 2015; Isaacowitz 2012; Leland 2017; MacMillan 2018; Netburn 2016; Oaklander 2016; Tanner 2008). Various explanations have been offered for this argument. Some researchers have found that older people are happier because they have fewer life stressors and more cognitive control (Breheny et al. 2014; Warr 2015), leaving them freer to do things that they normally would not do. Their responsibilities and daily routines such as jobs and young children have been lifted, so they can relatively easily brush off life's stressors (Oaklander 2016). Another explanation is that older adults tend to focus on and remember positive events in their lives and left behind negative ones (Isaacowitz 2012). With age, maturity and decline in excitement also help older adults exhibit more positive emotions and serenity (Ross and Mirowsky 2008). These processes help older people better regulate their emotions, letting them view life in a sunnier light. Older people may have lower or more realistic achievement expectations than their younger counterparts. Some contended that older people had overall positive outlooks on life and therefore positive well-being (e.g., Anila and Dhanalakshmi 2014). Other studies (e.g., Danner, Snowdon, and Friesen 2001; Yang 2008) suggested that "survivor bias" may contribute to the skewed results in the happiness of older adults because the selective survival of respondents who are healthier and happier may lead to higher levels of happiness in older ages.

An argument contrary to the foregoing popular argument is that older people are less happy or satisfied than younger people (Deaton 2008; Rodgers 1982). Analyzing survey data from 15 national samples collected by the Survey Research Center at the University of Michigan and the National Opinion Research Center (NORC) at the University of Chicago from 1957 to 1978, Rodgers (1982) showed that older adults were less happy than age groups younger than 65 between 1957 and 1974, although levels of happiness among different age groups converged between 1975 and 1978. Deaton (2008) found that for most countries life satisfaction declines with age. Life changes at older ages such as deteriorating physical and cognitive abilities and a decreasing ability to conform to societal norms can cause social withdrawal, isolation, and anhedonia, which eventually lead to mild, moderate, or clinical depression (Cruwys 2014). The loss of grip on conformity to social norms, such as their ability to drive, can create a sense of lost independence, reduce social engagement, and increase health problems, especially depression (Chihuri et al. 2017; Curl et al. 2014; Pachana et al. 2017). The bereavement of a spouse can increase loneliness, depression, and grief (Blazer and Hybels 2005; Hensley 2006). In brief, declining health, loss of social roles, social network atrophy, and increasing probability of living alone can lead to less happiness in older ages.

A third argument is that the effect of age on happiness is nonlinear, namely, happiness rises and falls depending on age. Various patterns of curvilinear effect have been uncovered. One pattern detected by economists is the so-called U-shaped relationship between age and happiness with the nadir at between the mid-30s and early 50s (e.g., Blanchflower and Oswald 2008; Clark and Oswald 1994; Oswald 1997; van Landeghem 2012). It is also important to note that U-shaped pattern is observed in rich, developed countries such as the U.S., Canada, U.K., Australia, and New Zealand, but not in most countries (Deaton 2008). A contrasting pattern is an inverted U-shaped relationship between age and happiness (Easterlin 2006; Mroczek and Spiro 2005; Yang 2008). For example, using data from GSS 1973-1994, Easterlin (2006) found that happiness reached the apex at midlife, albeit not by a great deal, but declined after age of 51. Similarly, using GSS 1972-2004, Yang (2008) also detected a relatively flat parabolic trajectory with the probability of happiness reaching the peak at late 60s. A third pattern is a mixed curvilinear trajectory. For instance, Fritjers and Beaton's (2012) research revealed a wave-like pattern before controlling for socioeconomic variables and a U-shaped relationship between age and

happiness after socioeconomic variables are controlled. The U.K. Office of National Statistics reported in 2015 that individuals aged 20 and 40-50 scored progressively lower in measures of happiness, but after the middle years of their life, happiness became steadily greater until it leveled off at 70 (Warr 2015).

Finally, a fourth argument is that age has either no effect or a constant effect on happiness or subjective well-being. This older argument is mostly held by psychologists (e.g., Cantril 1965; Dear, Henderson, and Korten 2002; Palmore and Luikart 1972). Using the 9-year longitudinal data from the National Health and Nutrition Examination Survey I Epidemiologic Follow-up Study of 4,942 men and women initially aged 25 to 74, Costa et al. (1987) found no significant age, birth cohort, or period effects on happiness. Myers and Diener (1995:10) also concluded that "happiness and life satisfaction are similarly available to the young and the old" in their mega-analysis of primarily psychological studies of happiness.

It appears that different measurements of subjective well-being (SWB) may have minimal impact on the differences in empirical findings regarding the age-SWB relationship. For example, the inverse relationship between age and SWB was reported on the basis of both life satisfaction (Deaton 2008) and happiness (Rodgers 1982). No relationship between age and SWB was reported on the basis of both life satisfaction and happiness (Myers and Diener 1995). Blanchflower and Oswald (2004) found the same U-shaped relationship between age and SWB using both life satisfaction for the U.K. and happiness for the U.S. Easterlin (2006) and Yang (2008) using the measure of happiness and Mroczek and Spiro (2005) using the measure of life satisfaction reported the inverted U-shaped pattern in SWB.

Nevertheless, the variations in empirical findings may be attributable to a number of factors. First, whether the analysis is at the aggregate level or the individual level seems to make a difference in the patterns found. For instance, Deaton's (2008) analysis used country as the unit of analysis, but many other studies (e.g., Easterlin 2006; Mroczek and Spiro 2005; Yang 2008) used individual as the unit of analysis. Second, the level of development of the country under study is another factor that may impact the results. Deaton's (2008) finding of a U-shaped pattern in rich, developed countries and a negative relationship between age and life satisfaction in most other countries is a case in point. Third, how the data were handled and analyzed may have contributed to the differences in the results. The United States is one of the rich, developed countries. Nonetheless, the U.S. age patterns in happiness reported (i.e., the inverted U-shaped pattern and the inverse relationship) appear to contradict the U-shaped pattern reported in other developed countries (see Blanchflower and Oswald 2004, 2008; Clark and Oswald 1994; Oswald 1997; van Landeghem 2012). Even among the studies using the GSS data in the United States (i.e., Easterlin 2006; Rodgers 1982; Yang 2008), the patterns are different.

Apparently, the controversy continues. There exist a couple of major limitations with the literature reviewed above. First and foremost, existing research has not really considered the moderating effects of health status and economic status on happiness, although quite a few studies include some variables of health and economic status (see, for example, Easterlin 2006; Gerdtham and Johannesson 2001; Palmore and Luikart 1972; Yang 2008). It is important to examine the moderating effects of health status and economic status on happiness because without doing so we cannot fully assess the validity of the claim that older people are happier than younger people. Secondly, various patterns of nonlinear effects of age on happiness have been reported and therefore require further testing and verification. The U-shaped pattern seems to imply that youth and older adults have the same level of happiness, but this characterization may be inaccurate as the shape may not be like a U. The existing evidence on the inverted U-shaped pattern also appears to be relatively weak.

Hypotheses

This study tests three hypotheses that examine the effect of age on happiness contingent upon economic

conditions and health conditions, and the nonlinear effect of age on happiness over a lifetime. The first hypothesis is that *the effect of age on happiness is moderated by health conditions*. Many senior citizens struggle with declining health that can completely alter not only their state of mind but also their daily lives. Biological, social, and psychological issues can lead to changes in individuals' attitudes toward life satisfaction. Illness and functional impairment can cause depression (Blazer and Hybels 2005). Health issues can be spurred by psychological issues such as dementia. Stressful life events such as bereavement and life responsibility shifts create a significant risk of habitual illness in older adults, although they can affect all ages (Blazer and Hybels 2005). Hence, older adults with poor health will be less happy than their younger counterparts. On the other hand, older adults with good health can enjoy the benefits of fewer life stressors, better cognitive control, better emotional control, and a more positive outlook on aging and therefore can feel happier than ever.

The second hypothesis is that *the effect of age on happiness is moderated by economic status*. Economic status can help or hinder individuals' life conditions and therefore happiness. Those who live in poverty or with a lower economic status have poor living conditions, leading to physical and mental problems and premature mortality (WHO 2010). Those with a negative economic outlook also reported depression-like symptoms (Tuminello et al. 2011). A lack of economic resources also limits access to sufficient healthcare. In contrast, older adults with a good economic status have access to better living conditions, better doctors and hospitals, and an overall better quality of life. Money can boost happiness by saving time, helping others, and buying quality life experiences (Dunn and Horton 2013). Hence, older adults with a better economic status should be happier than younger people, but older adults in a poor economic status should be less happy than younger people.

Finally, we hypothesize that *age will have an inverted parabolic relationship with happiness*. Youngsters tend to have greater aspirations, life goals, and hopes for the future than adults, which can enhance positive thinking. While youngsters certainly experience stress in school, peer relations, and family relations, compared to adults who have a job, a family, and other social roles, they have relatively fewer responsibilities and daily life stressors to worry about. This could translate into a relatively satisfactory feeling of contentment or happiness. Once they enter adulthood and gain independence from their parents, they will pick up new social roles and duties, which could make life more stressful and therefore decrease happiness. In older ages, individuals' life aspirations and goals tend to be lower and more realistic, thereby leading to smaller discrepancies between aspirations and accomplishments and relatively achievable contentment (Cheng 2004). Meanwhile, the types of hassles or daily life stressors tend to decrease in later life as older adults become freer from responsibilities (Aldwin et al. 1996). Older adults may also have more coping resources and may assess stressful events differently as less stressful than younger people (Aldwin et al. 1996). As a result, older people may become happier again after certain point in their life.

Data and Methods

Data

The data for this study come from the General Social Surveys (GSS) from 1972 to 2016 conducted by the NORC at the University of Chicago (Smith et al. 2017). The GSS gathers data on social issues and trends in American society. The pooled sample included respondents aged 18 or older. We restricted the analysis to the respondents who provided a valid answer to the question on the dependent variable, happiness. All data were weighted so that the results can be generalized to the population. After weighting and restricting the data, the sample size consists of 57,523 respondents.

One advantage of the data is that the GSS allows generalization of findings to the population, as it is a random sample from the population. Another advantage is that the GSS contains many demographic and socioeconomic variables (e.g., sex, race, education, income) that have potential impact on happiness. Furthermore, the GSS permits us to simultaneously examine the effects of age, period, and cohort, which

are often unavailable in many datasets. It is important to simultaneously assess the effects of age, period, and cohort because they reflect different kinds of changes in individual life course and in larger societal contexts and because they are confounding (Yang 2008). Additionally, a large sample size enables reliable statistical estimates.

Limitations of the data must be acknowledged. One limitation is that GSS 1972-2016 are repeated cross-sectional data rather than panel data. Another limitation is that the variation of the happiness measure (described below) is limited with three categories, but this is the only measure available across the 44 years. Third, continuous data every year would be ideal, but the GSS has only collected data every other year since 1994. Fourth, while income is a good indicator of economic conditions, other indicators of economic conditions that could potentially influence happiness such as wealth and retirement accounts are not accessible from the GSS. Finally, some individual-level potential predictors of happiness such as important life events (e.g., promotion, pregnancy, loss of job, death in the family) and some macro-level structural determinants of happiness (e.g., welfare system) are not available in the GSS. Despite these limitations, the GSS remains the best available data to answer our research question.

Variables and Measurements

The dependent variable is happiness, which is based on the following survey question: "Taken all together, how would you say things are these days - would you say that you are very happy, pretty happy or not too happy?" Happiness is an ordinal variable with three categories: 1=*Very happy*, 2=*Pretty happy*, and 3=*Not too happy*. This variable was then reverse recoded so that a higher value indicates a higher degree of happiness.

The key independent variable is age, which is a continuous measure by years ranging from 18 to 89 or older. To test the hypotheses, we measure age in two different ways. First, to test the effects of interaction, we created two dummy variables for age with youth (18-29 years) as the reference category: middle-agers (30-64 years) and elders (65 or older). We used dummy variables for age groups in order to assess if elders are qualitatively different from youth and middle-agers in happiness. Second, to test the nonlinear effect of age, we used the continuous variable age and created a quadratic term age^2.

We use two moderating variables: economic status, and health status. Income is used to measure economic status. Income is defined as "Inflation-adjusted personal income." Income is divided by 1,000 to show constant dollars in $1,000. Health status is measured by self-reported health, which is an ordinal variable with four categories: 1=*Excellent*, 2=*Good*, 3=*Fair*, and 4=*Poor*. This variable is reverse recoded so that a higher value indicates a better health status.

Our control variables include marital status, sex, education, race, religious attendance, work status, number of children, year, and birth cohort as these variables have been found to be possible predictors of happiness (e.g., Blanchflower and Oswald 2004, 2008; Dunn and Norton 2013; Easterlin 2006; Fritjers and Beaton 2012; Sutin et al. 2013; Yang 2008). Marital status was dummy coded with 1 for *Currently married* and 0 for *Not currently married*. Religious attendance is an ordinal variable with nine answer categories: 1=*Never*, 2=*Less than once a year*, 3=*About once or twice a year*, 4=*Several times a year*, 5=*About once a month*, 6=*2-3 times a month*, 7=*Nearly every week*, 8=*Every week*, and 9=*Several times a week*. Several dummy variables were created for work status: *Full time*, *Part time*, *Retired*, and *All other*, with *Unemployed* as the reference category. Number of children is a continuous variable ranging from 0 to 8 or more. Sex is a dummy variable coded 1 for *Male* and 0 for *Female*. Two dummy variables were created for race with white as the reference category: *Black* and *Other race*. Education is a continuous variable with 21 categories ranging from no schooling to 20 years or more of schooling.

A series of dummy variables for year was created in order to test the fluctuating period effect, using 1972 as

the reference category. Each year dummy variable was dummy coded 1 for the designated year (e.g., 1973) and 0 for all other years.

In order to detect generational differences in happiness, a number of dummy variables was recoded using the cohort variable: G.I. Generation (1924 or earlier), Silent Generation (1925-1945), Baby Boomers (1946-1964), Generation X (1965-1979), Millennials (1980-1994), and iGen (1995-2012) (McCrindle 2014).

To test the effect of interaction between age categories and health status on happiness, we created two cross-product terms: Health x Middle-ager, and Health x Elder. To test the effect of interaction between age categories and economic status on happiness, we created two interaction variables: Income x Middle-ager, and Income x Elder.

Methods of Data Analysis

Initially, we used ordinal logistic regression because the dependent variable is ordinal. However, the parallel line assumption was not met. Hence, we dummy coded the dependent variable with 1 indicating "Happy," including "Pretty happy" and "Very happy," and 0 denoting "Not too happy," and we then used logistic regression for this dichotomous dependent variable.

We constructed five logistic regression models to test Hypotheses 1 and 2. Model 1 includes two dummy variables for age: middle-agers and elders with youth as the reference category. Model 2 adds demographic and socioeconomic variables to Model 1. Model 3 adds generational cohorts to Model 2. Model 4 adds the dummy variables for year to Model 3. Model 5 adds four interaction terms to Model 4: Health x Middle-agers, Health x Elder, Income x Middle-agers, and Income x Elder.

We tested five additional logistic regression models to test Hypothesis 3. In Model 1, happiness is regressed on age. Model 2 adds the nonlinear term age^2 to Model 1. Model 3 adds all demographic and socioeconomic variables to Model 2. Model 4 adds generational cohort variables to Model 3. Model 5 adds dummy variables for year to Model 4.

As Yang (2008) noted, for aggregate population data the independent effects of age, period, and cohort cannot be estimated simultaneously because of the identification problem generated by the linear dependency among age, period, and cohort; however, for repeated cross-sectional surveys at the individual level such as the GSS it is possible to examine the independent effects of age, period, and cohort simultaneously because the liner dependency is not inevitable and can be broken. There are different methods of assessing the effects of age, period, and cohort, logistic regression is one of them because of our dichotomous dependent variable. It should also be noted that there is a potential issue of invalidity in coefficients of interaction terms in nonlinear models with categorical dependent variables because of unequal residual variances across groups (Allison 1999; Williams 2009). Nevertheless, in models with more covariates this is less likely to be a problem (Allison 1999). Since our models include a very large number of covariates, the impact of unequal residual heterogeneity is very small, if existent.

Results

Descriptive Analysis

The means and standard deviations of the variables used in analysis are presented in Table 1. The dependent variable, happiness, had a mean of 2.213, which indicated that on average the respondents were a little bit more than pretty happy. Of the respondents, 33 percent were very happy, 55.4 percent were pretty happy, and 11.6 percent were not too happy. The mean of a dummy variable can be interpreted as percent after multiplying it by 100. As can be seen in Table 1, of all of the respondents, 23.5 percent were considered youth, 61.4 percent fell into the middle-ager category, and 15.1 percent were elder.

With regard to the moderating variables, health condition had a median of 3, which indicated good health. Of the respondents, 30.8 percent reported they were in excellent health, 45.4 percent in good health, 18.5 percent in fair health, and 5.2 percent in poor health. The income variable, which is measured on a continuous scale, shows the average income of the

Table 1. Means and Standard Deviations (S.D.) of Variables Used in the Analysis, U.S. Adults, GSS 1972-2016

Variable	Mean	S.D.
Dependent Variable		
General Happiness	2.213	.633
Independent Variable		
Age		
Youth (18-29)	.235	.424
Middle-agers (30-64)	.614	.487
Elders (65+)	.151	.358
Moderating Variables		
Health Condition		
Excellent	.308	.838
Good	.454	.838
Fair	.185	.838
Poor	.052	.838
Income	18,810	29,557
Control Variables		
Marital Status		
Currently married	.604	.489
Not currently married	.396	.489
Number of Children	2.000	1.810
Race		
White	.810	.393
Black	.134	.342
Other	.057	.231
Sex		
Female	.542	.498
Male	.458	.498
Education	12.790	3.130
Religious Attendance	3.820	2.720
Work Status		
Full time	.499	.500
Part time	.110	.313
Retired	.118	.323
Unemployed	.035	.183
All other	.238	.453
Generation		
G.I.		
Silent	.248	.432
Baby Boom	.373	.484
GenX	.280	.449
Millennial	.316	.465
iGen	.064	.245

Table 1. (Continued)

Variable	Mean	S.D.
Period		
1972	.028	.164
1973	.026	.159
1974	.026	.158
1975	.026	.158
1976	.026	.159
1977	.027	.160
1978	.026	.160
1980	.025	.157
1982	.032	.176
1983	.027	.163
1984	.025	.156
1985	.027	.161
1986	.025	.157
1987	.031	.173
1988	.026	.156
1989	.027	.161
1990	.024	.152
1991	.026	.159
1993	.028	.164
1994	.052	.221
1996	.050	.218
1998	.049	.215
2000	.048	.214
2002	.024	.152
2004	.023	.150
2006	.052	.222
2008	.035	.184
2010	.035	.185
2012	.034	.181
2014	.044	.205
2016	.050	.217

respondents was $18,810 with a standard deviation of $29,557.

Among the control variables, marital status showed 60.4 percent currently married and 39.6 percent not currently married. On average, the respondents had two children. Of the respondents, 81 percent were white, while 13.4 percent were black and 5.7 percent belonged to other races. There were more women (54.2 percent) than men (45.8 percent) in the sample. The respondents on average had a slightly more than high school education. The respondents on average attended religious services several times a year. In regard to work status, about half of the respondents worked full time, 11 percent worked part time, 11.8 percent retired, 3.5 percent unemployed, and 23.8 percent belonged to other categories, including in school. Generationally, 13.8 percent of the respondents were classified as the G.I. Generation, 24.8 percent as the Silent Generation, 37.3 percent as Baby Boomers, 28 percent as GenXers, 31.6 percent as Millennials, and 6.4 percent as iGen. From 1972 to 1993, each year, the respondents made up around 2-3 percent of the pooled sample. Since 1994, the yearly proportion

increased to around 5 percent except for 2002-2004 and 2008-2014.

Logistic Regression Analyses

Table 2 presents the results of five logistic regression models predicting happiness with the purpose of testing Hypotheses 1 and 2. The model fit statistics shown at the bottom of the table indicate that except for Model 1, the other four models are good models because their models χ^2's are all statistically significant at the 0.001 level. The -2 log likelihoods and model χ^2's indicate that each more complex model fits the data better than its simpler model. The pseudo R^2's confirm this conclusion. We conducted special χ^2 tests of significance for the difference in model χ^2 between each more complex model and its simpler model and corroborated that each more complex model indeed fits the data better than its simpler model. Model 5 is the best-fitting model and explains about 12 percent of the variance in the probability of happiness.

Differences in Happiness Among Age Categories

As illustrated in Model 1, age does not have a significant effect on happiness because the coefficients for the two dummy variables for age are not statistically significant at the .05 level, indicating that the middle-agers and elders were not significantly different from the youth in happiness.

Model 2 shows that after adding demographic and socioeconomic variables, the coefficient for middle-agers becomes statistically significant, but the coefficient for elders or older adults is not significant at the .05 level. The results indicate that the middle-agers were less happy than the youth, but the elders were not significantly different from the youth, albeit less happy.

Model 3 displays that after generational cohort variables are added to the model the dummy variables for both elders and middle-agers gain statistical significance at the .01 level. The middle-agers were less happy than the youth, while the elders were happier than the youth.

Model 4 is the full model, including dummy variables for year. The results for the age dummy variables are similar to those in Model 3. The odds ratios indicate that the middle-agers were 13.1 percent less happy (.869 – 1 = -.131) than the youth, while the elders were 23.9 percent happier (1.239 – 1 = .239) than the youth.

Model 5 in Table 2 further shows that the interaction effects between health and age categories on happiness are not statistically significant at the .05 level, but the coefficient for Health x Elder is marginally significant at the .06 level. The evidence seems to be week but suggests intriguing moderating effects. Figure 1, based on calculations using the coefficients in Model 5 (B for youth = .176, B for middle-agers = .167, and B for Elderly = .120)[1], displays that the effect of health status on happiness was greatest for the youth, but smallest for the elders and somewhat in between for the middle-agers. Figure 1 also suggests that with the same level of health, the elders were much less happy than the youth and middle-agers. These results provide partial support for Hypothesis 1.

Model 5 in Table 2 also shows that the interaction effects between age and income on happiness are statistically significant at least at the .01 level. Figure 2, based on calculations using the coefficients in Model 5 (B for youth = .015, B for middle-agers = .007, and B for Elderly = .004)[2], shows that for each $1,000 increase in income, the odds of happiness for the youth increased by 1.5 percent while the odds of happiness for the middle-agers increased by 0.7 percent and the odds of happiness for the elders increased by 0.4 percent. Hence, the effect of income on happiness was greatest for the youth, somewhat in-between for the middle-agers, and least for the elders. Figure 2 also shows that with the same level of income, the youth were most happy, followed by the middle-agers, and the elders were least happy. These results confirm Hypothesis 2.

Nonlinear Effects of Age

Table 3 shows the results of five logistic regression models predicting happiness in order to test Hypothesis 3. The model fit statistics indicate that except for Model 1, the other four models are good models because the

Table 2. Logistic Regression Estimates (Standard Errors in Parentheses) Predicting Happiness, U.S. Adults, GSS 1972-2016

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Constant	2.000***	7.390	-.238**	.788	-1.512***	.599	-1.145***	.318	-2.376***	.301
	(.027)		(.087)		(.122)		(.142)		(.179)	
Age (Reference=Youth)										
Middle-agers (30-64)	.042	1.043	-.355***	.701	-.136**	.873	-.140**	.869	-.069	.934
	(.031)		(.037)		(.050)		(.051)		(.073)	
Elders (65+)	.024	1.025	-.018	.982	.223**	1.250	.214*	1.239	.224*	1.251
	(.043)		(.059)		(.084)		(.085)		(.105)	
Health Status			.129***	1.137	.126***	1.135	.189***	1.208	.176***	1.192
(4-point scale)			(.009)		(.009)		(.010)		(.019)	
Income (in $1,000)			.008***	1.008	.009***	1.009	.008***	1.008	.015***	1.015
			(.001)		(.001)		(.001)		(.002)	
Marital Status			.875***	2.398	.894***	2.445	.914***	2.494	.915***	2.496
(currently married)			(.030)		(.030)		(.031)		(.031)	
Number of Children			-.038**	.963	-.028**	.973	-.026**	.974	-.026**	.975
			(.008)		(.008)		(.010)		(.008)	
Race (Ref.=White)										
Black			-.563***	.569	-.566***	.568	-.554***	.575	-.551***	.577
			(.035)		(.035)		(.036)		(.036)	
Other			-.214**	.807	-.229***	.795	-.257***	.774	-.256**	.774
			(.055)		(.055)		(.057)		(.057)	
Sex (Male=1)			-.171***	.855	-.181***	.835	-.160***	.852	-.160***	.852
			(.030)		(.030)		(.030)		(.030)	
Education			.070***	1.073	.071***	1.074	.066***	1.068	.066***	1.069
			(.005)		(.005)		(.005)		(.005)	
Religious Attendance			.072***	1.075	.072***	1.074	.072***	1.068	.072***	1.074
			(.005)		(.005)		(.005)		(.005)	
Work Status (Ref. = Unemp)										
Full time			.908***	2.479	.914***	2.494	.908***	2.480	.900***	2.460
			(.057)		(.057)		(.058)		(.058)	

Table 2. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Part time			.792***	2.208	.777***	2.176	.758***	2.133	.760***	2.138
			(.066)		(.066)		(.067)		(.067)	
Retired			.859***	2.360	.876***	2.402	.858***	2.359	.848***	2.335
			(.075)		(.076)		(.076)		(.077)	
All other			.665***	1.944	.650***	1.916	.655***	1.926	.659***	1.933
			(.060)		(.060)		(.060)		(.060)	
Generation (Ref.=G.I.)										
Silent					-.023	.977	-.027	.974	-.022	.978
					(.034)		(.035)		(.035)	
Baby Boom					-.023	.977	-.005	.995	.001	1.001
					(.072)		(.072)		(.073)	
GenX					-.018	.982	-.020	.981	-.011	.989
					(.084)		(.084)		(.085)	
Millennial					.147	1.158	.131	1.140	.140	1.150
					(.088)		(.089)		(.089)	
iGen					.515***	1.674	.497***	1.644	.561***	1.752
					(.107)		(.108)		(.110)	
Period (Ref.=1972)										
1973							.434***	1.544	.434***	1.543
							(.107)		(.107)	
1974							.252*	1.287	.239*	1.271
							(.108)		(.108)	
1975							.239*	1.270	.225*	1.252
							(.107)		(.107)	
1976							.330**	1.391	.316**	1.372
							(.108)		(.108)	
1977							.426***	1.531	.411***	1.508
							(.110)		(.113)	

Table 2. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
1978							1.235***	3.439	1.217***	3.377
							(.122)		(.122)	
1980							.308**	1.361	.291**	1.338
							(.109)		(.110)	
1982							.397***	1.487	.382***	1.465
							(.100)		(.101)	
1983							.853***	2.346	.833***	2.301
							(.111)		(.111)	
1984							.367***	1.443	.356***	1.427
							(.111)		(.111)	
1985							.491***	1.634	.478***	1.614
							(.112)		(.112)	
1986							1.089***	2.970	1.072***	2.920
							(.118)		(.118)	
1987							.422***	1.526	.407***	1.502
							(.103)		(.103)	
1988							1.003***	2.725	.988***	2.687
							(.122)		(.122)	
1989							.874***	2.397	.855***	2.352
							(.118)		(.118)	
1990							1.034***	2.811	1.017***	2.765
							(.127)		(.127)	
1991							.825***	2.281	.811***	2.250
							(.117)		(.117)	
1993							.754***	2.126	.741***	2.098
							(.114)		(.114)	

Table 2. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
1994							.594***	1.811	.581***	1.788
							(.094)		(.094)	
1996							.580***	1.787	.567***	1.762
							(.095)		(.095)	
1998							.476***	1.609	.462***	1.588
							(.095)		(.095)	
2000							.756***	2.130	.741***	2.098
							(.098)		(.098)	
2002							.685***	1.984	.672***	1.958
							(.115)		(.115)	
2004							.541**	1.718	.530***	1.698
							(.115)		(.115)	
2006							.667***	1.948	.653***	1.922
							(.095)		(.095)	
2008							.423***	1.527	.410***	1.507
							(.099)		(.099)	
2010							.564***	1.758	.554***	1.740
							(.099)		(.100)	
2012							.632***	1.881	.624***	1.867
							(.102)		(.102)	
2014							.660***	1.936	.653***	1.921
							(.097)		(.098)	
2016							.505***	1.657	.492***	1.636
							(.093)		(.093)	

Table 2. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Interactions										
Health x Middle-ager									-.009	1.009
									(.021)	
Health x Elder									-.056	1.057
									(.030)	
Income x Middle-ager									-.008**	.992
									(.003)	
Income x Elder									-.011**	.989
									(.004)	
-2 log likelihood	41,346		37,778		37,724		37,453		37,437	
Model χ^2	1.852		3,329***		3,382***		3,654***		3,669***	
Pseudo R^2	.000		.110		.112		.121		.122	
df	2		15		20		50		54	
N	57,523		57,251		57,250		57,250		57,250	

* p ≤ .05 ** p ≤ .01 *** p ≤ .001

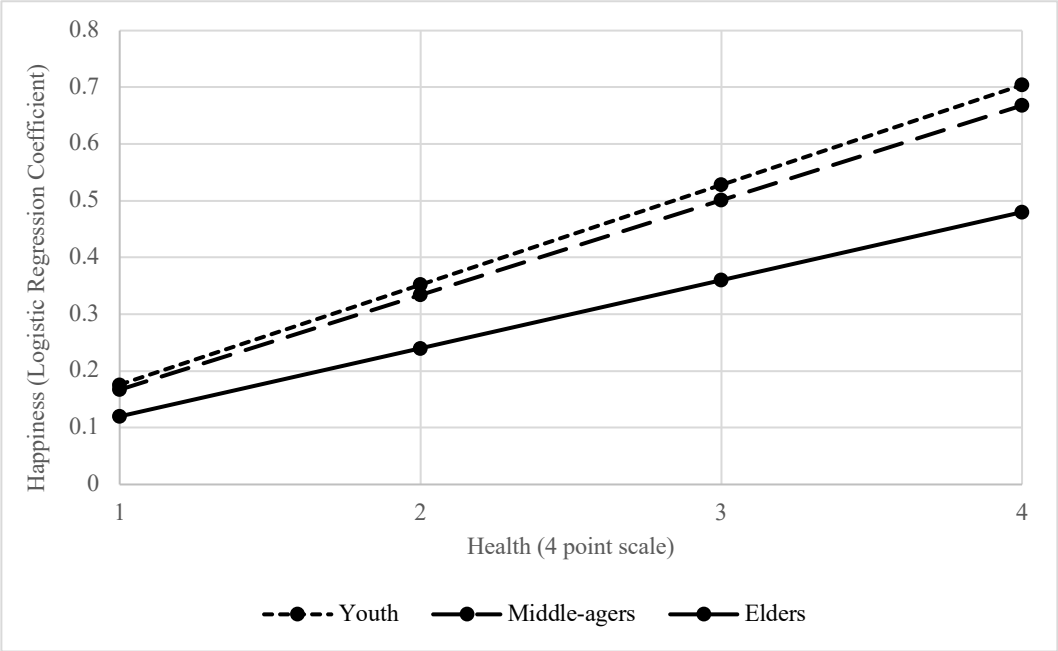

Figure 1. Effects of Health Status on Predicted Happiness by Age Categories, U.S. Adults, GSS 1972-2016

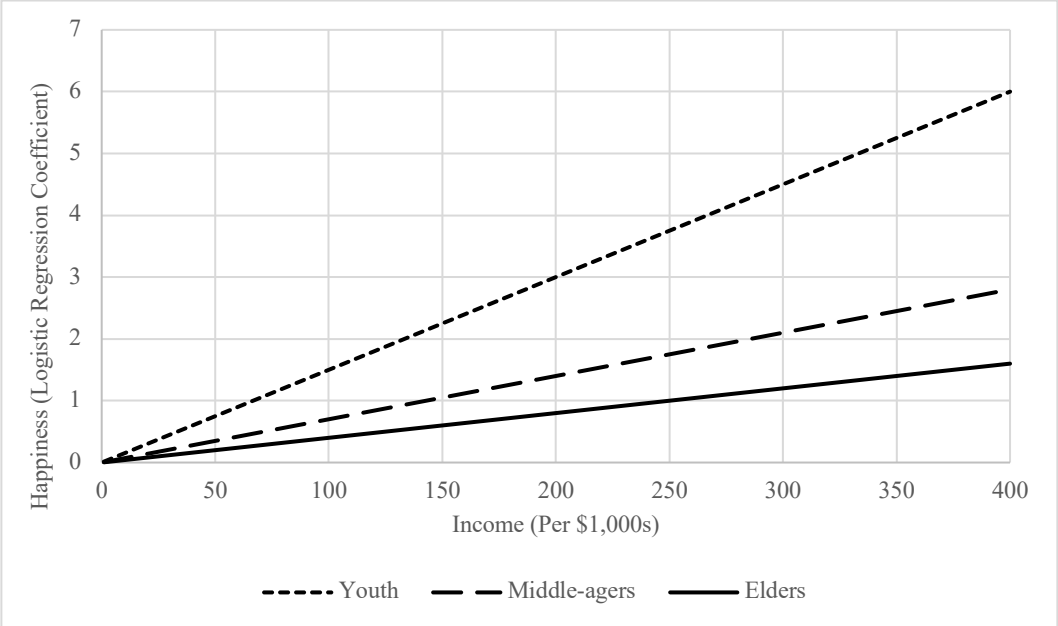

Figure 2. Effects of Income on Predicted Happiness by Age Categories, U.S. Adults, GSS 1972-2016

models χ^2's are all statistically significant at least at the 0.05 level. The -2 log likelihoods, model χ^2's, pseudo R^2's, and special χ^2 tests of significance for the difference in model χ^2 between each more complex model and its simpler model all indicate that each more complex model fits the data better than its simpler model. Model 5 is the best-fitting model and explains about 12 percent of the variance in the probability of happiness.

Model 1 reveals that age is not a significant predictor of happiness by itself. This non-effect is proven to be spurious in Model 2, because adding the quadratic term renders both age and age^2 statistically significant at the .05 level. The results indicate that age has a nonlinear effect on happiness, but the signs for both the linear term and the square term depict a parabolic relationship, which contradicts our hypothesis. In Model 3, including demographic and socioeconomic variables reverses the parabolic pattern as the signs for both the linear term and the square term switch. Model 4 is similar to Model 3 after including generational cohort variables.

Model 5 includes dummy year variables. Figure 3, which is based on the coefficients in Model 5 of Table 3, displays that the effect of age on happiness is nonlinear, roughly like a J shape. Youth were happier than middle-agers; happiness declined with age; those at the age of 40 were the least happy; they then gradually regained happiness after 40, and the elders were the happiest. These results support Hypothesis 3.

The Cohort Effect

Model 5 in Table 3 also shows generational differences in happiness. Except for the Silent Generation, which was not significantly different from the G.I. Generation, all other generations were significantly happier than the G.I. Generation. As shown in Figure 4, the later the generations, the happier they were. For example, the odds ratios show that the Baby Boomers were 1.2 times as happy as the G.I. Generation, and the iGen was about 2.2 times as happy as the G.I. Generation.

The Period Effect

Model 5 in Table 3 shows that respondents in all years after 1972 were relatively happier than respondents in 1972, but happiness has varied over time. The magnitude of such period changes was relatively small. Figure 5, based on the odds ratios in Model 5 of Table 3, reveals that the effect of time on happiness is nonlinear. The figure shows that respondents in 1978 were the happiest in the past 5 decades, but happiness has declined with fluctuations after 1978 and leveled off after 1992.

Effects of Other Control Variables

In addition, it is useful to note the effects of the control variables on happiness: marital status, number of children, race, sex, education, religious attendance, and work status. Model 5 in Table 3 is the best fitting model to interpret coefficients for the control variables. All sociodemographic variables are statistically significant at least at the .01 level. Based on the odds ratios in Model 5, married respondents were 2.503 times as happy as unmarried ones. For each additional child, the odds of happiness were predicted to decrease by 2.7 percent. On average, blacks were about 42 percent less happy than whites, and other races were about 22 percent less happy than whites. Men were 15 percent less happy than women. For each additional year of schooling, the odds of happiness were predicted to increase by nearly 7 percent.

For each level increase in attendance of religious services, the odds of happiness were predicted to increase 7.5 percent. Compared to the unemployed, full-time workers were 1.48 times happier, part-time workers were 1.14 times happier, people in other situations were 92 percent happier, and retirees were 1.38 times happier. Full-time workers are the happiest among all work statuses.

Discussion and Conclusions

Although the claim in recent overflowed media reports that older people are happier than younger people may contain partial truth, we question its unconditional validity. The reality is much more complicated. Using data from General Social Surveys 1972-2016, this study

Table 3. Logistic Regression Estimates Predicting Happiness with a Quadratic Term, U.S. Adults, GSS 1972-2016

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Constant	2.070***	7.922	1.862***	6.434	.788***	2.199	-.207***	.813	-.890***	.411
	(.036)		(.092)		(.128)		(.292)		(.302)	
Age	-.001	.999	.009*	1.009	-.058***	.961	-.038***	.962	-.037***	.964
	(.001)		(.004)		(.006)		(.010)		(.010)	
Age^2			-.000102*	.909		1.006	.000475***	1.0005	.000463***	1.0005
			(.000041)		.000578***		(.000093)		(.000094)	
					(.000051)					
Health Status					.127***	1.135	.126***	1.135	.189***	1.208
(4-point scale)					(.009)		(.009)		(.010)	
Income (in $1,000)					.009***	1.009	.009***	1.009	.008***	1.008
					(.001)		(.001)		(.001)	
Marital Status					.896***	2.449	.899***	2.458	.917***	2.503
(currently married)					(.030)		(.030)		(.031)	
Number of Children					-.030**	.970	-.028***	.972	-.027***	.973
					(.008)		(.008)		(.008)	
Race (Ref.= White)										
Black					-.564***	.569	-.564***	.569	-.551***	.576
					(.035)		(.035)		(.036)	
Other					-.224**	.799	-.226***	.797	-.251***	.778
					(.055)		(.055)		(.057)	
Sex (Male=1)					-.174***	.840	-.179***	.836	-.158***	.854
					(.030)		(.030)		(.030)	
Education					.071***	1.073	.072***	1.074	.067***	1.069
					(.005)		(.005)		(.005)	
Religious Attendance					.073***	1.076	.072***	1.075	.072***	1.075
					(.005)		(.005)		(.005)	
Work Status										
(Ref.=Unemployed)										
Full time					.908***	2.480	.913***	2.491	.906***	2.475
					(.057)		(.057)		(.058)	
Part time					.791***	2.206	.781***	2.183	.761***	2.140
					(.066)		(.066)		(.067)	

Table 3. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Retired					.895***	2.447	.888***	2.430	.868***	2.382
					(.075)		(.075)		(.076)	
All other					.660***	1.935	.649***	1.914	.653***	1.922
					(.060)		(.060)		(.060)	
Generation (Ref.=G.I.)										
Silent							-.021	.979	-.026	.975
							(.035)		(.035)	
Baby Boom							.182	1.199	.200*	1.221
							(.093)		(.094)	
GenX							.287*	1.332	.290*	1.337
							(.130)		(.130)	
Millennial							.470**	1.600	.470**	1.600
							(.156)		(.157)	
iGen							.772	2.164	.778***	2.178
							(.184)		(.185)	
Period (Ref.=1972)										
1973									.438***	1.549
									(.107)	
1974									.260*	1.297
									(.108)	
1975									.239*	1.270
									(.107)	
1976									.327**	1.387
									(.108)	
1977									.429***	1.536
									(.110)	
1978									1.241***	3.459
									(.122)	
1980									.308**	1.361
									(.109)	
1982									.396***	1.486
									(.100)	
1983									.855***	2.352
									(.111)	

Table 3. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
1984									.368*** (.111)	1.445
1985									.489*** (.112)	1.630
1986									1.008*** (.118)	2.967
1987									.421*** (.103)	1.523
1988									1.000*** (.122)	2.718
1989									.871*** (.118)	2.390
1990									1.029*** (.127)	2.797
1991									.824*** (.117)	2.280
1993									.755*** (.114)	2.127
1994									.590*** (.094)	1.805
1996									.576*** (.095)	1.779
1998									.474*** (.095)	1.606
2000									.750*** (.098)	2.118
2002									.680*** (.115)	1.974
2004									.536*** (.115)	1.709
2006									.660*** (.095)	1.935
2008									.419*** (.099)	1.520

Table 3. (Continued)

Predictor	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
2010									.556*** (.099)	1.744
2012									.627*** (.102)	1.871
2014									.653*** (.097)	1.922
2016									.499*** (.093)	1.647
-2 log likelihood	41,347		41,341		37,750		37,726		37,455	
Model χ^2	1.388		7.433*		3,356***		3,381***		3,652***	
Pseudo R^2	.000		.000		.111		.112		.121	
df	1		2		15		20		50	
N	57,523		57,523		57,251		57,250		57,250	

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

investigates if the effect of age on happiness varies by health status and economic status and if the effect of age on happiness is nonlinear over a lifetime. We also analyze the effects of generational cohort and period on happiness. The results show that the effect of age on happiness is moderated weakly by health status and strongly by income. This study also detects a significant J-shaped relationship between age and happiness. It is also found that later generations are happier than earlier generations and that the happiness of Americans has ebbed and flown over time.

More specifically, we tested three hypotheses. Our first hypothesis that the effect of age on happiness is moderated by health conditions is partly supported. A better health status was associated with a higher level of happiness, but a better health status increased happiness most for youth, least for the elders, and somewhat in-between for middle-agers. Although the difference between middle-agers and youth in happiness was trivial, the difference between elders and youth in happiness was quite visible. With the same level of health, older adults were much less happy than youth and middle-agers.

Our second hypothesis is also supported. The effect of age on happiness varied, depending on economic status. An increase in income had the greatest positive effect on the happiness of youth, a medium positive effect on the happiness of middle-agers, and the slightest positive effect on the happiness of older adults. With the same level of income, older adults were much less happy than youth and middle-agers.

The finding that the effect of age on happiness shows a J-shaped pattern lends support to our final hypothesis. We found a J-shaped trajectory of happiness with age that dipped first and then gradually rose. Youth were somewhat happier than middle-agers. Happiness declined through the middle ages, reaching the nadir at the age of 40. People regained happiness after 40.

The effect of generational cohort on happiness shows that the later the generation, the happier it is. iGen, Millennials, GenX, and Baby Boomers were significantly happier than the G.I. generation. Happiness has varied over time, as respondents in all years after 1972 were relatively happier than those interviewed in 1972. During the span of 44 years, respondents were most happy in 1978. After hitting the peak, happiness has declined with fluctuations and stabilized after 1992.

In addition, those who were currently married were significantly happier than those not currently married. Males were less happy than females. Blacks and other races were less happy than whites. As education increased, so did happiness. Individuals who attended religious services more frequently were happier than those who attended less frequently. People who worked full-time or part-time, or had retired were at least twice as happy as the unemployed.

The findings of this study have several significant implications for scholarly research on this topic and practices. As reviewed earlier, the most popular position advocated by the media is that older people are generally happier than younger people (Bratskeir 2016; Gregiore 2015; Isaacowitz 2012; Leland 2017; MacMillan 2018; Netburn 2016; Oaklander 2016; Tanner 2008). The findings of this study challenge this popular position. Although the argument that older people are happier than younger people may not be totally wrong, it does not capture the whole story because it neglects the moderating effects of health status and economic status on happiness. The results indicate that if we only look at the independent effect of age on happiness, older adults seem to be happier than the youth as well as the middle-agers. Nonetheless, when the moderating effects of health status and economic status on happiness are taken into account, the picture is totally different.

Specifically, when the effect of interaction between health status and age is considered, older adults are considerably less happy than the youth with the same health status (see Figure 1). This finding suggests that health is a crucial condition for the happiness of older adults. To ensure the happiness of older adults, we must ensure that they have good health. This finding also implies that it may not be meaningful to talk about the

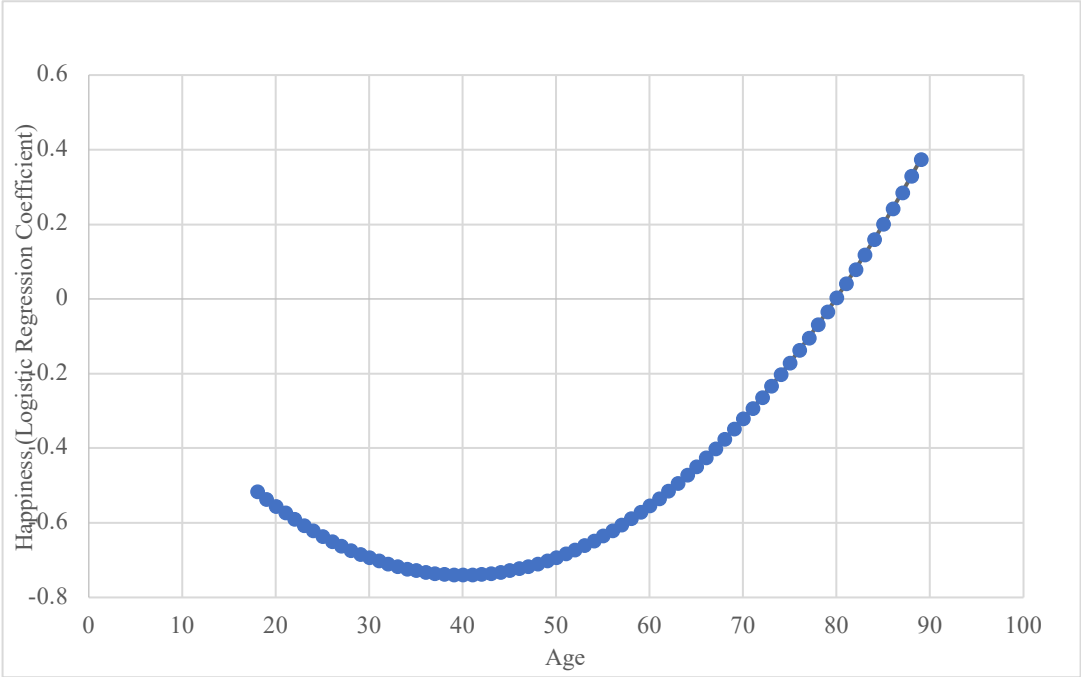

Figure 3. Effect of Age on Predicted Happiness, U.S. Adults, GSS 1972-2016

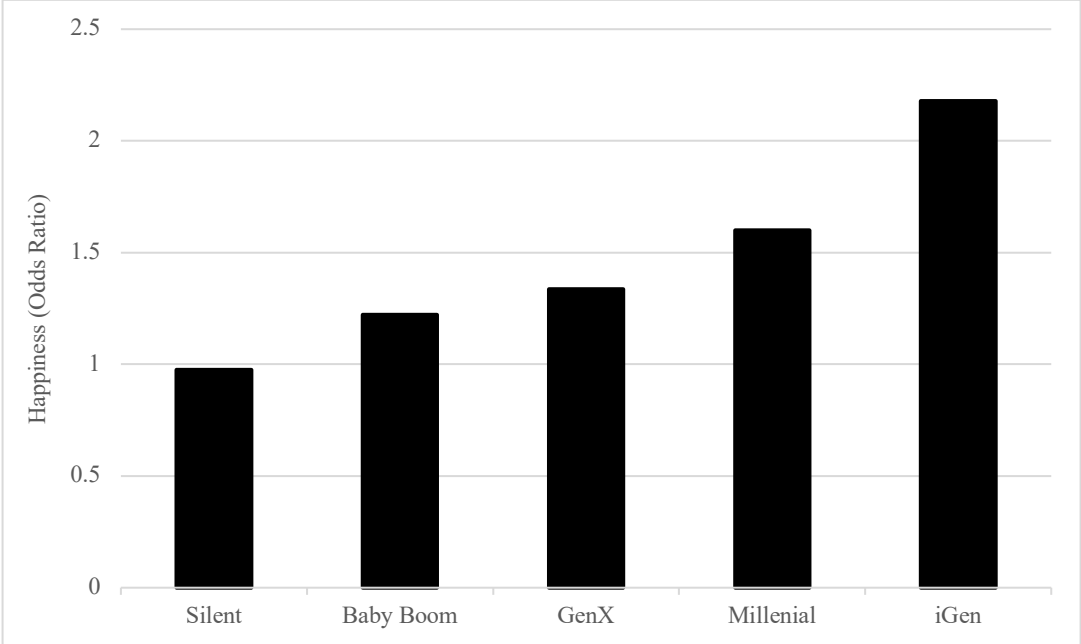

Figure 4. Generational Differences in Odds Ratios of Happiness (Reference Category=G.I. Generation), U.S. Adults, GSS 1972-2016

happiness of older adults without talking about their health condition. The happiness of older adults depends on their health condition. Healthy older adults may be happier than youth as a whole, but this may not be the case for older adults with poor health. As health generally declines with age, a significant proportion of older adults will need assistance to stay happy.

In the same vein, when the effect of interaction between income (as a measure of economic status) and age is taken into consideration, older adults are much less happy than the youth and the middle-agers with the same income (see Figure 2). This finding suggests that economic condition is another critical condition for the happiness of older adults. To be happier, older adults must have superior economic status in order to overcome disadvantages. The happiness of older adults is relative, contingent upon their economic condition. Older adults with sufficient income for retirement may be happier than youngsters and middle-agers who are in the process of earning more, but older adults with no enough income or no income at all after retirement will not be happier than their younger counterparts. In addition, poor health will decrease the likelihood and time of working, cost more money for health care, reduce savings, and make older adults less happy than the younger ones.

The above findings have practical implications for services to older adults. The significant effects of interaction between age and health status and between age and income suggest that government policies and programs such as Medicaid, social security, and pharmaceutical supplementation will need to address the needs of older adults who have poor economic and/or health conditions.

The J-shaped age-happiness pattern uncovered in this study (Figure 3) is close to the U-shaped pattern detected in many studies conducted by economists (e.g., Blanchflower and Oswald 2004, 2008; Clark and Oswald 1994; Oswald 1997; van Landeghem 2012). Nevertheless, unlike the U-shaped pattern, the J-shaped pattern suggests that older adults were not equally happy as the youth but were happier than the youth when they passed the age of 62. Moreover, our finding challenges the inverted U-shaped pattern found by Easterlin (2006) and Yang (2008) using earlier GSS data. We believe that Easterlin (2006) and Yang (2008) found an inverted U-shaped pattern because they did not reverse code the happiness variable, so a higher value of happiness actually indicated a lower level of happiness. It is essential to note that the J-shaped pattern applies to the United States and is not universal (see Deaton 2008). The nonlinear findings have significant practical implications for improving life satisfaction over the life span. A significant nonlinear relationship between age and happiness suggests the need of support for people after a certain age.

Prior studies provide meager evidence on cohort differences in happiness, except for Yang's (2008) study. Nevertheless, our finding of progressive increments in happiness across birth cohorts holding age and period effects constant contradicts Yang's (2008) finding that baby boomers were less happy than their earlier and later cohorts. Our finding suggests that life on average is getting better generation by generation as living conditions and life expectancy improve, regardless of cohort size.

Our period effects on happiness reveal both similarities and differences in comparison to Yang's (2008) findings. Similar to Yang's (2008) results, our findings showed fluctuating period effects over time and the same nadir year in happiness (i.e., 1972). However, different from Yang's (2008) results, our findings displayed a different zenith. In Yang's (2008) study, the happiest year was 1974, but the happiest year in our study was 1978. Yang's (2008) study ended in 2004, but our study extended beyond 2004 and showed declines in happiness in 2008 and again in 2016.

In addition, the finding that married people are happier than unmarried people suggests that marriage provides protective effects (Waite 1995) and makes people happier on average. The result that racial minorities are less happy than whites implies that minorities are less satisfied with American life than the majority, and therefore there are inequality issues that

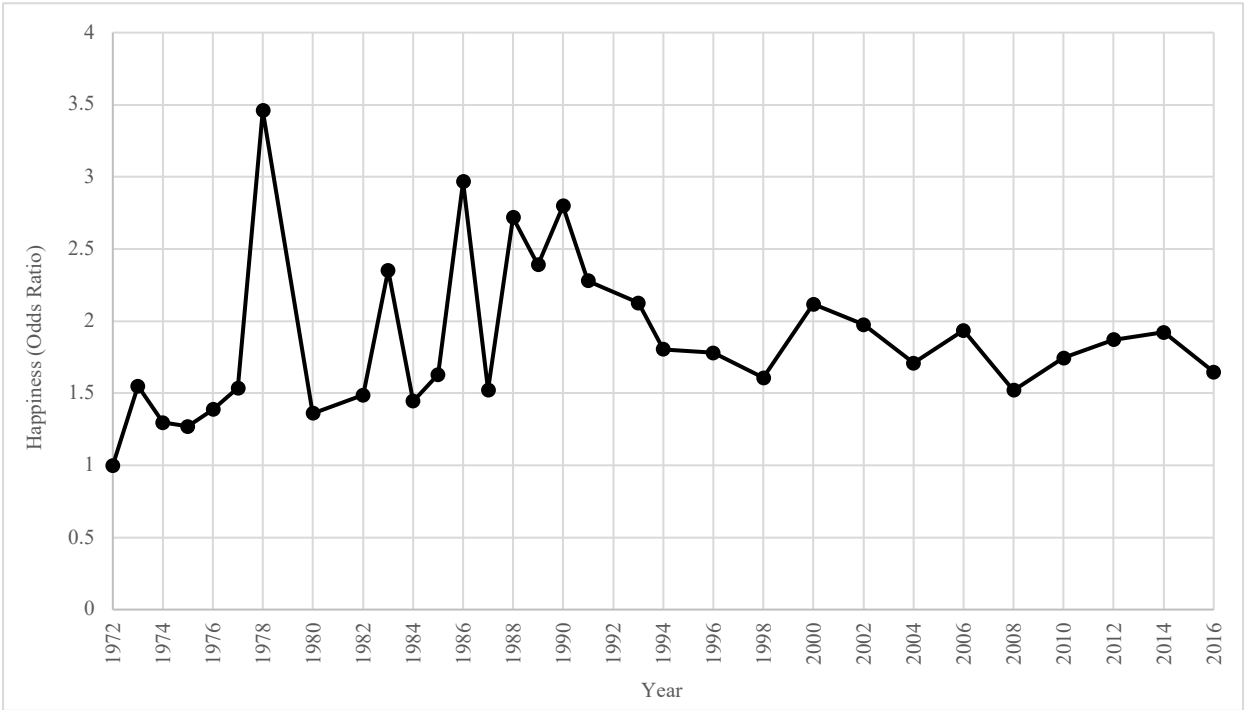

Figure 5. Effects of Period on Happiness, U.S. Adults, GSS 1972-2016

still need to be addressed. The finding of a positive relationship between frequency of attending religious services and happiness suggests that religious service may be beneficial to happiness. A significant positive relationship between education and happiness points to the positive effect of education on happiness.

This study contributes to a fuller understanding of the effect of age on happiness by taking into account the moderating effect of economic and health statuses and by providing some new and nuanced evidence for the nonlinear effect of age on happiness. Further research could benefit from a qualitative study, so that we can gain an in-depth understanding of who is really happier and why. A comparative in-depth analysis of happiness among older adults, middle-agers, and youth may help understand the mechanisms of happiness across the life course. Although repeated cross-sectional trend data are useful in understanding how happiness changes with age, panel data will provide ultimate evidence to assess the effect of age on happiness in the life course.

Footnotes

1. The formulas for calculating the B's for different age categories are as follows:
   B for Youth = .176 health status - .009 (0) x health status - .056 (0) x health status = .176 health status
   B for Middle-agers = .176 health status - .009 (1) x health status -.056 (0) x health status = .167 health status
   B for Elderly = .176 health status - .009 (0) x health status - .056 (1) x health status = .120 health status

2. The formulas for calculating the B's for different age categories are as follows:
   B for Youth = .015 income - .008 (0) x income - .011 (0) x income = .015 income
   B for Middle-agers = .015 income - .008 (1) x income - .011 (0) x income = .007 income
   B for Elderly = .015 income - .008 (0) x income - .011 (1) x income = .004 income

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