

CHAONAN CHEN

AGING AND LIFE SATISFACTION *

(Accepted 27 October, 2000)

ABSTRACT. This paper was intended to examine how major life events – *such as retirement, deterioration of health, and loss of spouse* – experienced in the aging process may affect the elderly's life satisfaction. An explanation was also proposed to the change in the effects of age groups on life satisfaction because of the control of the aging effect. A simple form of a longitudinal survey conducted in Taiwan in 1989 and 1993 was used for the empirical test. It was found that life satisfaction among the elderly decreased as age *increased beyond 65 years of age*. It was also found that social demographic variables, an income decrease, living arrangement, and level of activity participation have a profound impact on life satisfaction of Taiwan's elderly. When the correlates were controlled, the coefficients for age groups greater than 70 turned positive. This change could be explained by two types of cohort experience: (1) from rough to prosperous life experience and (2) cohort norm on life expectancy.

KEY WORDS: activity participation, aging, cohort, life events, life satisfaction, subjective well-being

Life satisfaction has a long research history in social gerontology. Research results, however, are far from conclusive (Doyler and Forehand, 1984; Janson and Mueller, 1983). The general public and many researchers see a link between advancing age and decreased subjective well-being because of the social, physical, and psychological losses that accompany the transition to old age. In other words, major life events experienced in the aging process are supposed to have a profound impact on the elderly's life satisfaction. Nevertheless, survey research results as reviewed suggest that the relationship between age and subjective well-being is weak and varies in direction across studies (George et al., 1985). The observation is applicable to both the zero-order effect and regression coefficients based either on cross-sectional or longitudinal data. In this paper, the effect of aging on life satis-

* Valuable comments are received from Professor Y. S. Hsieh.



faction is examined. The variation after controlling aging effects is interpreted as a cohort effect or cohort's past life experience. In this study, several age groups experienced a basically consistently-improving economy in their life span and shared similar norms on life expectancy, and they can be defined as a cohort. Their common experience thus turns subjective well-being into a positive after controlling relevant losses.

1. LITERATURE REVIEW

The diversive research results on the relationship between age and subjective well-being have been frequently reported. Life satisfaction, morale and happiness are the three measurements most commonly used for subjective well-being. It has been shown that a negative relationship between happiness and age was demonstrated by survey results in the 1950s and 1960s, but no relationship at all emerged in surveys conducted during the 1970s (Campbell, 1981). In the 1980s, a significant positive relationship was reported by studies using the same measure and controlling for a number of acknowledged correlates of well-being, such as health and income (Witt et al., 1980; Janson and Mueller, 1983).

Another review of the subjective well-being also reports that it has a weak relationship with age (Larson, 1978). The 15 correlations reported from 11 studies ranged from -0.02 to -0.20 . Moreover, only a minority of them was statistically significant. Five out of eleven studies controlled on other variables and resulted in insignificant regression coefficients. Of the 11 studies, 2 were based on longitudinal data, and neither of them found significant changes in subjective well-being.

A review of 8 data sets, covering the entire adult age range and using two measures of well-being indicators, also indicated a low but various correlation (Herzog and Rodgers, 1981). The seven age-life-satisfaction estimates ranged from -0.05 to 0.11 . Among them, 3 positive coefficients and 1 negative coefficient were weak, but statistically significant. On the other hand, the seven age-happiness estimates available ranged from -0.08 to 0.03 . Only one positive correlation attained statistical significance.

In a meta-analysis of cross-sectional estimates of the age/subjective well-being relationship, 221 zero-order effects were located from 119 different sources. Only about 41% of them were negative (Stock et al., 1983). The 95% confidence interval about the mean of the effect sizes extended from 0.01 to 0.06.

Several sources which cause variation in the relationship between age and subjective well-being are identifiable. They are the coverage and grouping of age, numbers and types of correlates, and various measures of subjective well-being. The concept of subjective well-being becomes meaningful only when it is placed in some context or compared with reference groups. Since researches vary in purposes, age coverage and grouping are diversified. Some may be interested in the differences among the three major life stages, as comparisons are made either among age groups of 24–44, 45–64 and 65 or above (Herzog and Rogers, 1981) or among 18–34, 35–59 and 60–69 (George et al., 1985). Others investigate with a complete picture of differentials in subjective well-being in the adult life span. Their samples thus cover age 18 to 91 and are divided into 10-year age groups (Spreitzer and Synder, 1974; Cutler, 1979). Some others may investigate changes after middle ages. Samples may be grouped either into ages 40–54, 55–64 and 65 or above (Doyler and Forehand, 1984) or into ages 46–50, 51–55, 56–60, 61–65 and 66–70 (Palmore and Kivett, 1977). In the final stage of life, the elderly are intensively impinged by major life events, such as retirement and marriage dissolution, and the concomitant social, physical and psychological losses. Life satisfaction may thus decrease sharply year by year. Thus, an examination of change in the elderly's life satisfaction by five-year age groups becomes critical for social welfare programs. *This is specially true for Taiwan, since its proportion of elderly aged 65 or above has reached 7%, a threshold for aging population set by World Health Organization, in 1993. The proportion will drastically increase to 20.5% by 2036 (CEPD, 1991). An early examination of the elderly's life satisfaction must be helpful for the planning of social welfare programs for the elderly.*

Quite a number of correlates of the relationship between age and subjective well-being have been examined. A standard path model may include five types of factors: (1) attachment to the social

structure which is operationalized as social demographic characteristics, (2) socio-economic achievements and resources, (3) physical health, (4) involvement in and support from primary groups, and (5) participation in meaningful social and leisure activities (Elwell and Maltbie-Crannell, 1981; Liang et al., 1980; McClelland, 1982; Mutran and Reitzes, 1981; George et al., 1985). Both the level of the factors and changes in the factors occurring in the aging process might affect one's interpretation of well-being items. Moreover, the numbers and types of correlates employed in the regression models will inevitably affect the coefficient of age variables and make comparisons difficult. In one study, age is taken as a moderator of the determinants of life satisfaction (George et al., 1985), or age may affect the influence of correlates. For example, marriage is probably a resource fostering life satisfaction at all ages (Campbell et al., 1976), but lack of a marital partner is not likely to be stigmatizing because of high rates of widowhood (Lopata, 1973). So being married is expected to be most strongly related to subjective well-being for middle-aged persons, to be least strongly related for young adults, and an intermediate for older adults. When samples of all ages are pooled together, coefficients of the correlates and age may be affected.

Numerous measures of subjective well-being have been proposed. Life satisfaction, happiness, affect and morale are the four most frequently studied concepts. Several have defined a multi-dimensional construction. These include the LSIA (Neugarten et al., 1961), the PCG Morale Scale (Lawton, 1972), and the Bradburn Affect Balance Scale (Bradburn, 1969). Others have been based on a uni-dimensional construct. These include the Kutner Morale Scale (Kutner et al., 1956), the life satisfaction scale of the Cornell study of retirement (Thompson et al., 1960), the Havighurst and Albrech's (1953) scale of happiness and single item measures of satisfaction (Spreitzer and Snyder, 1974) and happiness (Kivett, 1976). It has been suggested that within this multiplicity of related measures is a shared core – subjective well-being (Larson, 1978).

In spite of the high intercorrelations among the measures of subjective well-being, a limitation on its interpretation is worth a special note. It is in regard to the extent to which the measurements can be assumed to measure the same thing in different populations

(Larson, 1978). It is suspected that well-being items dealing with planning ahead, goals and life assessment might be differently interpreted across subcultural groups, across social classes and across ages. Variations in subjective well-being can be explained as well by aging and cohort factors (Herzog and Rodgers, 1981).

In this paper, a simplest form of longitudinal data is used to investigate the effect of major life events on the elderly's life satisfaction. It is also interesting to find that the study population has experienced a basically consistently-improving economy in their life span and shares similar norms of life expectancy. Their common experience is interpretable as the reason why the relationship between age and subjective well-being turns positive after controlling relevant losses that occur in the aging process.

2. THE STUDY SETTING

Taiwan is a small island with an area of 36 000 km². It is located 160 km from the East Coast of Fukien Province of mainland China and between Japan and the Philippines. It was discovered by curious Chinese and Japanese before 1600. A large volume of immigrants were led by the celebrated personage Cheng Ch'eng-Kung in 1662. After some years, it succumbed to control by the new Manchu regime in mainland China. These events were followed by a continuous migration of Chinese that raised the population from a few thousand in 1600 to more than two million by 1895, which was when Taiwan was ceded to Japan. Japan evolved a system of managing affairs in Taiwan and developed a successful colonial program in Taiwan. Taiwan was thus transformed from a "backward" and neglected island into a thriving region that could regularly export a large share of its agricultural produce. Meanwhile, the colonial government set out to halt the further migration of people from mainland China. Still, Taiwan's population grew rapidly from about 3 million in 1905 to 6 million in 1943 (Barclay, 1954).

Taiwan was returned to the Republic of China in 1949. Thereafter, a series of modernization programs were launched. By 1990, Taiwan seemed close to being unambiguously classifiable as a mature industrial economy, if one accepts Simon Kuznet's six stylized characteristics of modern economic growth (Ranis, 1992).

Kuznet's required structural transformation, in terms of a shift from agricultural to non-agricultural activities has reached the point where only 4 percent of GDP and 13 percent of labor force employment are generated by agriculture. Taiwan long ago fully navigated her way through the necessary demographic transition, with a population growth rate now so low that it causes concern and per capita incomes soaring at sustained 6–8 percent annual rates over the past two decades. Life expectancy is now about seventy-four years. This small island has a population of 22 million as of 1999.

More specifically, Taiwan has experienced drastic socio-economic changes in this century. Its per capita income has increased from US\$196 dollars in 1952 to US\$ 12 040 dollars in 1998. The share of primary industry decreased from 56.1% in 1952 to 8.8% in 1998. Meanwhile, the proportions of secondary industry and tertiary industry increased from 16.9% and 27% respectively in 1952 to 37.9% and 53.2%, respectively in 1998. Accompanying the drastic economic change is a speedy completion of a demographic transition. At the turn of the century, the mortality rate started to decline, while the decline in the fertility rate began in the 1960s. By 1985, a demographic transition was completed. At that time, fertility and mortality rates were 1.96% and 0.48%, respectively. As a result of the fast completion of the demographic transition, the population aged quickly. In 1993, the proportion of people aged 65 and over accounted for more than 7% of the total population for the first time.

The sample of this study consisted of those who were aged 60 or above in 1993. Of those aged 70, they had reached their young adulthood prior to the beginning of World War II. They thus are assumed to have a deep impression about the rough times of World War II. Their appreciation of the development from agriculture to non-agriculture thus is stronger than that of the young-old. Moreover, the age groups share a similar norm on life expectancy. They believe that "Age 70 is scarce" or "Life begins in 70." *These similarities can be taken as cohort effect.*

3. DATA AND METHODS

3.1. *The Data*

A simple form of longitudinal survey data is used in this analysis. The data come from the "Survey of Health and Living Status of the Elderly in Taiwan." The survey was jointly conducted by the Taiwan Provincial Institute of Family Planning, and the Population Studies Center and Institute of Gerontology of the University of Michigan in 1989 and 1993. The first-round survey was a three-stage equal probability sample to represent all persons in Taiwan aged 60 or over as of the end of 1988, and who appear in the registration system of the non-aboriginal areas of Taiwan. In total, 4 412 cases were selected. The sampling ratio was 1/370. By the end of October 1989, 4 049 cases were interviewed. The response rate was 91.8% (TPIFP, 1989, 1993).

The first-round follow-up survey was conducted in 1993, with 3 155 cases (77.9%) completed, as 74.6% of the attrition was caused by death and the other 25.4% was lost to follow-up. After matching, we pooled the 1989 and 1993 data together. The pooled data is used for this analysis.

The characteristics of the 3 155 cases in 1993 are shown in Table I. In a 4-year period, there were 587 cases or 18.6% of the sample who changed their living arrangement (Chen, 1999). This level of Change is similar to Mutchler and Burr's finding i.e. 17.9% (Mutchler and Burr, 1991). However, their observation period was 2.5 years. They divide the household categories into living alone, heading a multiperson household, living in a multiperson household of which the elderly person is not the head, and nonhousehold outcomes of institutionalization and death. With the result, they conclude that there is a high degree of inertia in living arrangements. We, however, feel that this level of change is rather high. In the tradition of Eastern societies, people of old wish to settle down with as many offspring as possible. When one out of five old people changed their living arrangement in a 4-year period, we are inclined to believe that the rate of change is rather high. We suspect that the high change rate is motivated by dissatisfaction with their living arrangements. It is also of high concern if this rate of change continues in the future.

TABLE I
Sample characteristics [%]

<i>Living arrangement</i>		<i>Sex</i>		<i>Age</i>	
Living alone	8.7 (11.8)	Male	56.5	60–64	37.8
With spouse	14.4 (16.7)	Female	43.5	65–69	30.0
With family members	75.7 (70.3)	Total	100.0	70–74	17.7
With others	1.2 (1.2)	N	3151	75–79	8.4
Total	100.0 (100.0)			80+	6.1
N	3151 (3151)	<i>Ethnicity</i>		Total	100.0
		Fukienese	60.4	N	3151
		Hakka	15.4		
<i>Income</i>		Mainlander	21.2	<i>Health status</i>	
5 000 ⁻	29.9	Native	1.6	Excellent	17.3
6 000–10 000	22.2	Unknown	1.4	Good	22.4
12 000–15 000	19.0	Total	100.0	Fair	32.8
16 000–20 000	11.8	N	3151	Poor	17.3
20 000 ⁺	17.1			Very poor	4.3
Total	100.0	<i>Marital status</i>		Unknown	5.9
N	3151	Married	67.8	Total	100.0
		Separated	1.7	N	3151
<i>Education</i>		Divorced	0.9		
Illiterate	40.4	Widow	26.2	<i>Life events</i>	
Literate	8.6	Unmarried	3.3	Loss of children	5.5
Primary	32.2	Total	100.0	Marriage dissolution	7.4
Junior High	8.2	N	3151	Remarried	0.3
Senior High	5.4			Health deterioration	43.7
College ⁺	4.8			Income decrease	85.9
Unknown	0.4				
Total	100.0				
N	3151				

Source: 1989 and 1993 surveys of health and life status of the Elderly in Taiwan. Figures in () are percentages for living arrangements in 1993.

In the four-year period only a small portion of the sample experienced important life-cycle events; There are 234 cases, 7.4%, which experienced family dissolution through divorce, separation or death of spouse; 172 cases experienced the death of one or more children in the period. The number of elderly individuals who subjectively felt a change in resources was numerous; 43.7% of the sample felt their health status was worse than a year ago; 85.9% of them felt their income was worse than 4 years ago.

In addition, the majority of the sample were married, aged less than 70, Fukienese, in good health, less-educated, male, and with an

income of less than NT\$10 000 dollars per month. The majority of them preferred to live with children either married or not.

3.2. *Measurements*

Life satisfaction

In this study, life satisfaction is taken as the dependent variable. The five types of correlates listed in the first section are included in this analysis. The construction or measurements of the dependent and independent variables are briefly described in this section.

In this analysis, *two indices of life satisfaction are constructed based on a batch of interview questions* adopted from LSIA (Life Satisfaction Index-A) (Neugarten et al., 1961). The original LSIA consists of 20 survey questions. It intends to reflect five dimensions: zest, apathy, resolution and fortitude, congruency, and self-concept or mood tone. In empirical studies, congruence, mood tone and zest have been identified (Adams, 1969; Hoyt et al., 1983). As mentioned before, different items may give different stimuli to different age groups or cultural sub-group (Larson, 1978).

In the 1989 survey, ten questions were raised. The respondents were asked to show if they agreed or disagreed to them. The questions were:

- (1) I have had more breaks in life than most of the people I know.
(compared to elderly neighbors and relatives)
- (2) As I look back on my life, I am fairly well satisfied.
- (3) My life could be happier than it is now.
- (4) I would not change my past even if I could.
- (5) These are the best years of my life.
- (6) Most of the things I do are boring or monotonous.
- (7) I have always felt interested in the things I have done.
- (8) I expect some interesting and pleasant things to happen to me in the future.
- (9) I feel old and somewhat tired.
- (10) I've become pretty much what I expected out of life.

When codes 1 and 0 are assigned to the answers of "agreement" and "disagreement" to the above items, a factor analysis can be applied to them. The results showed those items 1, 2, 4, 5, 7 and 10 made up a factor. It explained 33.4% of variance (Chen and Lin,

TABLE II
Results of factor analysis on life satisfaction

Item	Male	Female	Married	Not married	Total
A life better than other's	0.797	0.804	0.809	0.775	0.801
Best days in a life	0.817	0.819	0.806	0.833	0.817
More good events in the future	0.514	0.508	0.506	0.475	0.511
Feel satisfied with one's life	0.783	0.830	0.792	0.824	0.805
Eigen value	2.181	2.265	2.189	2.201	2.219
% Variance explained	54.5	56.6	54.7	55.0	55.5
N	1512	1156	1828	840	2668

Source: see footnote of Table I.

1996). The 6 items represent one's assessment of past and current life condition. They can be used to construct an index to show one's global assessment of life satisfaction.

In the 1993 survey, only items 1, 2, 5 and 8 were included in the schedule. Wording of the four items was slightly modified, so the items were not really comparable. In this analysis, only the four items of the 1993 survey were used to construct the index of life satisfaction.

Table II shows the results of factor analysis. The four items made up one factor, which explained 55.5% of variance. Three out of the four items examined one's satisfaction with one's past life. Their factor loadings were about 0.8. Another item explored one's feeling toward life expectation in the future. Its factor loading was 0.51. When the data were further analyzed by sex and marital status, the results were basically consistent. The analyses suggest that either three or four items can be used to construct an index for life satisfaction. *It, however, somewhat differs from the results of U.S. studies in directly reflecting one's global assessment about life satisfaction without any underlining dimensions.* In this analysis, both indices are used. The index ranging 0–3 is used to reflect one's global assessment about life in the past, while the 0–4 index included one's feeling toward the future as well. The differential analytical results of the two indices may give us a hint about the influence of feeling toward one's future life.

Social activity

Theoretically, life satisfaction is affected by the level of social activity participation, changes of social activity participation, living arrangement, major life events and socio-demographic variables. There were a number of postulations on the relationship between social activity participation and life satisfaction. The disengagement theory postulates that human aging involves an inevitable severance of relationship with others and that this process is beneficial to society and to the individual (Cumming and Henry, 1961). The identity crisis theory proposes that the leisure time acquired after retirement may be filled up with social activities, but dignity and self-confidence is not obtainable through leisure activities (Miller, 1965). The activity theory assumes that when change occurs, the typical response is to restore the previous equilibrium (Havighurst, 1961), but continuity assumes evolution and allows change to be integrated into one's prior history without necessarily causing upheaval or disequilibrium (Atchley, 1971, 1987).

Facing different postulations, this analysis decides to check if the level of social activity participation or changes of social activity participation has effects on life satisfaction of the elderly. A broad view of social activities is also adopted. It covers three types of activities including (1) leisure or hobby activities, (2) participation in club or organizations, and (3) travelling activities. In the 1989 survey, twelve types of hobbies were checked including (1) gardening for pleasure, (2) handicrafts, calligraphy, playing musical instruments, and singing, (3) hobbies: fishing, collection of stamps or antiques, (4) reading newspapers, books, (5) watching TV or listening to radio, (6) sitting and thinking, (7) worshipping Gods, performing rites, praying, reading the Bible, (8) rearing pets, (9) playing with children or grandchildren, (10) playing games: mahjong, cards, chess, (11) socializing, visiting, talking with friends and neighbors, (12) doing exercises, sports, physical recreation such as morning exercises, folk dancing, mountain climbing, choral singing. In the 1993 follow-up survey, hobbies and crafts were grouped into one item, but a new item for hiking, mountain climbing, jogging, and other outdoor exercises was added to the schedule. Here, the survey data are used to construct indices of leisure activities. Code 1 is assigned to the elderly who have

done the activity, regardless of frequency; otherwise, 0. So the index ranges from 0 to 12. The 1993 index of leisure activities is included in the regression analysis as one of the indicators of level of social activities. The comparison of 1989 and 1993 indices results in a status of change in leisure, i.e. the same, an increase, and a decrease. They are further used to create two dummy variables to represent changes in activities. One is "increase of leisure activities." The other is "decrease of leisure activities." Those who are in the status of increasing leisure activities are assigned code 1 for the former dummy variable; otherwise, 0. Similarly, those who are in the status of decreasing leisure activities are assigned code 1 for the later dummy variable; otherwise, 0. Those of the elderly who have the same numbers of leisure activities are taken as the reference group.

Three types of travelling activities are available in two surveys, including one-day domestic travel, two-or-more-days of domestic travel, and travel to foreign countries. Experience of the activities in the past six months is coded 1; otherwise, 0. The summation of the scores makes up the index of travelling. The 1993 index of travelling is included in the regression analysis as one of the level of activity participation. The comparison of 1989 and 1993 indices again results in a status of changes in travelling activities. They are also used to create two dummy variables, i.e. "increase in traveling activities" and "decrease in traveling activities."

Participation in six types of clubs or organization are questioned in the surveys. They are (1) religious group, (2) business, professional or farm associations, (3) voluntary, welfare or aid groups, (4) community center or social or recreational clubs, (5) clan association, and (6) organizations of retired elderly persons. Participation or belonging in any organization is scored 1. The cumulation of the score becomes the index of social organization. The comparison of 1989 and 1993 indices of social organization again leads to two dummy variables, i.e. "increase in social organization participation" and "decrease in social organization participation."

The variable of support from primary groups or family is indicated by "living arrangement." Those who live with their adult children are assigned code 1; otherwise, 0. Empirical studies show that living with children receive more economic, ADL (Activity

of Daily Life) and IADL (Instrumental Activity of Daily Life) support (Chen, 1996). The elderly who received more support felt more satisfied with their past and current life. *Since Taiwan is far from a welfare state, support to the elderly relies heavily on family resources. The result thus indicates that the elderly are still well-cared by their families, in spite of the impingement of speedy westernization.*

Life events

Six major life events are included in the regression analysis. They are death of children, marriage dissolution, re-marriage, deterioration in health, decrease in income, and retirement. In the four-year period between 1989 and 1993, the elderly who had experienced loss of children, marriage dissolution, re-marriage, health deterioration, income decrease, and retirement were assigned code 1; otherwise, 0. Most of them are related to role loss, so they may affect the level and change of social activities and living arrangement. They may also have a direct effect on the life satisfaction of the elderly.

Social demographic variables

Five social status variables are selected into this analysis. They are sex, education, ethnicity, marital status, and age. The first four variables are dichotomized. Male, primary or above education, Fukienese, and married elderly are assigned code 1; otherwise, 0. Age is divided into five age groups, i.e. 60–64, 65–69, 70–74, 75–79, and 80 or above. Four age dummy variables are further created. They are “65–69,” “70–74,” “75–79,” and “80+.” The age group 60–64 is the reference group.

Summary statistics of the dependent and independent variables are listed in Appendix I.

4. THE ANALYTICAL RESULTS

4.1. *Life Satisfaction and Age Without Covariates*

When no correlates were controlled, life satisfaction decreased as age advanced (see Table III). For index 0–3, its mean was 1.70 for age-group 60–64. As age increased, it decreased gradually to

TABLE III
Distribution of life satisfaction indices [%]

	60–64	65–69	70–74	75–79	80+	Total	N
Index 0–3							
0	23.4	27.9	29.1	32.9	44.3	27.8	847
1	18.8	19.0	15.1	15.1	15.1	17.6	537
2	21.8	19.1	23.4	19.0	15.7	20.7	629
3	36.0	34.1	32.4	32.9	24.9	33.9	1031
Total	100.0	100.0	100.0	100.0	100.0	100.0	
N	1146	912	543	258	185	3044	
		$\chi^2 = 47.08$	DF = 12		$P = 0.00$		
\bar{X}	1.70	1.59	1.59	1.52	1.21		
SD	1.18	1.22	1.21	1.25	1.25		
		F = 7.24	$P = 0.00$		$R^2 = 0.008$		
Index 0–4							
0	14.8	20.3	23.0	26.7	36.8	20.3	617
1	18.0	17.3	13.8	14.0	17.3	16.7	507
2	18.1	18.2	18.6	16.3	11.4	17.6	536
3	22.3	18.3	20.4	19.0	18.9	20.3	618
4	26.8	25.9	24.3	24.0	15.7	25.2	766
Total	100.0	100.0	100.0	100.0	100.0	100.0	
N	1146	912	543	258	185	3044	
		$\chi^2 = 71.83$	DF = 16		$P = 0.00$		
\bar{X}	2.28	2.12	2.09	2.00	1.59		
SD	1.41	1.48	1.49	1.54	1.52		
		F = 9.93	$P = 0.00$		$R^2 = 0.011$		

Source: see footnote of Table I.

1.21 for age-group 80 or above. The differences among the age-groups were significant at the 0.01 level. Similar trends were also observed in terms of percentage distribution. The proportion of index-0 accounted for 23.4% for age-group 60–64, and increased thereafter. It was as high as 44.3% for age-group 80 or above, or 44.3% of the elderly aged 80 or above had negative responses to all of the three items assessing past life satisfaction.

For index 0–4, which included another item about future life, the relationship between age and life satisfaction was also negative. Its

mean was 2.28 for age-group 60–64, and decreased consistently to 1.59 for age-group 80 or above. The differences among age-groups were also significant at the 0.01 level. On the other hand, the proportion of index-0 increased as age advanced. It had a share of 14.8% for age-group 60–64, and increased to 36.8% for age-group 80 or above. The differences were significant at the 0.01 level as indicated by the chi square value.

Comparisons across index 0–4 and index 0–3 showed that the elderly's assessment about future life also decreased as age advanced. When the item about future life was added, the index mean increased 0.58 for age-group 60–64, while the increase for age-group 80 or above was only 0.38. On the other hand, the proportion of index-0 decreased more for the younger age-groups. It decreased 8.6% for age-group 60–64. The counterpart decrease was 6.1%, 6.2%, and 7.5% for age-groups 70–74, 75–79, and 80 or above, respectively.

A broader trend of a decline in life satisfaction as age advanced was also indicated by another large scale survey conducted in Taiwan with a sample of 3 720 cases aged 20 or above (MOI, 1999). The survey used a single item "Are you satisfied with your life three years ago (in 1996)?" Five categories of answers were offered to the question, i.e. very satisfied, satisfied, not satisfied, not satisfied very much, and no opinion or hard to say. The proportion of satisfied and very satisfied decreased from 78.5% for age-group 20–29 to 76.2% and 76.0% for age-groups 60–69 and 70 or above, respectively.

4.2. *Life Satisfaction and Age with Covariates*

Since the indices of life satisfaction were interval scale, OLS regression was employed to estimate the effects of correlates on life satisfaction. The five types of correlates were included step by step to show the effect of the aging process. Since 290 cases failed to answer the item about income change, they were excluded in the regression analysis. Table IV showed regression results of life satisfaction index 0–3. Model 1 was the basic model to show the gross effect of age on life satisfaction. Before controlling any correlates, there was a negative relationship between age and life satisfaction. The coefficients of the four age-groups were all negative. However,

TABLE IV
Results of OLS regression of life satisfaction on correlates (index 0–3)

Model	1	2	3	4	5
Age:					
65–69	–0.035 (–1.69)	–0.021 (–1.01)	–0.020 (–0.99)	–0.021 (–1.03)	–0.011 (–0.58)
70–74	–0.010 (–0.51)	0.011 (0.54)	0.010 (0.46)	0.008 (0.39)	0.030 (1.54)
75–79	–0.001 (–0.04)	0.021 (1.08)	0.014 (0.74)	0.013 (0.67)	0.045* (2.39)
80+	–0.051** (–2.64)	–0.020 (–1.05)	–0.021 (–1.10)	–0.017 (–0.90)	0.023 (1.25)
Sex		0.005 (0.28)	0.020 (1.02)	0.022 (1.15)	–0.006 (–0.31)
Education		0.116** (5.83)	0.109** (5.66)	0.108** (5.65)	0.051** (2.67)
Ethnicity		–0.052** (–2.68)	–0.040* (–2.15)	–0.041* (–2.20)	–0.036* (–1.99)
Marital status		0.117** (6.07)	0.114** (6.08)	0.113** (6.06)	0.022 (0.86)
Income decrease			–0.248** (–13.88)	–0.249** (–13.91)	–0.218** (–12.45)
Health deterioration				–0.035 (–1.95)	–0.034* (–1.98)
Retirement				–0.008 (–0.42)	0.003 (0.14)
Living arrangement					0.090** (3.40)
Index of:					
SO					0.017 (0.72)
LA					0.137** (6.17)
T					0.165** (7.32)
Decrease of:					
SO					0.044 (1.93)
LA					–0.036 (–1.12)
T					–0.030 (–1.38)
Increase of:					
SO					–0.017 (–0.94)
LA					–0.017 (–0.54)
T					0.038* (2.00)
Adj R ²	0.002	0.029	0.090	0.091	0.146
F	2.196	11.67	32.45	26.94	24.248
P	0.067	0.001	0.001	0.001	0.001
N	2861	2861	2861	2861	2861

Notes:

Source: See footnotes of Table I.

Figures in parentheses are t-values.

SO: Social Organization.

LA: Leisure Activities.

T: Trip.

Code 1 is assigned to income decrease, health deterioration, retired, living with children, male, primary or above education, married, Fukieneese, decrease of activities and increase of activities; otherwise, 0.

* and ** indicate significance at 0.05 and 0.01 level respectively.

only the coefficients for age-groups 65–69 and 80 or above were significant at the 0.10 and 0.01 level, respectively. The results suggested that life satisfaction decreased after retirement and at the oldest old group. In total, age could explain about 0.2% of variance.

Model 2 examined the effects of age and social demographic variables. The effects of education, ethnicity and marital status were significant at the 0.01 level. The effect of age was affected greatly by

the inclusion of the four variables. The coefficients for age groups 65–69 and 80 and above remained negative but became insignificant. Moreover, the coefficients for age-groups 70–74 and 75–79 turned positive. These changes mainly came from ethnicity, education and marital status. The non-Fukienese elderly are more satisfied with their past lives. This was also true for the better educated and married elderly. It seems the elderly with more resources felt more satisfied with their past lives. The inclusion of the social demographic variables led to a substantial increase of the model's explanation power from 0.2% to 2.9%.

In model 3, "income decrease" was added into the model. Its effect on life satisfaction was negative and significant at the 0.01 level. It, however, did not affect the effect of other independent variables. Nevertheless, its inclusion led to a substantial increase of explanation ability from 2.9% to 9%.

In model 4, "health deterioration" and "retirement" were further included. Although the effect of "health deterioration" was almost significant at the 0.05 level, retirement's effect was insignificant. Moreover, the effects of other variables remained about the same, so the explanation power of model 4 was almost equal to that of model 3.

The impingement of aging was by far mostly considered in the regression model. With the control of these correlates, their negative effects on life satisfaction were taken away from age groups. It thus made the coefficients of age groups either insignificant or turn positive.

In model 5, the variables about current status such as "living arrangement" and variables of activity were included additionally. Their inclusion had a substantial impact on the effect of age-group and total explanation ability. The coefficients for age-group 80 and above also turned positive, and the coefficient for age group 75–79 became significant at the 0.05 level. The model's explanation power was increased to 14.6%. However, the other three types of correlates were affected slightly.

It is interesting to note that the level of social activities had a positive effect and were mostly significant at the 0.01 level. On the other hand, the effect of changes in social activities was mostly insignificant. The only exception was "increase of trip." It had a

positive and significant effect on life satisfaction. These results suggest that the continuity theory is more applicable in Taiwanese elderly.

As noted before, life satisfaction index 0–4 contained one item on future life and three items on past or current life assessment. Although the regression results of index 0–4 on correlates had a basically similar pattern to that of index 0–3, the inclusion of the item on evaluating future life led to several important changes (see Table V). At first, it was noted that in model 1 the coefficients of four age groups all slightly decreased. It suggested that they were less confident with the future in relative to those aged 60–64. Secondly, “health deterioration” was consistently negative and significant at the 0.05 level in the models which it was included. Probably, it was one of the major sources of uncertainty toward future life. Thirdly, the effect of social demographic variables increased slightly. The effect of marital status became significant at the 0.05 level. It might reflect that with support from the spouse the elderly felt more confident toward future life. The coefficients for education and ethnicity also became slightly greater. It might indicate that those higher status elderly had more resources and thus had more confidence toward the future. Finally, the effect of “increase in trip” decreased slightly and became insignificant. It might suggest that the inclusion of future life assessment diluted the effect of changes in traveling.

5. DISCUSSION

This study showed that, generally speaking, life satisfaction decreased as age advanced. When correlates or aging effects were controlled, the coefficients for age groups greater than 70 turned positive. The effect of age-group 75–79 was significant at the 0.05 level. *Since demographic and aging effects have been controlled*, this change could be ascribed to the cohort effect, because the elderly aged 70 or above shared the following two types of cohort experience.

TABLE V
Results of OLS regression of life satisfaction on correlates (index 0–4)

Model	1	2	3	4	5
Age:					
65–69	–0.042* (–2.02)	–0.026 (–1.26)	–0.025 (–1.24)	–0.024 (–1.19)	–0.016 (–0.80)
70–74	–0.021 (–1.05)	0.002 (1.07)	0.001 (0.012)	0.001 (0.07)	0.020 (1.05)
75–79	–0.008 (–0.42)	0.016 (0.83)	0.009 (0.50)	0.010 (0.54)	0.038* (2.04)
80+	–0.056** (–2.89)	–0.021 (–1.08)	–0.021 (–1.13)	–0.016 (–0.82)	0.020 (1.05)
Sex		–0.005 (–0.25)	0.008 (0.44)	0.009 (0.46)	–0.012 (–0.61)
Education		0.134** (6.79)	0.127** (6.64)	0.127** (6.63)	0.078** (4.03)
Ethnicity		–0.073** (–3.80)	–0.062** (–3.33)	–0.063** (–3.36)	–0.059** (–3.21)
Marital status		0.140** (7.28)	0.136** (7.32)	0.135** (7.24)	0.059* (2.26)
Income decrease			–0.235** (–13.16)	–0.235** (–13.18)	–0.209** (–11.85)
Health deterioration			–0.038* (–2.14)	–0.038* (–2.18)	
Retirement				0.008 (0.41)	0.017 (0.92)
Living arrangement					0.073** (2.74)
Index of:					
SO					0.003 (0.12)
LA					0.132** (5.94)
T					0.135** (5.99)
Decrease of:					
SO					0.044 (1.95)
LA					–0.030 (–0.94)
T					–0.021 (–0.95)
Increase of:					
SO					–0.029 (–1.57)
LA					–0.005 (–0.14)
T					0.035 (1.84)
Adj R ²	0.002	0.040	0.095	0.096	0.137
F	2.652	15.98	34.31	28.53	22.642
P	0.031	0.001	0.001	0.001	0.001
N	2861	2861	2861	2861	2861

Notes:

Source: See footnotes of Table I.

Figures in parentheses are t-values.

SO: Social Organization.

LA: Leisure Activities.

T: Trip.

Code 1 is assigned to income decrease, health deterioration, retired, living with children, male, primary or above education, married, Fukieneese, decrease of activities and increase of activities; otherwise, 0.

* and ** indicates significance at 0.05 and 0.01 level respectively.

(1) From rough to prosperous life experience

The elderly aged 70 or above were born before 1923. During World War II, they reached their adulthood. Thus they had a deep impression about the rough times caused by World War II. When they moved to middle age, they were major contributors to Taiwan's economic miracles. They in turn enjoyed a better life provided by

fast economic growth. A life experience from hardship to prosperity helped them to turn the past into old good days. When they were asked to retrospect about their past life, they had a positive image of it.

(2) Cohort norm on life expectancy

It was believed that “population aged 70 is scarce.” A more modernized saying is “life begins at age 70.” This belief may make the elderly feel that every day after age 70 is a bonus. They thus appreciated more their past, current and future lives.

In brief, this study provides a special case of a possible cohort effect on life satisfaction. There are other possible cohort experiences. For example, from good to bad times, a consistently good life, or a consistently poor life. They might render different effects on life satisfaction.

The effects of some results are somewhat unexpected. “Health deterioration” is not one of the most influential factors on life satisfaction of the elderly. Probably, it reflects that the study population was relatively young. *The elderly aged 75 or above accounted only for 14.5%*. Its disabled proportion was relatively low, about 4% only. A national insurance program covering every citizen was launched in March 1995. If the program could be extended to cover the costs of day-care and home-care, it might further decrease the effect of “health deterioration.” On the other hand, the effect of “living arrangement” is rather substantial. It may indicate that the proportion of the elderly who live alone or with a spouse only had reached a historical peak of 34% of the population aged 65 or above in 1993. It thus suggests that a rather substantial proportion of the elderly did not gain needed support from their families and this resulted in less life satisfaction. Finally, the level of social activity participation had a substantial effect, while the changes of social activities had almost no effect on life satisfaction. The results suggest that the continuity theory is more applicable in the explanation of the behavior of the studied population.

APPENDIX I

Summary statistics of dependent and independent variables

Variables definition	Mean	Standard
Index	2.27	1.41
Income decrease	0.86	0.35
Sex	0.56	0.50
Marital status	0.66	0.50
Retirement	0.21	0.41
Living arrangement	0.60	0.49
65–69	0.30	0.46
70–74	0.18	0.38
75–79	0.08	0.28
80+	0.05	0.21
Health deterioration	0.47	1.88
Education	0.19	0.39
Ethnicity	0.38	0.49
Index of travelling	1.10	1.20
Index of social organization	0.54	0.78
Index of leisure activities	11.08	5.04
Decrease of travelling	0.27	0.44
Decrease of social organization	0.20	0.40
Decrease of leisure activities	0.51	0.50
Increase of travelling	0.27	0.44
Increase of social organization	0.19	0.39
Increase of leisure activities	0.40	0.49

Source: see footnote of Table I.

REFERENCES

- Adams, D.: 1969, 'Analysis of a life satisfaction index', *Journal of Gerontology* 24, pp. 470–474.
- Atchley, Robert C.: 1971, 'Retirement and leisure participation: Continuity or crisis?', *The Gerontologist* 11(1, part 1), pp. 13–17.
- Atchley, Robert C.: 1987, *Aging, Continuity, and Change* (Wadsworth Publishing Company, Belmont, CA).
- Barclay, G. W.: 1954, *Colonial Development and Population in Taiwan* (Princeton University Press, Princeton, New Jersey).
- Bradburn, N.: 1969, *The Structure of Psychological Well-Being* (Aldine, Chicago).
- Campbell, A.: 1981, *The Sense of Well-Being in America* (New York: McGraw-Hill).

- Campbell, A., P. Converse and W. Rodgers: 1976, *The Quality of American Life* (Russell Sage Foundation, New York).
- CEPD: 1991, *Population Projection for Taiwan, 1990–2036*. Council for Economic Planning and Development, Executive Yuan (Republic of China).
- Chen, C. N.: 1996, 'Living arrangements and economic support for the elderly in Taiwan', *Journal of Population Studies* 17, pp. 59–82.
- Chen, C. N. and H. S. Lin: 1996, 'Life satisfaction and participation of social organizations among the elderly in Taiwan', *Proceeding of Conference on Demography, Family, and Life Quality*. Chinese Population Association, March 4–5, Taipei. (In Chinese)
- Chen, C. N.: 1999, 'Change of living arrangements and its consequences among the elderly in Taiwan', *Proceedings of the National Science Council, Republic of China, Part C: Humanities and Social Sciences* 9(2), pp. 364–375.
- Cumming, E. and W. Henry: 1960, *Growing Old* (Basic Books, New York).
- Cutler, S. J.: 1979, 'Age variations in the dimensionality of life satisfaction', *Journal of Gerontology* 34, pp. 573–578.
- Dolyer, D. and M. J. Forehand: 1984, 'Life satisfaction and old age', *Research On Aging* 6, pp. 432–448.
- Ellwell, F. and A. D. Maltbie-Crannell: 1981, 'The impact of role loss upon coping resources and life satisfaction of the elderly', *Journal of Gerontology* 36, pp. 223–232.
- George, L. K., M. O. Okun and R. Landerman: 1985, 'Age as a moderator of the determinants of life satisfaction', *Research On Aging* 7, pp. 209–233.
- Havighurst, R. J.: 1961, 'Successful aging', *Gerontologist* 1, pp. 8–13.
- Havighurst, R. and R. Albrecht: 1953, *Older People* (Longmans/Green, New York).
- Herzog, A. R. and W. Z. Rodgers: 1981, 'The structure of subjective well-being in different age groups', *Journal of Gerontology* 36, pp. 472–479.
- Hoyt, D. R. and T. C. Creech: 1983, 'The life satisfaction index: A methodological and theoretical critique', *Journal of Gerontology* 38, pp. 111–116.
- Janson, P. and K. F. Mueller: 1983, 'Age, ethnicity and well-being: A comparative study of Anglos, Blacks and Mexican Americans', *Research on Aging* 5, pp. 353–368.
- Kivett, V.: 1976, *The Aged in North Carolina: Physical, Social and Environmental Characteristics and Sources of Assistance*. (North Carolina Agricultural Experiment Station, Tech. Bul. No. 237).
- Kutner, B., D. Fanshel, A. Togo and T. Langer: 1956, *Five Hundred over Sixty* (Russell Sage Foundation, New York).
- Larson, R.: 1978, 'Thirty years of research on the subjective well-being of older Americans', *Journal of Gerontology* 33, pp. 109–125.
- Lawton, M.: 1972, 'The dimensions of morale', in D. Kent (ed.), *Research Planning and Action for the Elderly* (Behavioral Publications, New York).
- Liang, J., L. Dvorkin, E. Kahana and F. Mazian: 1980, 'Social integration and morale: A re-examination', *Journal of Gerontology* 35, pp. 746–757.

- Lopata, H. Z.: 1973, *Widowhood in An American City* (Schenkman, Cambridge, MA).
- Lowry, J. H.: 1984, 'Life satisfaction time components among the elderly', *Research on Aging* 6, pp. 417–431.
- McClelland, K. A.: 1982, 'Self-conception and life satisfaction: Integrating and subculture and activity theory', *Journal of Gerontology* 37, pp. 723–732.
- Miller, S. J.: 1965, 'The social dilemma of the aging leisure participant', in Arnold M. Rose and Warren A. Peterson (eds.), *Older People and Their Social World* (Davis, Philadelphia), pp. 77–92.
- MOI: 1999, *Report on Life Status of Citizen in Taiwan Area, Republic of China*. Statistics Department, Ministry of Interior, R.O.C. (In Chinese)
- Mutchler, J. and J. Burr: 1991, 'A longitudinal analysis of household and non-household living arrangements in later life', *Demography* 28(3), pp. 375–390.
- Mutran, E. and D. C. Reitzes: 1981, 'Retirement, identity and well-being: Realignment of role relationships', *Journal of Gerontology* 36, pp. 741–749.
- Neugarten, B., R. Havighurst and S. Tobin: 1961, 'The measurement of life satisfaction', *Journal of Gerontology* 16, pp. 134–143.
- Palmore, E. and V. Kivett: 1977, 'Change in life satisfaction: A longitudinal study of persons age 46–70', *Journal of Gerontology* 32, pp. 311–316.
- Ranis, G. R. (eds.): 1992, *Taiwan-From Developing to Mature Economy* (Westview Press, Boulder).
- Spreitzer, E. and E. E. Snyder: 1974, 'Correlates of life satisfaction among the aged', *Journal of Gerontology* 29, pp. 454–458.
- Stock, W. A., M. A. Okun, M. J. Haring and R. A. Witter: 1983, 'Age and subjective well-being: A meta-analysis', in R. J. Light (ed.), *Evaluation Studies Review Annual*, vol. 8 (Sage, Beverly Hills, CA).
- Thompson, W., G. Streib and J. Kosa: 1960, 'The effect of retirement on personal adjustment: A panel analysis', *Journal of Gerontology* 15, pp. 165–169.
- TPIFP: 1989, *1989 Survey of Health and Living Status of the Elderly in Taiwan: Questionnaire and Survey Design* (Comparative Study of the Elderly in Four Asian Countries).
- TPIFP: 1993, *1993 Survey of Health and Living Status of the Elderly in Taiwan: Questionnaire and Survey Design* (Comparative Study of the Elderly in Four Asian Countries).
- Witt, D. P., G. D. Lowe, C. W. Peek and E. W. Curry: 1980, 'The changing association between age and happiness: Emerging trend or methodological artifact?', *Social Forces* 58, pp. 1302–1307.

The Institute of Economics
Academia Sinica
Taiwan

