Measuring Subjective Well-Being in Taiwan

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Abstract   This paper explores the measurement of subjective well-being (SWB) in Taiwan through survey data as a result of 13 self-reported SWB questions. We illustrate the findings using multivariate data analysis approaches. First, by taking the first two principal component scores extracted from all SWB measurements, the biplot presents a relatively "even" society for SWBs, in which the plot depicts all data-points radiating from the center. Second, we employ factor analysis to juxtapose these 13 SWB measurements into three factors: health-related, prosperity-related, and social-related. Third and finally, this paper applies the seemingly unrelated regression model to verify the determinants of SWB. The SWB measurements are mostly increasing in higher education and (disposable) income, while falling with unemployment. Volunteering, donating more money to charities, having more leisure time, spending more hours on sports, and being involved in more arts-related activities all enhance an individual's well-being. Gender and age may matter, but they are indecisive in the direction for various SWBs.

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1 Introduction

There is widespread agreement in the literature that subjective well-being (SWB) contains a cognitive component that includes evaluations of one's own life and an emotional component that relates to one's affective state (Diener et al. 1999; Diener 1984). This article uses self-reported satisfaction with life as the measure of individual well-being from telephone survey data in Taiwan. As SWB is conceptualized as a multidimensional construct, the survey's questions pertain to overall life evaluations, self-assessed financial and health states, and personal views about future, community, and society.[1]

For the determinants of SWB, previous studies consider how various socioeconomic and demographic characteristics are associated with SWB. There is a non-linear trend that goes downward first and upward later throughout the courses of one's life and reaches the bottom around middle age (Blanchflower and Oswald 2008). Research studies identify the positive impact of income and the negative impact of unemployment (Oswald 1997; Stutzer 2004; Frey and Stutzer 2002; Blanchflower and Oswald 2008). Alesina et al. (2004) note that individuals have a lower tendency to report themselves as being happy when inequality is high, even after controlling for individual income and personal characteristics in different countries over a span of years. Still other studies separate well-being according to global questions about overall life satisfaction and domain-specific questions about work, income, social relationships, and neighborhood (Ryff and Keyes 1995). Dolan et al. (2008) conclude that poor health, separation, unemployment, and a lack of social contacts are all strongly negatively associated with SWB. Layard (2005) points out that the source of SWB may result from family relationships, one's financial situation, work, community, and friends.[2]

Taiwan has maintained its Chinese culture and Confucian values even after going through a great transition of economic and political developments in the past three decades. Shin and Inoguchi (2009) argue that Confucian Asia, such as Taiwan, Japan, and South Korea, emphasizes social relationships, family, community, harmony, and trust, which lead to enhanced happiness and life satisfaction (see also Tsai et al. 2012). Our contribution to the literature thus provides a more general measurement and determinants of Taiwanese SWB in various aspects. Based on the descriptive data analysis, we reach the conclusion that Taiwanese people's well-being is more about the "happiness that is family-related" rather than "the happiness of the individual". On the other hand, Taiwanese people show great sympathy for society, resulting in relatively low scores about their views on the happiness of society as a whole even though their other SWB scores are higher.

The main purpose of this paper is to measure and explore SWB in Taiwan, even as the present paper is at the crossroads of two lines of research on SWB. The first branch studies the measurement of "subjective happiness" and the determinants of individual well-being. The second branch is related to the methodology. Using multivariate analytical approaches to fulfill the first purpose, we contribute to the methodology issue in this strand as discussed in Ferrer-i-Carbonell and Frijters (2004) by employing principal component analysis (PCA), factor analysis (FA), and the seemingly unrelated regression (SUREG) model.

We apply both PCA and FA to group variables into subsets such that the variables within each subset are mutually highly correlated, while at the same time variables within

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[1] The related empirical literature on SWB using people's cognitive and affective evaluations of their lives includes Kahneman et al. (1999), Ryan and Deci (2003), and Kahneman and Krueger (2006) for a thorough survey.

[2] Throughout the paper we will cover more related literature about SWB.

different subsets are relatively uncorrelated. Nevertheless, both are different with their own unique purposes. Hence, we can extract and construct the concept of individual well-being from various measurements (e.g. Ryff and Keyes 1995; Lucas et al. 1996). The biplot, based on the first two principal component scores, shows data-points clouded in the center and scattered all over the plot in such a way as to radiate from the center. This reflects a relatively "even" society indicated by all respondents' SWB scores. FA collocates these 13 SWB measurements into three factors: health-related, prosperity-related, and social-related. These three factors coincide with the research about SWB in the fields of psychology, economics, and sociology.

To accommodate all SWB measurements, we further apply SUREG to identify the determinants of SWBs. We shall also examine how an individual's well-being can be improved by way of other factors, including volunteering, donating money to charities, leisure time, reading hours, sporting hours, and being involved in arts-related activities. Housing relates several aspects about family and community, yielding a particular impact on SWB in Taiwan.

SUREG is a simultaneous equation method appropriate for multiple equations with correlated error terms and possesses multiple advantages over the ordinary least squares (OLS) regression model. In several respects, our empirical study is similar to that found in other studies. In general, women and married people have higher levels of SWB than those of other corresponding statuses (Blanchflower and Oswald 2008; Shin and Inoguchi 2009). SWB is increases in health, education, and income, but falls with unemployment (Winkelmann and Winkelmann 1998; Frey and Stutzer 2002; Cummins et al. 2003; Helliwell 2003; Di Tella and MacCulloch 2006). Nevertheless, some new findings are revealed after the consideration of various SWB measures. For example, our data do not show that SWB falls with age and then rises as seen in the literature. Taiwanese people with a strong desire to help others, such as donating more money to charities or volunteering, experience higher SWB than others. Under a collectivist yet highly economically developed and democratic culture, Taiwanese SWBs present great diversity, which may differ from other Asian countries and western countries (e.g. Shin and Inoguchi 2009).

The remainder of this paper is organized as follows. Section 2 describes and summarizes the data from respondents that have answered 13 questions about SWB. A relatively low score about one's personal view about happiness for the whole society is obtained in comparison with the average score of individual happiness and other SWB average scores. Section 3 depicts the structure and components of SWB using various multivariate data approaches, in which PCA presents a fair spectrum about SWB in Taiwan, FA explores SWB components, and SUR identifies the determinants of individual well-being. Both numerical and graphical presentations enhance the analysis. Section 5 concludes.

2 Data Description

The survey was conducted by *Global Views Survey Research Center* through the computer assisted telephone interview (CATI) system from January 31 to February 3, 2012.[3] The survey uses stratified random sampling by dividing the target population into 20 strata

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[3] This survey is a pioneer in measuring SWB by using a telephone survey format in Taiwan. Previous studies about SWB in Taiwan have employed different data resources (e.g. Tsou and Liu 2001; Chan et al. 2002; Lu and Hu 2005; Chang 2009; Liu et al. 2012). For related features about Taiwanese SWB, one can refer to these studies.

Table 1 List of variables

Variables	Description
Well-being measurement (all questions end with "as a whole on a scale of 1–10")	
Life	How satisfied are you at present with your life?
Physical	How satisfied are you with your current physical health condition?
Mental	How satisfied are you with your current psychological health condition?
Appearance	How satisfied are you with your appearance (including body shape and face)?
Achievement	How do you evaluate your current achievements (including work, life, and family) with your life?
Evaluation	To what extent do you feel the things you do in your life are worthwhile?
Friendship	How satisfied are you about the relationship with your friends?
Family	How satisfied are you about the relationship with your family?
Community	To what extent do you feel yourself as a part of the community?
Finance	How satisfied are you with your current financial status and income?
Future	How confident are you with your future life?
Happiness	How happy are you with your life?
Society	How do you evaluate the happiness of the whole society?
Socio-economic variables	
Gender	Respondent's sex
Age	Respondent's age
Marital	Respondent's marital status
Education	Respondent's education
Income	Respondent's average monthly income
Expense	How do you feel about the adequateness of your life expenditure?
Child	Do you have children?
Housing	Respondent's housing status
Employ	Respondent's vocational status
Sport	How many hours do you spend on sports activity in a week?
Reading	How many hours do you spend reading in a week?
Arts	How often do you participate in arts-related activities?
Learning	Have you participated in any training courses in the past 12 months?
Leisure	How do you feel about the adequateness of your leisure time?
Volunteer	Have you done any volunteer work in the past 12 months?
Donation	How much have you donated to any charity in the past 12 months?

according to the cities/counties where the respondents live in Taiwan. The total sample size is 1,062, and the sample size of each stratum is proportional to the percentage of the target population in the stratum.

The respondents were asked twelve questions to assess their SWB in assorted aspects and one question to evaluate the happiness of the whole society as presented in Table 1, in which italics denote the variable names. Figure 1 presents the sturcTure of the questionnaire design intended to measure individual well-being. The hierarchical structure of the 12 SWB measures has been guided by Maslow's hierarchy of needs (e.g. Tay and Diener 2011). The respondents evaluate all 13 questions in terms of "as a whole on a scale of 1–10". A higher score indicates a higher level of satisfaction in respondents' SWBs.
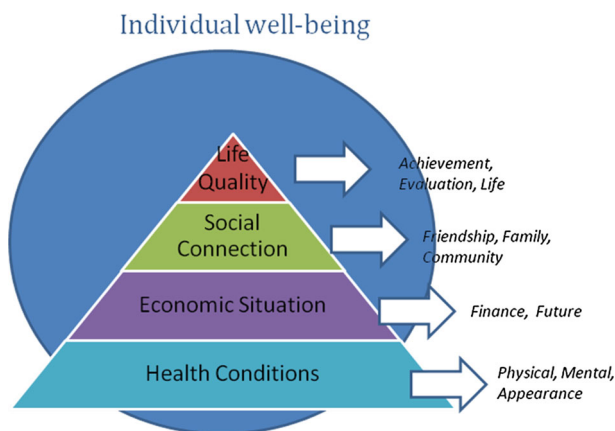
Individual well-being

Fig. 1 The sturcture of questionaire design to measure individual well-being

Table 2 Summary statistics for subjective well-being measurments

Well-being measurement	First quantile	Median	Mean	Third quantile	SD	No response
Life	5.00	6.00	5.95	7.50	2.09	55
Physical	5.00	7.00	6.50	8.00	1.89	39
Mental	5.00	7.00	6.98	8.00	2.05	40
Appearance	5.00	7.00	6.63	8.00	1.86	44
Achievement	5.00	7.00	6.50	8.00	2.10	39
Evaluation	5.00	7.00	6.65	8.00	1.98	50
Friendship	6.00	7.00	7.11	8.00	1.87	39
Family	7.00	8.00	7.87	9.00	1.78	19
Community	5.00	6.00	5.97	7.00	2.02	64
Finance	5.00	6.00	5.59	7.00	2.27	40
Future	5.00	6.00	5.79	7.00	2.23	47
Happiness	5.00	6.00	6.37	8.00	2.07	19
Society	5.00	5.00	4.99	6.00	1.72	33

Table 2 presents the summary statistics for all 13 SWB scores. It is well-known that a strong emphasis on Chinese philosophy in the mean, or the median, results in encouraging moderation for all things. Hence, the greatest amount of middle scores (between the first and third quantiles) is from 5 to 7 or from 6 to 8 for most SWB measurements in Table 2, except for the highest score of 7–9 for *Family* and the narrowest score of 5–6 for *Society*.

Taiwan's society has maintained a very traditional Chinese culture, leading to the highest average score in family life. However, *Society* yields the lowest scores for both average and standard deviation. The higher scores of self-reported health status, family, and life satisfaction may not reflect a corresponding higher score on those people's view of happiness with the whole society. In fact, such a cheerless opinion of happiness with the whole society shows up as a very common view for respondents through the lowest variance. Both *Finance* and *Future* produce the largest values of standard deviation, indicating dissimilarity about one's financial state and relatively diverse prospects about

the future. The relatively low average score of *Finance* mirrors the current stagnant economic growth in Taiwan.

It is a particularly interesting phenomenon that *Community* has the highest non-response rate, indicating that people are reluctant to express their own role in the community where they reside. Taiwanese people are more intimate with their family and friends, but are less involved in their community. Moreover, *Community* has relatively low average scores in comparison with the average scores for both *Family* and *Friendship*. The average score of *Happiness* is greater than those of *Community* and *Society*, but is lower than the average scores for both *Family* and *Friendship*. The trend of individual well-being is between family (friends) and community (society).

In order to fully understand the factors of well-being, we record respondents' personal background information, such as age, gender, marital status, educational level, and others, including altruistic tendencies (volunteer work or charitable donations) and participation in continuing education, hours of reading, and art-related hobbies. Table 1 provides this information and a list of all the explanatory variables used in the following regression analysis. Table 3 presents summary statistics and the number of no responses for these variables and gives the corresponding codings for those categorical explanatory variables. Each respondent's occupation is classified into 13 categories,[4] which are not convenient for regression analysis. Therefore, a recoded variable *Employ* combines all those respondents with any types of jobs into one group so as to compare with the unemployed and others.

2.1 Happy People Do Not Comprise a Happy Society

In this subsection we focus on discussing the relatively low score of *Society*. Figure 2 presents the proportion of each score for *Happiness* and *Society*, showing that more people give a score of under 6 for *Society* than that for *Happiness*, while more people give a score of over 7 for *Happiness* than that for *Society*. The score of 5 receives the most responses for both *Happiness* and *Society*, and there is another peak at 8 for *Happiness* in terms of the proportion for the score.

People have sympathy towards (other people in) society. According to Suh et al. (1998), large differences exist in whether people in different cultures rely on their feelings when making life-satisfaction judgments. Diener (2000) asserts that people vary markedly across societies in the factors they consider to be relevant to life satisfaction, perhaps because culture has a pervasive influence on people's values and goals.[5] Although the literature lacks a similar discussion about people's perception of society, we reach a relatively different conclusion on measuring happiness between people's eyes and heart.

Although the global view of satisfaction with life denotes a cognitive process of evaluation, the cognitive component of beliefs has rarely been explored as a pathway to life satisfaction. Chen et al. (2006) suggest that life satisfaction is derived not only from one's evaluation of the self, but also from how one assesses the world outside the self. This

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[4] The classification of occupation includes (1) military and public service, (2) professional, (3) agriculture, animal husbandry, forestry, and fishing, (4) mining and quarrying, (5) service, (6) business, (7) home-making, (8) self-employed, (9) student, (10) electronics, (11) manufacturing, (12) unemployed or retired, and (13) others.

[5] When deciding how satisfied they are, people in individualistic nations find it natural to consult their effects in different cultures. In these societies, feeling pleasant emotions frequently is a reasonable predictor of life satisfaction. By contrast, people in collectivist cultures tend to more often consult norms for whether they should be satisfied and to consider the social appraisals of family and friends in evaluating their lives (Diener 2000).

Table 3 Summary statistics for demographic covariates

Variables	Proportion (coding)	No response
Gender	Male 43.97 %, female 56.03 % (0 = male, 1 = female)	0
Marital	Single 18.17 %, married 74.67 %, and others including divorced, separated, or widowed 6.78 % (1 = single, 2 = married, 3 = others)	4
Education	Primary school and below 14.50 %, junior high school 12.43 %, senior high school 30.98 %, junior college 15.91 %, university 21.09 %, graduate and above 4.80 % (1 = primary school and below, 2 = junior high school, 3 = senior high school, 4 = junior college, 5 = university, 6 = graduate and above)	3
Child	No 20.34 %, yes 79.10 % (0 = no, 1 = yes)	6
Expense	Pretty much shortage 19.87 %, slight shortage 23.16 %, adequate 41.24 %, and plenty 10.73 % (1 = pretty much shortage, 2 = slight shortage, 3 = adequate, 4 = plenty)	53
Employ	Employed 60.55 %, unemployed 4.71 %, housewife 16.48 %, retired 14.50 %, student 2.07 % (1 = employed, 2 = unemployed, 3 = housewife, 4 = retired, 5 = student)	18
Housing	Respondent's own residence 75.52 %, rent a residence 11.30 %, parents' residence 9.6 %, others 3.01 % (1 = own, 2 = rent, 3 = parents, 4 = others)	6
Arts	Never 44.63 %, occasionally 38.98 %, often 14.88 % (1 = never, 2 = occasionally, 3 = often)	16
Learning	No 64.78 %, yes 34.65 (0 = no, 1 = yes)	6
Leisure	Pretty much shortage 19.40 %, slight shortage 30.89 %, adequate 34.65 %, and plenty 10.55 % (1 = pretty much shortage, 2 = slight shortage, 3 = adequate, 4 = plenty)	48
Volunteer	No 79.76 %, yes 19.68 % (0 = no, 1 = yes)	6
	Median, mean, and SD	
Age	55.00, 51.20, 14.48	5
Income	25.00, 31.33, 23.31 (unit: NT\$10,000)	94
Sport	2.00, 3.47, 4.18	49
Reading	0.00, 3.035, 4.50	23
Donation	0.15, 1.13, 25.31 (unit: NT\$10,000, US\$1 = NT\$29.54 on average for February 2012)	124

proposition is especially important in collectivistic cultures like China, as many East Asian cultures base their SWB judgment more on external information compared with Western cultures (Suh 2000). Kwan et al. (1997) and Diener and Suh (2000) systematically analyze the related cultural theory about SWB, while Lu and Gilmour (2004) discuss the conceptions of happiness as embedded in both Euro-American and Asian cultures.

For the Chinese, Confucianism has been the dominant value system and the most powerful source of influence shaping their culture and mentality for 1,000s of years. Confucian philosophy presupposes that the life of each individual is only a link in that person's family lineage and that an individual is a continuation of his or her ancestors. The same reasoning can be applied to a person's offspring. Although this philosophy does not necessarily take the form of reincarnation conviction, it does put one's family or clan right in the centre of one's entire life and mundane existence. Thus, Lu and Lin (1998) conclude that Chinese happiness is more about "the happiness of the society" rather than "the happiness of the individual".
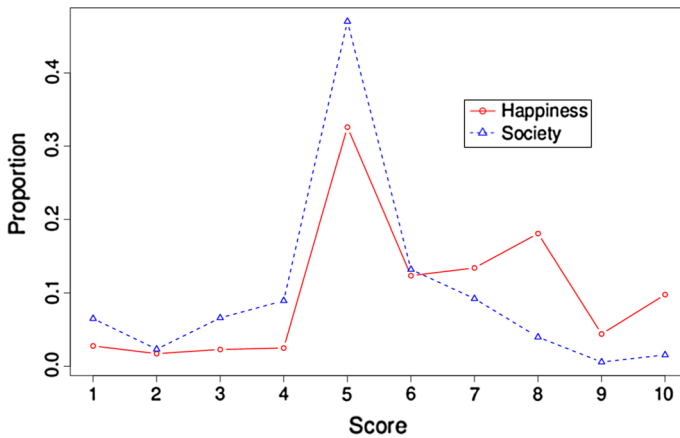
Fig. 2 The proportions of scores for *happiness* and *society*

Since the early 1990s Taiwan has witnessed that the growth of a free and independent mass media offers a new window on the world and a microphone from which the public can address political, social, and economic concerns (Gingerich et al. 2011). The prevalence of an attitude of distrust toward ethical and social values emerges in society during periods of great transition. Chang and Holt (1996) argue that modernization has led to increasing discomfort on the part of the individual in Taiwanese society. The increasing complexity of modern Taiwanese social and economic life has been marked by increased interpersonal contact, but the phenomenon in Taiwan is how people look at other people in society rather than a type of result on the social cynicism issue.[6] As life and work pressure has become increasingly heavy, Taiwanese people are more sympathetic toward other people in the society no matter what their own SWBs are. This also reflects that the traditional Chinese emphasis on modesty, together with the tendency to give more consideration to others, seems gradually to have given way to conception with misery, which in turn relatively elevates individual well-beings.

3 Multivariate Analysis for Subjective Well-Beings

This study first addresses the multifaceted relations among all 13 SWB measurements using multivariate techniques. The estimated Pearson and Spearman correlation coefficients for these 13 dimensions of well-being related issues are quite similar. Table 4 only reports the estimated Pearson correlation coefficients, which appear in the right-upper triangle. The values vary from 0.23 to 0.74, indicating positive relationships among all SWBs.

We use two closely related techniques, PCA and FA, to reduce the dimensionality of multivariate data. Both approaches summarize the correlations and interactions among the variables in terms of a small number of underlying factors, which are able to identify key variables or groups of variables that control the systems being studied. Generally, PCA seeks to represent p correlated random variables by means of a reduced set of uncorrelated variables, which are obtained by transforming the original set into an appropriate subspace.

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[6] Chen et al. (2006) conclude that social cynicism is negatively related to life satisfaction.

Table 4 Pairwise correlation coefficients among well-being measurements

	Life	Physical	Mental	Appearance	Achievement	Evaluation	Friendship	Family	Community	Finance	Future	Happiness	Society
Life	1	0.43	0.47	0.35	0.58	0.43	0.35	0.33	0.24	0.63	0.62	0.50	0.42
Physical	0.27	1	0.64	0.49	0.43	0.42	0.33	0.31	0.32	0.42	0.42	0.37	0.27
Mental	0.34	0.54	1	0.51	0.55	0.47	0.41	0.4	0.37	0.46	0.51	0.47	0.32
Appearance	0.25	0.42	0.45	1	0.49	0.46	0.42	0.37	0.31	0.41	0.42	0.34	0.26
Achievement	0.44	0.28	0.42	0.38	1	0.67	0.49	0.49	0.42	0.64	0.66	0.56	0.39
Evaluation	0.28	0.30	0.35	0.37	0.57	1	0.52	0.46	0.37	0.53	0.55	0.50	0.29
Friendship	0.29	0.28	0.38	0.36	0.46	0.46	1	0.45	0.38	0.38	0.41	0.41	0.27
Family	0.26	0.23	0.34	0.30	0.45	0.40	0.44	1	0.34	0.33	0.36	0.41	0.23
Community	0.16	0.29	0.32	0.27	0.36	0.30	0.34	0.28	1	0.37	0.39	0.27	0.31
Finance	0.48	0.28	0.31	0.34	0.50	0.38	0.32	0.25	0.33	1	0.74	0.53	0.42
Future	0.52	0.29	0.38	0.33	0.55	0.43	0.33	0.28	0.29	0.63	1	0.61	0.47
Happiness	0.38	0.23	0.37	0.23	0.45	0.41	0.36	0.33	0.16	0.39	0.47	1	0.46
Society	0.31	0.19	0.25	0.19	0.25	0.17	0.17	0.13	0.19	0.26	0.34	0.32	1

We choose the uncorrelated variables to provide a good linear combination of the original variables, in terms of explaining maximal variance and orthogonal directions in the data. The resulting dimension reduction also permits a graphical representation of the data so that significant relationships among observations or samples can be identified.[7] FA is a collection of methods used to examine how underlying constructs influence the responses on a number of measured variables. It assumes that the measured responses are based on the underlying factors, while in PCA the principal components are based on the measured responses.

3.1 The "Even" Spectrum About SWB

Figure 3 shows the biplot of these well-being measurements for all respondents.[8] Both the first and second principal components, denoted as PC1 and PC2, represent 50.20 and 8.43 % of total variation for the original data, respectively. The first component can be interpreted as a measure of size, or a degree of expression of a certain feature, while the second and third (and so on) components can be interpreted as having some structure of that feature.[9] Table 5 presents the loadings of various SWB measures for computing the first two component scores. All the signs of the coefficients (loadings) for the first principal component appear to be positive. Therefore, we can use the loading values of PC1 as the corresponding weights for all SWB measurements, which form a single index to evaluate the overall level of well-being for each individual. The loading values of PC2 for *Physical*, *Mental*, *Appearance*, *Evaluation*, *Friendship*, *Family*, and *Community* are all positive, while the others are negative, but the value of *Achievement* is shown to be different from those of other SWB measurements. PC2 indicates personal health conditions and social connections. All the SWB measurements are split up into two groups due to the different signs of the variables, except that *Achievement* is located in the middle among them in Fig. 3.

Although all these SWB measures are positively correlated, the scatter of all data points in the first and second principal components spreads quite evenly in four quadrants, divided by the zero values of both the horizontal and vertical axes in Fig. 3. Looking at Table 1 again, *Future*, *Finance*, *Achievements*, *Life*, and *Happiness* yield the largest loading values for PC1, which can be viewed as an indicator for overall but more self-relevant SWBs, whereas PC2 is the one for more relations-oriented SWBs. Each number indicates one respondent and the data-points flock in the center. This may present that people in the reported SWB measurements are not too self-centered or too isolated from the others. The proximity of individual observations reflects their similarities with respect to this particular set of variables, as seen in the two dimensions. This radiation of all data-points from the

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[7] If the variance covariance and correlation matrices all have non-negative entries, then all coefficients of the first principal component will have the same sign according to the Perron–Frobenius theorem (see Naik and Khattree 1996). This suggests that the first component score can be used to establish a single measure of well-being when several aspects of SWBs are incorporated in the analysis. However, we intend to examine all these SWBs instead of reducing them into one in this paper.

[8] The biplot of Gabriel (1971) is an exploratory graphical tool that can illustrate the correlation structure among variables, the similarity of observations, and the relative values of data-points for the variables measured. The length of the variable vector in a biplot, relative to its length in the original *n*-space, indicates how well the 2-D biplot represents that vector. The angle between the two variable vectors reflects their pairwise correlation, as is evident in this two-dimensional projection. The correlation is the cosine of the angle. Hence, a 90° angle indicates zero correlation, and a 0° or 180° angle indicates a correlation of 1.0 or −1.0, respectively.

[9] Naik and Khattree (1996) conduct a similar analysis on national track records using Olympic track record data. Bei and Cheng (2013) employ the idea to construct a brand power index.
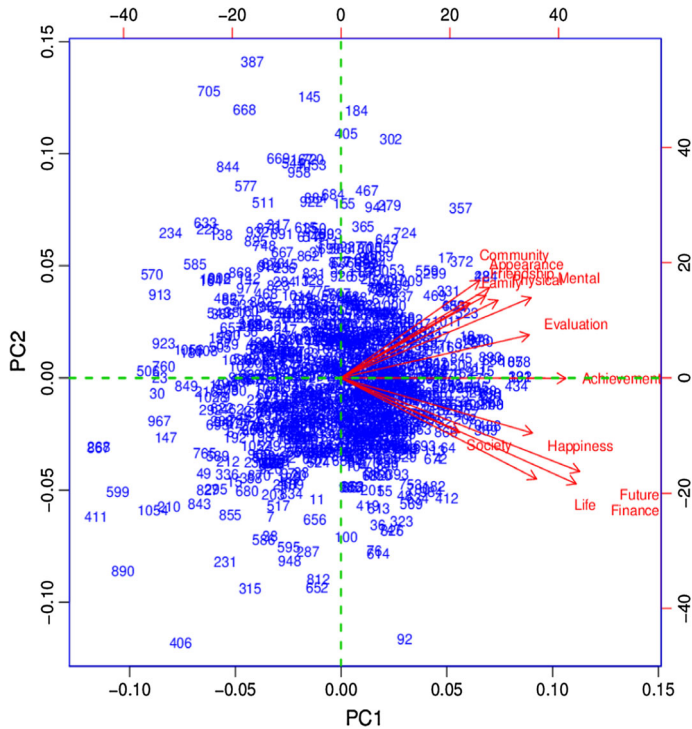
Fig. 3 The biplot of SWB measurements

Table 5 Loadings of the first two principal components

	PC1	PC2
Life	0.299	−0.356
Physical	0.240	0.274
Mental	0.291	0.283
Appearance	0.227	0.318
Achievement	0.344	−0.002
Evaluation	0.288	0.151
Friendship	0.222	0.290
Family	0.197	0.264
Community	0.213	0.344
Finance	0.360	−0.373
Future	0.365	−0.329
Happiness	0.293	−0.194
Society	0.182	−0.192

center reflects assorted features in various aspects of SWBs, indicating an "even" or "fair" society in SWB from the view of the Taiwanese—no matter what health and wealth conditions they have. The data-points located in the first quadrant imply respondents with relatively high values for all SWB measurements, while those at the third quadrant denote

respondents with relatively low values for those measurements. The second quadrant circumscribes those respondents having higher scores in healthy states, friendships, and family, but relatively lower scores in finance and happiness. In general, the fourth quadrant has opposite SWB scores to the second one.

The diversity of individual well-being indicates that people react differently to the same circumstances, and they evaluate conditions based on their own expectations, values, and previous experiences. We may conclude that a wide and fair spectrum of SWB appears in Taiwan, which results in a random and even spread without any particular patter in Fig. 3. People reconcile their own lives with their well-being.

3.2 The Structure of SWB

SWB encompasses a broad group of phenomena including people's emotional responses, domain satisfactions, and global judgments of life satisfaction. Our SWB measurements are relatively varied, but they all tend to tap the hedonic component of the well-being concept. In this section we explore the content and structure of the cognitive component concerning SWB. As subjective survey data measuring well-being are based on individuals' judgments, a possible multitude of systematic and non-systematic biases may exist [see the related discussions in Frey and Stutzer (2005), Di Tella and MacCulloch (2006), Krueger and Schkade (2008) and Blanchflower (2009)]. To alleviate the potential biases as well as to reflect this multifaceted fact, we apply FA to verify the structure of SWB.[10] On the other hand, Diener et al. (1999) point out that separable components for well-being exhibit unique patterns of relations with different variables rather than a monolithic entity. As with the discussions in a later section, some variables are relevant to well-being, but the subjective element is always essential.

We next apply McDonald's (1999) approach to conduct a hierarchical FA[11] and Fig. 4 presents the structure diagram of FA for well-being measurements using the psych package in R.[12] The structure diagram suggests that the 13 SWB measurements can be classififed into three factors: the first one represents the prosperity-related factor, the second is social-related, and the third is health-related. The diagram conceptualizes the structural equation model, where "g" denotes the general factor of individual well-being encompassing all 13 subjective cognitions, and the values in the diagram indicate the factor loadings. These three factors are quite in accordance with the original framework of the questionnaire design, which intends to capture SWB in terms of the research areas of economics, sociology, and psychology in the literature.[13]

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[10] The details for carrying out FA can be seen in Reise et al. (2010).

[11] McDonald proposes the coefficient omega as an estimate of the general factor saturation of a test. One way to find omega is to conduct a factor analysis of the original data set, rotate the factors obliquely, do a Schmid Leiman transformation, and then find omega.

[12] See http://www.r-project.org/.

[13] Zinbarg et al. (2006) argue that many scales are assumed by their developers and users to be primarily a measure of one latent variable. When it is also assumed that the scale conforms to the effect indicator model of measurement, it is important to support such an interpretation with evidence regarding the internal structure of that scale. In particular, it is important to examine two related properties pertaining to the internal structure of such a scale. The first property relates to whether all the indicators forming the scale measure a common latent variable. The second internal structural property pertains to the proportion of variance in the scale scores (derived from summing or averaging the indicators) accounted for by this latent variable that is common to all the indicators (McDonald 1999). In other words, if an effect indicator scale is primarily a measure of one latent variable common to all the indicators forming the scale, then that latent variable should account for the majority of the variance in the scale scores.
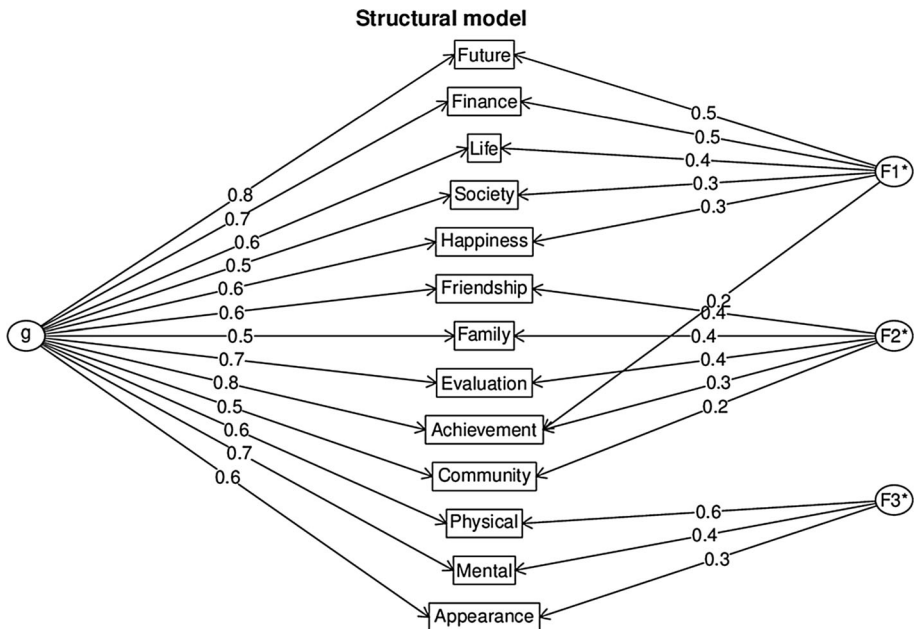
Structural model

Fig. 4 Structural model of relations between general and specific factors for SWB measurements

The prosperity-related SWB factor mostly results from *Life*, *Achievement*, *Finance*, *Future*, *Happiness*, and *Society*, of which the first four measurements are more or less linked to the respondents' financial status. In a later discussion, we find that people with higher income tend to have higher scores in all these measurements. Both life satisfaction and happiness are most often used to measure well-being. Although one of the purposes to measure happiness is to provide an alternative to economic indicators, such as GDP, material prosperity is much more related to life evaluation than it is to emotional well-being. Simple cross-country correlations of GDP per capita and measures of SWB show a significant positive correlation, but countries with faster-growing GDP per capita do not show corresponding increases in well-being (Myers and Diener 1995; Oswald 1997). Although *Society* has the shortest length in Fig. 4, denoting the smallest variance, it almost is superimposed on *Finance* and is very close to *Life* and *Future*.

Earlier studies and surveys in the literature on the effects of income upon SWB provide an ambiguous picture (see Helliwell 2003). From samples of data including individuals within the same country, those with higher relative incomes generally show significantly higher measures of SWB, although the magnitude of the effect is often described as small (Diener et al. 1999). In some countries there is evidence of an increasing prevalence of materialistic goals among the young, which is thought to lead to larger or more significant higher well-being effects from higher incomes (Helliwell 2003). However, other studies find that individuals attaching high subjective values to financial success have lower values of SWB, even when their financial aspirations, referring to wealth and material success, are met (e.g. Kasser and Ryan 1993). We shall return to discuss the related issues in a later section.

The social-related factor for SWB includes *Achievement*, *Evaluation*, *Friendship*, *Family*, and *Community*, where the first two measurements relate to self-esteem and the

last three variables obviously reflect the respondents' personal relationship with others. A substantial body of research supports the hypothesis that being embedded within social networks positively impacts one's well-being (e.g. Silverstein and Parker 2002; Baker et al. 2005). Helliwell and Wang (2010) conclude that there are sufficiently strong linkages between trust and well-being. Although *Achievement* appears in a different way in Fig. 3, it is the only variable embodied in both prosperity- and social-related factors, reflecting that *Achievement* is possessed of both prosperity and social elements in its meaning. Life satisfaction reflects the affect dimension of self-system, whereas self-concept represents cognitive appraisals of the self's competencies and weaknesses (see Chen et al. 2006). Self-esteem refers to a positive or negative orientation toward the self and reflects a sense of self-regard (*Achievement*) and self-worth (*Evaluation*). It is usually linked to an expectation of success in life. Diener and Diener (1995) find that the correlation between self-esteem and life satisfaction is significant with the degree of individualism in a nation.

This social-related factor may be used to represent that Taiwanese obviously belong to a collectivist culture (e.g. Lu et al. 2006), where the distinction between self and others is blurred. Based on previous research of self-esteem and life satisfaction in collectivistic cultures, Chen et al. (2006) hypothesize that self-esteem is still a significant predictor of life satisfaction in the Chinese context. Diener and Diener (1995) argue that family and friendship satisfaction have a stronger correlation with life satisfaction in collectivist cultures. In collectivist cultures a person's life satisfaction may be derived much more from his or her in-group (family, friends, and co-workers) than from self-esteem. Frequent interactions with friends and neighbors are associated with systematically higher assessments of SWB. Helliwell and Putnam (2004) show that the SWB has effects on frequent contacts with family, friends, and neighbors.

Diener and Diener (1995) nonetheless show that the link between self-esteem and life satisfaction is relatively weaker in collectivistic cultures, where one's groups are more emphasized than the self. The positive correlation between self-esteem and life satisfaction has not only been validated in individualistic cultures where serving oneself is given priority over serving one's group (Diener and Diener 1995; Lucas et al. 1996), but has also been shown to be important in collectivistic cultures like Hong Kong as well (Kwan et al. 1997). In collectivistic cultures, as argued by Heine et al. (1999), self-esteem is not as important as in Western cultures, for the need to feel good about oneself is subjected to the goal of maintaining one's interdependencies, and relevant social relationships are more crucial to how one assesses one's life. Kwan et al. (1997) confirm the additive effect of harmonious interpersonal relationships to self-esteem in explaining life satisfaction. Consistent with these findings, Suh (2000) specifies the role of the self in linking culture and SWB. Members of individualistic cultures attend more to their internal psychological attributes in making this judgement, whereas those of collectivistic cultures attend more to external social cues when evaluating SWB (see Chen et al. 2006). Our second factor integrates with the affiliated findings in the related studies.

The third health-related SWB factor contains three variables: *Physical*, *Mental*, and *Appearance*. Subramanian et al. (2005) conclude that poor health and unhappiness are highly positively correlated within individuals. Diener et al. (1995) show that physical attractiveness is related to SWB and argue that part of this relation might be due to happier people doing more things to enhance their beauty. The development of positive psychology has stimulated a growing interest in the literature of what constitutes people's happiness and well-being. According to Diener (1984) and his colleagues (Diener and Diener 1995; Diener et al. 2003), high SWB reflects positive thoughts and feelings about one's life.

Psychosocial prosperity is much more related to well-being and positive thoughts than it is to life evaluation. Some findings present that extraversion is one of the strongest and most consistent predictors of life satisfaction at the global level (Schimmack et al. 2004). Ryan and Deci (2003) discuss physical health and its relations to well-being, pointing out that enhancing physical and psychological health leads to improving the quality of life. The satisfactions of personal physical health and mental health are together a reasonable combination of SWB. Better physical and mental health usually leads to people feeling more confident about their appearance.

All these three factors represent the study of well-being in the literature of psychology, economics, and sociology as aforementioned. With a collectivist society in Taiwan, many social capital aspects are both a means for enhancing the self and a means for supporting the family and the view on society, which later discussions will show. Personal accomplishment and prospect for the future are also highly related to other SWBs. We have now reached the conclusion that the components of well-being factors are fully mixed with different kinds of features during Taiwan's great transition of economic development in the last three decades. Both the fairness spectrum and complexity of the structure of an individual's well-being scores represent the great diversity in Taiwan's society.

4 Determinants of SWBs

Since the SWB measurements vary and we have testified as to the ingredients of SWB in the previous section, they also tend to tap the hedonic component of the SWB concept, which could be more susceptible to changes in life circumstances. This subsection looks to identify the evidence on the determinants of individual well-being.

The estimated pair-wise correlations at the right-upper triangle in Table 4 suggest that equivalent equations for those 13 well-being measurements may emerge. Therefore, instead of using the OLS regression model for each well-being measurement, we apply the SUREG (Greene 2003) to simultaneously identify the determinants of all well-being measurements. SUREG has several advantages over single equation methods. First, it can increase the efficiency of coefficient estimates. Second, it allows for cross-equation tests, which are invalid when correlated equations are estimated separately (Felmlee and Hargens 1988). Finally, and most importantly, after introducing a variety of parameter constraints across either some or all of our regression equations, SUREG allows us to simultaneously compute model fit statistics for all dependent variables. The values at the left-lower triangle in Table 4 are the Pearson correlation coefficients for the residuals of the simultaneous regression models for all these 13 SWB measures. These values are between 0.13 and 0.63, which are generally smaller than those at the right-upper triangle.

We may use the first principal score or three-factor scores, discussed in the previous section, as the responses in the model fitting. These two alternative measures of SWB yield fairly consistent results versus using 13 SWB measurements. To get the complete picture, we report the determinants of the original 13 SWB measurements according to the SUREG analysis as presented in Table 6.

4.1 Gender

Gender has been widely investigated in the issue of happiness, in which one can refer to Myers and Diener (1995). General speaking, most studies conclude that small gender differences in well-being appear in all age groups (e.g. Diener 1984; Diener et al. 1999),

Table 6 Determinants of the subjective well-being

	Life	Physical	Mental	Appearance	Achievement	Evaluation	Friendship	Family	Community	Finance	Future	Happiness	Society
Intercept	3.76***	6.01***	5.42***	5.97***	3.46***	3.09***	5.98***	6.67***	4.12***	1.22**	2.91***	3.79***	2.38***
Gender	0.23	−0.14	0.11	−0.32**	0.26*	0.29**	0.19	0.04	−0.13	0.25*	0.05	0.18	0.16
Age	−0.02***	−0.02***	−0.01	−0.01	0.00	0.01	0.00	0.00	0.01*	0.01	0.00	0.00	0.02**
Marital2	0.67*	0.32	0.33	0.50	0.81**	0.75***	0.05	−0.13	−0.24	0.54	0.43	0.28	0.20
Marital3	1.18***	−0.05	0.03	0.52	0.71	0.77*	0.27	−0.20	−0.84*	0.21	0.21	0.26	0.40
Education2	0.76***	0.19	0.39	0.69**	0.49*	0.93***	0.74***	0.69**	0.68**	0.98***	0.51*	0.47*	0.41
Education3	0.79***	0.60**	0.75***	0.87***	0.85***	0.96***	0.65***	0.74***	0.83***	1.28***	1.13***	0.49*	0.68***
Education4	1.09***	0.93***	0.82***	1.27***	1.01***	1.00***	0.76***	0.70**	0.71**	1.42***	1.13***	0.40	0.59**
Education5	0.95***	0.91***	0.77**	1.21***	0.99***	1.08***	0.68**	0.53*	0.29	1.32***	0.88***	0.53*	0.81***
Education6	1.22***	0.74*	0.63	0.79**	0.93**	1.35***	0.60	0.31	−0.24	1.40***	0.94***	0.36	0.74***
Income	0.01	−0.01	0.03	−0.03	0.02	0.03	−0.01	0.03	−0.04	0.11***	0.03	−0.02	−0.02
Expense2	0.44**	0.00	0.12	−0.04	0.26	0.54***	−0.08	−0.23	−0.13	0.71***	0.53***	0.12	0.28
Expense3	1.45***	0.63**	0.76***	0.36**	1.36***	1.00***	0.57***	0.40**	0.35*	1.96***	1.61***	1.10***	0.80***
Expense4	2.39***	1.00***	1.07***	0.47*	2.06***	1.55***	0.85**	0.59**	1.07***	3.33***	2.84***	1.75***	1.28***
Child	−0.25	0.26	0.32	0.03	−0.06	−0.03	−0.05	0.09	0.49	−0.19	−0.21	−0.11	−0.30
Housing2	−0.28	−0.23	−0.29	0.10	−0.01	0.11	−0.15	−0.22	−0.32	−0.09	−0.36*	−0.40**	−0.13
Housing3	−0.11	−0.21	−0.30	−0.06	0.04	0.52**	0.20	−0.36	−0.48*	−0.40*	−0.31	−0.22	−0.33*
Housing4	0.05	−0.47	−0.84**	−0.56	−1.06***	0.16	−0.55	−0.77*	−0.37	−0.37	−0.15	−0.16	0.05
Employ2	−0.94***	−0.51*	−1.09***	−1.00***	−1.14***	−1.11***	−0.75**	−0.36	−0.71**	−0.78***	−1.14***	−0.79***	−0.58**
Employ3	0.15	−0.26	−0.54**	−0.39*	−0.29	−0.12	−0.12	0.03	−0.02	−0.03	−0.21	−0.14	−0.18
Employ4	0.16	−0.54**	−0.70***	−0.66***	−0.45*	−0.71***	−0.42*	−0.26	−0.38	0.00	0.00	−0.19	0.24
Employ5	−0.23	−0.67	−0.28	−0.65	−0.83*	−1.19***	−0.77*	0.43	−0.02	−0.06	−0.76*	0.46	−0.27
Sport	0.04**	0.05***	0.03*	0.03*	0.03*	0.06***	0.02	0.05***	0.01	0.03*	0.06***	0.06***	0.01
Reading	0.02	0.00	0.02	0.02	−0.01	0.00	0.00	0.00	0.00	−0.01	0.00	−0.01	−0.02
Arts2	0.14	−0.11	−0.12	−0.06	0.16	0.29**	−0.03	−0.11	0.18	0.16	0.21	0.37**	0.11
Arts3	−0.03	0.04	−0.11	−0.13	0.22	0.50***	0.09	−0.13	0.22	0.03	0.15	0.19	0.05
Learning	−0.05	−0.16	−0.17	0.05	−0.04	0.03	0.00	0.05	−0.02	0.14	−0.11	0.05	0.24*

Table 6 continued

	Life	Physical	Mental	Appearance	Achievement	Evaluation	Friendship	Family	Community	Finance	Future	Happiness	Society
Leisure2	0.38**	0.09	0.30	0.10	0.14	0.06	0.11	0.09	0.42**	0.47***	0.42**	0.70***	0.67***
Leisure3	0.51***	0.57***	0.50***	0.34*	0.36*	0.16	0.19	0.35*	0.69***	0.49***	0.53***	0.87***	0.80***
Leisure4	0.66***	0.58**	0.70***	0.02	0.18	-0.05	0.31	-0.07	0.29	0.33	0.69***	1.41***	0.63***
Volunteer	0.20	0.36**	0.55***	0.09	0.28	0.30*	0.36**	0.20	0.63***	0.12	0.40**	0.45***	-0.10
Donation	0.03	0.02	0.03	0.07***	0.07***	0.05***	0.03	0.02	0.02	0.04	0.05**	0.03	-0.01
R^2 (%)	30.08	16.99	16.86	13.36	27.75	23.09	9.27	8.79	14.04	45.22	37.04	26.26	19.39
n	746	746	752	749	752	744	749	756	738	752	749	757	751

Significance levels: * 10 %, ** 5 %, *** 1 %

but women are happier than men. Table 6 presents that gender difference may or may not appear in different SWB measurements.

We first find that a female is more satisfied in *Achievement*, *Evaluation*, and *Finance*, but feels less satisfied in her *Appearance* than a male when other things are equal. In general, a female's average income is less than a male's,[14] but it seems that the female can easily satisfy her current status in finance and life expectation. This may reflect the traditional values for women in a Taiwanese society. *Gender* is not a significant variable for the scores of *Life*, *Physical*, *Mental*, *Friendship*, *Family*, *Community*, *Future*, *Happiness*, and *Society*.

4.2 Age

Blanchflower and Oswald (2008) and Frijters and Beatton (2011) discuss the puzzle about the relationship between age and happiness. This puzzle is mostly due to the economic literature revealing a possible *U* shape relationship with the minimum level of satisfaction occurring in middle age (35–50), while the majority of psychologists have concluded there is not much of a relationship at all. Helliwell (2006) discuss that results in many countries have *U* shaped patterns of well-being over the life cycle. However, research using a large recent cross-section of Canadian life satisfaction data suggests that perhaps one-third of the *U* shape is removed if a separate variable is added based on the respondent's current estimate of stress related to work/life balance.

Age has a significantly negative effect on both *Life* and *Physical*, but a significantly positive effect on *Community* and *Society*.[15] This reflects that older people are discontent with their life satisfaction and physical health and may tend to devote themselves more to being a part of the community. Their positive views about the happiness of society could be because older people, who grew up in an impoverished environment and worked diligently in their younger days, appreciate more what they have nowadays.

To further explore the age effect, Fig. 5 shows the relationships of the average well-being scores and age by gender, in which "M" and "F" indicate the average score of male and female, respectively, for the corresponding age category. We obtain the curve by the locally-weighted polynomial regression (Cleveland 1979) between score and age of all respondents. Instead of a *U* shape, we observe a "broken stick" on the average scores of *Appearance*, *Achievement*, *Evaluation*, *Family*, *Finance*, and *Mental* according to age in Fig. 5. The "breaking point" is at the age group 40–44, where the maximum or minimum scores may occur. Middle-aged people not only face a "turning point" in life, but also emerge with a mixture of "miserable and joyful" life situations. The cross-over between "M" and "F" among ages in Fig. 5 also explains why gender is not significant for most SWB equations.

4.3 Marital

Marital status has an influence on *Life*, *Achievement*, *Evaluation*, and *Community*, but the impacts of *Marital* dummies are different on the four equations. The reference group is single people, where *Marital2* denotes married respondents, and *Marital3* denotes those

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[14] The value of the *t* statistic is as high as 7.835 for testing the mean difference of incomes between males and females.

[15] Several authors include squared age by $Age^2/1{,}000$ in the literature, but this term is not significant at all in our empirical studies. Hence, the results of fitting with this term are not reported here.
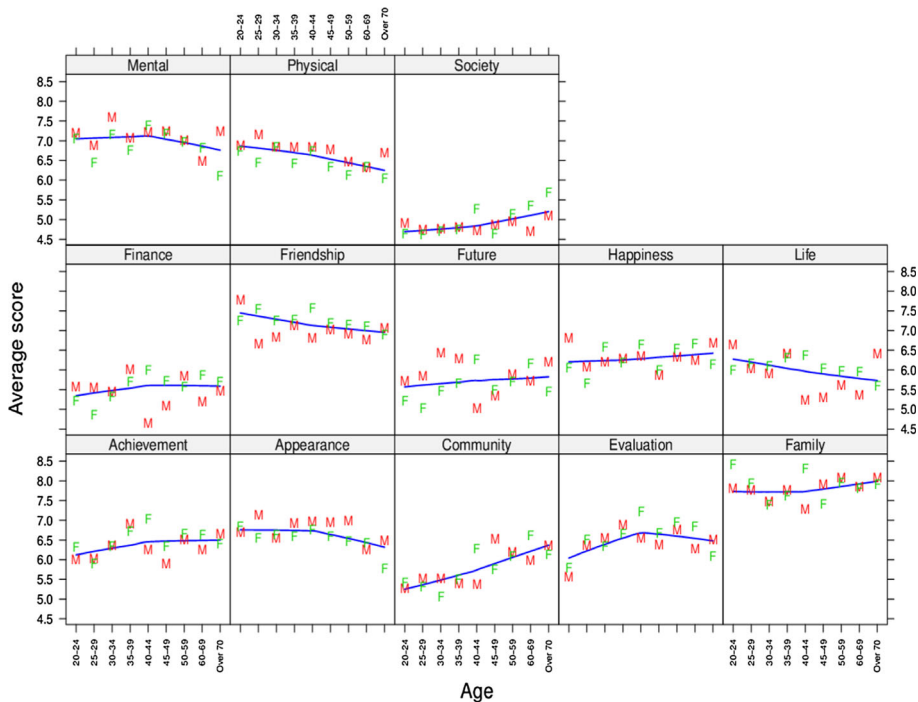
Fig. 5 Average SWB scores and ages by gender

widowed, divorced, or separated. *Marital3* is negatively significant on *Community*, which means that people with unfortunate marriages tend to be more isolated from perceiving themselves as part of the community than others, but they are more satisfied with *Life* and *Achievement* than those who are single.

While *Marital2* generates a positive effect on *Life*, *Achievement*, and *Evaluation*, our data indicate that married people are more satisfied with their life and both achievement and self-evaluations in their own life than those who are single. This coincides with the conclusion that being married increases both life satisfaction and happiness, especially where the alternative in the literature is being separated or divorced (Diener et al. 1999; Helliwell 2003; Helliwell and Putnam 2004; Myers and Diener 1995). Helliwell and Putnam (2004) show that married people have an advantage on indices of anxiety and unhappiness over those who are single, divorced, or separated. Divorce rates are shown to negatively affect happiness (e.g. Helliwell 2006).

4.4 Education

Putnam (2001) points out that education is the strongest systematic determinant of individual participation in a variety of social activities, and social connections are linked to increased health and well-being. For instance, it is possible that social capital or education in a community creates positive externalities for its members, if well-being rises through networking with people who have higher levels of community involvement or education. Helliwell (2003) shows that one's own education has a strong positive effect on well-being, and the strong positive effect from the national average variable indicates the existence of

positive spillovers to others. We derive a similar conclusion from our empirical study on higher-educated people in Taiwan.

Education is usually the most important predictor of political and social engagement and is generally important for enhancing people's well-being. Almost all *Education* dummies are positive and significant in Table 6. The only exception is that for *Community*, where people with higher education degrees tend to not recognize themselves as part of a community. The reference group is those respondents with an education of elementary school or below. *Education2* to *Education6* denotes those who have junior high, senior high, junior college, university, and graduate degrees, respectively. Roughly speaking and not applicable to all, we find that the higher education a respondent has, the higher the scores are for the well-being measurements. Education is a very important social capital in a Chinese society. In our study, it is obvious to see that increases in average education levels improve every kind of well-being, nut this enhancement seems not to apply to *Happiness*. In comparison with other equations, the significances and magnitudes of all *Education* dummies are relatively weaker and smaller for the equation *Happiness*.

4.5 Income and Expense

The adequacy or paucity of life expenditure is a greater decisive factor in well-being than real income. There is a good deal of empirical support for the notion that SWB depends on relative income (Oswald 1997; Tsou and Liu 2001; Stutzer 2004; Asadullah and Chaudhury 2012). Kingdon and Knight (2007) show that comparator income, when measured as the average income of others in the local residential cluster, enters the household's utility function positively (close neighbors are 'positives', not 'negatives'), but that the income of more distant others enters negatively. Ferrer-i-Carbonell (2005) presents an empirical test of four hypotheses about the importance of income and "comparison income" for individual well-being.[16]

Two variables relate to income in the model fitting. *Income* denotes a respondent's monthly income, and *Expense* is an ordinal scale measure, which asks respondents whether their financial status is adequate to daily life expenditure. *Expense2*, *Expense3*, and *Expense4* indicate that the replies of a respondent to the latter are "slight shortage", "adequate", and "plenty", respectively. The reference group is those people who are very short of money for their daily life. Therefore, *Expense* can be a surrogate of disposable income or an indicator of financial strain. The estimated Pearson and Spearman correlation coefficients between *Income and Expense* are 0.34 and 0.32, respectively. We include either one of *Income* and *Expense* in the model fitting, which leads to a positively significant variable for all SWB equations in SUREG. When both are included together as shown in Table 6, almost all *Expense* dummies remain positively significant, and the estimated coefficient values become larger as the plenteous degree of life expenditure is higher. This means the more the disposable income the respondents have, the higher the score that SWB measurement yields. Financial stress can be said to be the most influential factor to determine people's well-being in terms of all the values of the estimated coefficients in Table 6.

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[16] The four specifications are based on the following hypotheses: (1) only an individual's own family income is important, (2) individual well-being depends on the income of the reference group, or (3) on the difference between an individual's own income and the average income of the reference group, and (4) income comparisons are "upwards".
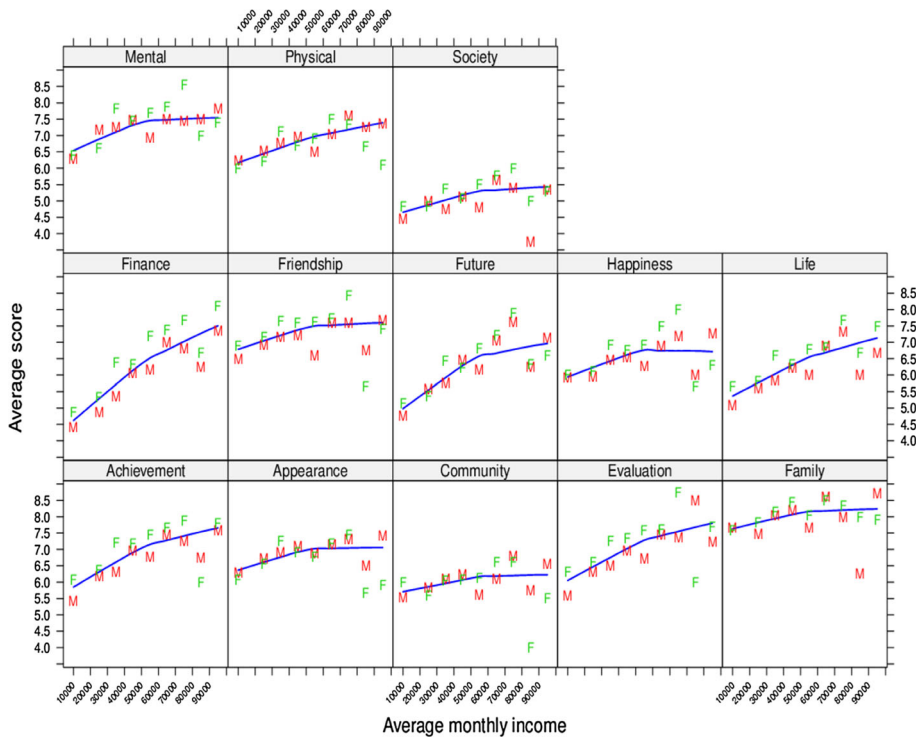
Fig. 6 Average SWB scores and average monthly income by gender

Although Fig. 6 shows a positively upward relationship between the average well-being scores and average monthly income by gender, *Income* is only significant for the equation of *Finance* in Table 6, where all *Expense* dummies are included in model fitting. A similar pattern is shown in Frey and Stutzer (2002) on income and life satisfaction. On the other hand, Fig. 6 obtains a different type of "broken stick" from that of *Age* in Fig. 5 and the breaking point is around monthly income between NT$50,000 and NT$60,000. The maximum score of the curve is partly due to the limit of *Income* categories. This common phenomenon happens to all SWB measurements. In general, a female is more satisfied with all SWB measurements than a male when controlling monthly income. Figure 6 confirms the previous conclusion that a female is more satisfied with several SWBs than a male given the same income levels.

Supporting the many earlier findings that the SWB effects of income relate mainly to relative income, the community or national level of income has an insignificant negative effect when added to the life satisfaction and happiness equations (Helliwell and Putnam 2004). Kahneman et al. (2006) point out that high income being associated with a good mood is widespread, but mostly illusory. People with above-average income are relatively satisfied with their lives, but they are barely happier than others in moment-to-moment experiences, tend to be more tense, and do not spend more time on particularly enjoyable activities. Our data show that *Income* has an insignificant and negative effect on several SWB equations in Table 6. Financial stress seems to be more decisive than income in determining one's well-being in Taiwan.

4.6 Housing

The literature has not widely considered housing as a measure for well-being. Rossi and Weber (1996) conclude that homeownership is beneficial to both owners and society, and homeowners tend to have higher life satisfaction and self-esteem and are more likely to be members of community improvement groups. Rohe et al. (2002) conclude that home ownership may affect the opportunity structure by enhancing neighborhood stability and civic involvement in local volunteer and political affairs. Home ownership may also impact perceptions of opportunity by increasing financial resources, enhancing psychological and physical health, and having positive impacts on one's self-esteem. Cattaneo et al. (2009) investigate the impact of replacing dirt floors with cement floors on child health and adult happiness in Mexico.

Not all the *Housing* dummies are significant, of which the reference group is respondents who possess their own residence, while *Housing2* denotes those that rent a residence, whereas *Housing3* denotes that the habitation belongs to the respondent's parents, and *Housing4* denotes a dwelling place from other sources. *Housing2* is negatively significant for *Future* and *Happiness*. *Housing3* is negatively significant for *Community*, *Finance*, and *Society*, but has a positive effect on *Evaluation*. *Housing4* is negatively significant for *Mental*, *Achievement*, and *Family*. In general, people possessing their own residence have a higher score in well-being measurements. One of the most important reasons for this result is that an owner-occupied dwelling unit is central to Chinese people's conception of a secure and successful life. Higher homeownership may have neighborhood benefits and make people become more involved in the community and society. However, people bear the financial pressure due to a mortgage, once they purchase a property with a bank loan. This may explain why *Housing2* is not a decisive variable for most well-being measurements between people owning or renting a residence.

Housing is an important issue in traditional Chinese society since there are several meanings to owing a property. It means "setting up a family" for a traditional Chinese society, reflecting one's financial and economic status, being able to maintain family responsibility, and improving a stable security for the whole family as well as society. Helping young people purchase a residence is one of the important welfare policies of the government since most young people (young couples) currently cannot afford to buy a property, especially in Taiwan's major cities.

4.7 Employ

The findings by Winkelmann and Winkelmann (1998), Di Tella et al. (2003), and Dolan et al. (2008) show that individuals report large well-being reductions from being unemployed. High national unemployment rates have been shown to negatively affect happiness (e.g. Di Tella et al. 2001). The dummies *Employ2*, *Employ3*, *Employ4*, and *Employ5* denote the current position of being unemployed, a housewife, a retiree, or a student for a respondent, respectively, and the reference group is a respondent having any kind of work. Table 6 also shows that unemployment (*Employ2*) is strongly negatively associated with all SWB measurements except that for *Family*. It is particularly interesting to see that being unemployed does not have a significant influence on the relationship with *Family*, partly because the family usually provides all kinds of support to jobless family members without reservation in Chinese society.

Although Argyle (1999) discusses that there is no clear or consistent difference between housewives' happiness and that of women at work, being a housewife (*Employ3*) is less

satisfying for both *Mental* and *Appearance* and is insignificant in other SWBs. Mitchelson and Burns (1998) discuss the relationship between perfectionism and career mothers' dual roles of being a worker and a mother as well as perfectionism's association with SWB.

Retired people (*Employ4*) have a negative self-assessment concerning their *Mental*, *Appearance*, *Achievement*, *Evaluation*, and *Friendship*. As Taiwan's society becomes older, this result may push policy makers towards paying more attention to retirees. For example, Nimord (2011) examines the impact of leisure activities on the well-being of the very old and suggests that innovative, brand-new activities serving as a resource for resilience may contribute to an enhanced sense of well-being. Students (*Employ5*) should be the hope of a society, but they appear to be unsatisfied with *Friendship*, *Achievement*, *Evaluation*, and *Future*. Students care (worry) about their relationship with friends, but the latter three results are a warning to the policy makers to provide more useful and meaningful things for youths.

4.8 Sport

The literature of psychology includes studies about physical exercise's impact on mood. Sport provides social satisfaction from belonging to clubs and teams and from the close personal interaction involved in most active games. For example, Hills and Argyle (1998) conclude that sport/exercise leads to increased happiness, using the Oxford Happiness Inventory as a measure of happiness. In Table 6, except for *Friendship*, *Community*, and *Society*, the more time a respondent spends on a sporting activity weekly, the higher the scores are for the other SWB measurements.

4.9 Arts

Arts is a positively significant variable to enhance both *Evaluation* and *Happiness*, indicating that a respondent participating in more arts-related activities has higher scores of happiness and self-evaluation in life.[17] Little research has been conducted on the well-being benefits of attending arts-related activities. Hills and Argyle (1998) find that some social aspects of these activities, including music, generate well-being. Michalos and Kahlke (2008) investigate the impact of arts-related activities on the perceived or experienced quality of life. Packer and Ballantyne (2011) draw on theoretical constructs from the field of positive psychology to take optimal advantage of the potential of music festivals to impact positively on young adults' psychological and social well-being.

4.10 Learning

The literature lacks a clear discussion and evidence about the relationship between SWB and participation in learning and training courses. Nevertheless, psychologists discuss that self-improvement, including education and training, can increase SWB. Ryff and Keyes (1995) specify that personal growth—a sense of continued growth and development as a person—is one of the six distinct aspects of human actualization to form the psychological well-being. Bauer and McAdams (2004) assert that people who strive toward specific kinds of personal growth are likely to have developed specific kinds of personality development, which at least concerns the broad developmental trajectories of social-cognitive maturity

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[17] Although *Arts* does not have significant impact on most SWBs, the attendance arts-related activities itself may be explained by other variables, such *Education* and *Income* (Wen and Cheng 2013).

and social-emotional well-being. This may partly be in accordance with *Learning* being only significant for the equation of *Society* in Table 6.

4.11 Leisure

Hills and Argyle (1998) point out that in addition to producing temporary states of joy, leisure is a major source of happiness. Apart from the influence of sports and social activities in other well-being studies, Lu and Hu (2005) examine how one's personality correlates with other leisure activities. We focus herein on the time of leisure activity, rather than its contents. *Leisure2*, *Leisure3*, and *Leisure4* indicate that the replies of respondents for their leisure time are "slight shortage", "adequate", and "plenty", respectively. The reference group is those people who have only very short period of time for their leisure activity.

Aaker et al. (2011) examine the link between happiness and the ways in which individuals choose to spend their time and the experiences they accumulate over the course of such temporal expenditures, which quite literally constitute each person's life. *Leisure* appears to be one of the important determinants of most SWB measurements in Table 6, except for the equations of *Evaluation* and *Friendship*. In general, having more time to undertake leisure activities uplift the scores of individual well-being, especially for those of *Life*, *Happiness*, and *Society*, giving all others being equal. Nevertheless, the magnitude and significance of all *Leisure* dummies are not consistent in all equations. For example, only *Leisure3* is significant for *Appearance*, *Achievement*, and *Family*.

4.12 Volunteer

The coefficient on *Volunteer* is a positive and significant variable for the equations of *Physical*, *Mental*, *Evaluation*, *Friendship*, *Community*, *Future*, and *Happiness*. People who conduct volunteer work possess higher average satisfaction scores in these seven indicators than those who are not involved in such work. Phillips (1967) examines the relationship between voluntary social participation and self-reported happiness. Research on the consequences of volunteering for individuals has identified several such benefits, including better physical health, better mental health, and enhanced SWB (see Baker et al. 2005). Windsor et al. (2008) obtain non-linear associations between hours spent volunteering and psychological well-being. Helliwell (2003) shows that those who are more connected, whether through participation in churches or other volunteer organizations, are more satisfied with their lives.

4.13 Donation

The literature recently has paid a great deal of attention to donation in measuring well-being. Dunn et al. (2008) conclude that spending money on other people may have a more positive impact on happiness than spending money on oneself. Garnett (2008) discusses the relationship between philanthropy and happiness. Whatever motivates and animates individual philanthropists, the purpose of philanthropy itself is to promote the welfare, happiness, and culture of mankind. Dunn et al. (2011) show that people who donate their money to charities or splurge on gifts for others are more content than those who squander all their savings on themselves.

Helping people is certainly a kind of traditional value—as the proverb says, philanthropy is the basis for happiness. This survey asks respondents how much money they have donated to charities or non-governmental organizations over the past 12 months. We find that *Donation* has a positively significant impact on *Appearance*, *Achievement*, *Evaluation*, and *Future*. It seems that people devoting more money to pro-social spending feel more confident about their accomplishment and self-appraisal in their current life as well as their future life and even their image. Those who donate more show higher self-esteem.

Both *Donation* and *Volunteer* indicate philanthropy—one assists people by giving money, and the other does so by giving time and action. Both actions can be a part of social capital, defined as networks, norms, and understandings that facilitate cooperative activities. Putnam (2001) shows a positive relationship between social capital and self-assessments of individual welfare and further argues that people who give blood, give money, and have volunteered their time are people who are more social-connected. *Donation* and *Volunteer* have positive effects on all SWBs, except that both yield an insignificant and negative effect on the equation of *Society*. The latter result may reflect that those people who are involved more in helping others show their sympathies about society and hence see unhappiness in society.

Both *Child* (whether the respondent has a child or children) and *Reading* (average reading hours/week) are not significant for all regression equations when other factors are given.

5 Conclusions

Data on well-being provide fairly good claims as measures of individual welfare. This paper has illustrated and explained the similarities and differences in measuring SWB. The investigation employs multivariate data analysis approaches, which provide a way for exploring the simultaneous indicators of self-evaluations due to the complex construct of well-being. Family life is traditionally highly valued in Taiwanese society, resulting in the highest score of self-assessment for this aspect. PCA reveals a fair spectrum about SWB in Taiwan, in which people regard themselves evenly in spite of their wealth and health. FA explores the components of SWB with regard to health-related, prosperity-related, and social-related factors. These three factors represent the study of well-being in the literature of psychology, economics, and sociology. With a collectivist society in Taiwan, many social capital aspects are not only a means for enhancing the self, but also a means for supporting the family and the view on society. Personal accomplishment and prospects for the future are also highly related versus other SWBs. We reach the conclusion that the components of factors are fully mixed with different kinds of features.

Our study's evidence confirms that social capital is strongly linked to SWB through several different forms by examining the determinants of well-being for Taiwanese through the use of SUREG. Volunteering, donating more money to charities, having more leisure time, spending more hours on sports, and being more involved in arts-related activities all appear to be related to happiness and life satisfaction and other well-being measurements. The SWB measurements are mostly increasing in higher education, income, and disposable income, while falling with unemployment and when not possessing one's own residence. Nevertheless, the latter two indicators do not influence the satisfaction of family life due to their highly-valued perception. Low financial strain and higher education are the most influential on SWB. Gender and age do matter, but appear to have various impacts on Taiwanese SWBs.

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