Personal Well-being in Urban China

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Abstract This article reports the findings of a survey administering the personal well-being index (PWI) in six Chinese cities ($N = 3,390$) to ascertain the personal well-being of China's urban population. The specific aims of the study were: (a) ascertain whether Chinese urban residents are satisfied with their lives; (b) validate the PWI using an urban sample that is representative of the urban population and larger in size than that which has been utilized in existing studies for Mainland China; (c) compare the results to existing studies for Hong Kong, Macau, rural China and single city studies which have administered the PWI in Guangdong and Shandong; (d) examine whether the responses to the PWI from participants falls within the narrow range predicted by the 'Theory of Subjective Wellbeing Homeostasis' and provide further evidence on whether this framework is applicable to Chinese samples; and (e) examine which participant characteristics predict personal well-being, examine whether own income and/or relative income predicts personal well-being and compare these results with previous studies for China and other countries. The data indicated a moderate level of personal well-being (PWI score = 67.1). The PWI demonstrated good psychometric properties in terms of its reliability and validity, consistent with previous published studies. The PWI was within the normative range for non-western countries and was within the narrow band predicted by the 'Theory of Subjective Wellbeing Homeostasis'. Similar variables were found to predict personal well-being to those found in previous studies for China and elsewhere.

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1 Introduction

There is a large literature on personal well-being and its determinants by both economists (see Frey and Stutzer 2002, 2005; Dolan et al. 2008 for reviews) and psychologists (see Diener et al. 1999; Kahneman et al. 1999 for reviews). One of the striking features of this literature is that economic growth in rich countries has not resulted in higher personal well-being. Using United States data, Easterlin (1974) showed that personal well-being in a particular year was positively correlated with an individual's income. However, over time, personal well-being did not increase, in spite of a sharp increase in real income. More recently, Easterlin (1995) and Blanchflower and Oswald (2004) reached similar conclusions for the United States in the period since the publication of Easterlin (1974). Similar conclusions have been reached for the relationship between personal well-being and income for a number of other countries (see e.g., Inglehart and Klingemann 2000; Veenhoven 1993).

Easterlin (1974) argued that the impact of income on a person's personal well-being depends on changing standards based on an individual's expectations and social comparisons. If a person's income increases simultaneously with his or her reference group's income, then there is little impact on a person's personal well-being. The literature on the relationship between personal well-being and relative income in economics is now quite large (see Clark et al. 2008 for a review). Another possible explanation for the apparent paradox of stable personal well-being with rising income is 'The Theory of Subjective Wellbeing Homeostasis' (Cummins 1998; Cummins and Nistico 2002; Cummins et al. 2002). This theory proposes that, under normal circumstances, personal well-being is actively controlled and maintained within a limited positive range by a set of psychological devices and personality traits. As such, under normal circumstances, higher income will not generate higher personal well-being since personal well-being is maintained under homeostatic control. However, as Cummins (2000) noted, for those who are experiencing potentially stressful circumstances within their lives, income can be used to purchase the resources needed to overcome these circumstances and hence reduce the probability of homeostatic failure.

Urban China is an interesting context in which to study personal well-being, since it has experienced rapid and sustained economic growth for three decades. The Asian financial crisis of the late 1990s had little adverse effect on Chinese economic growth and since that point annual growth in Gross Domestic Product has averaged about 10%, reaching almost 12% in 2007 (Prasad 2009). Estimates by the consulting group, Consensus Economics, published in 2005, suggested that by 2015 China will overtake the United States as the world's largest economy (Eslake 2006). Market reforms have resulted in a substantial improvement in the living standards of the average urban Chinese. Since economic reforms commenced in 1978, it is estimated that more than 400 million Chinese have been lifted out of poverty (Chen and Ravallion 2007). The consumption structure of urban Chinese has undergone substantial change. The relative share of income spent on basic necessities has fallen (Shu and Zhu 2009) with large shopping centres selling a full range of western brand names springing up in most large cities (Davis 2005). Life expectancy in China has increased from 35 years in 1949 to 67.9 years in 1981 to 72.4 years in 2005, which was higher than the world average of 67 years (UNDP 2008). China's human development

index has increased from 0.530 in 1975 to 0.781 in 2006, representing a 47.3% increase (UNDP 2008).

However, at the same time, economic growth has come at a cost. Urban China has experienced substantial environmental degradation. China has 16 of the world's 20 most polluted cities (World Bank 2007). In 2005, just 31% of Chinese cities met national air quality standards and more than 75% of water in rivers in China's urban areas cannot be used for drinking or fishing (Economy 2007). The World Bank (2007) estimates that only 1% of China's urban population of 560 million breathe air considered safe in the European Union. In a preliminary version of the World Bank's (2007) most recent study on pollution in China, it estimated that the annual number of premature pollution-related deaths in China are as high as 750,000. While this figure was censored from the final version of the report, it was openly discussed at the conference launching the World Bank study and has been reported in the media (see e.g., Kahn and Yardley 2007; Toy 2007).

China's economic growth has also been accompanied by a spiraling crime rate. Between 1992 and 2004 crime rates in China almost doubled (Hu 2006). One influential chain of thought links the increase in China's crime rate to the one-child policy, which has led to a sharp increase in the number of males aged 16–25. Over the same period, sex ratios (males to females) in the crime-prone ages of 16–25 years increased sharply from 1.053 to 1.093. Using provincial level data for the period 1988–2004, Edlund et al. (2007) found that a 0.01 increase in the sex ratio raised property and violent crime rates 5–6%, suggesting that an increase in the number of young males may account for as much as one-third of the overall rise in crime. Public opinion surveys in China since the beginning of the 1990s have consistently shown that Chinese urban citizens are concerned about increasing crime rates and anti-social behaviour amongst adolescents (see Nielsen and Smyth 2008).

The benefits of economic growth have not been evenly distributed. Income inequality rose sharply during the initial reform period (Knight and Song 2003). The Gini measure of income inequality increased from 0.31 at the beginning of the economic reforms to 0.45 in 2004, which is a similar level to the United States (Dollar 2007). Using province-year grouped data, Chotikapanich et al. (2007) studied the extent of income inequality in rural and urban China over the period 1978–2002. Their results showed that income inequality in rural China was slightly higher than urban China, but income inequality in urban China has increased so rapidly in recent years that it may soon surpass that in rural China. The expected relationship between income inequality and personal well-being is unclear. Hirschman (1973) suggested that high levels of income inequality might be positively correlated with personal well-being, even for the poor, if people interpret other's faster progression as a sign that their turn will come soon. However, Thurow (1971) suggested people who perceive higher inequality might report lower personal well-being if they have quasi-aesthetic preferences for more equal distributions of wealth. Smyth and Qian (2008) examined the effect of reference group income on reported personal well-being in urban China and found that having wealthier city-mates lowered reported well-being, controlling for own income.

In addition to rising income inequality, poverty has also become an urban issue. Mass retrenchments in state-owned enterprises since the late 1990s have increased unemployment, creating an urban under-class. As a result of state-owned enterprise restructuring, it is estimated that 26 million state-owned employees were made redundant between 1998 and 2002 (Armitage 2003). Several studies have found an increase in the incidence of urban poverty in China since the late 1990s (Fang et al. 2002; Meng et al. 2007). The problem has been that those who have been retrenched from the state-owned sector are invariably precisely those who find it the most difficult to find another job. Appleton et al.

(2002) found that, using survey data from 2000, as many as 11% of urban workers had been retrenched and 53% of these remained unemployed at the time of the survey. These authors found that the risk of retrenchment was higher for women, the less educated, the low skilled and the middle-aged. The fact that re-employment rates were low implies that unemployment will be long-term. The duration of unemployment was longer for the unhealthy, the less educated and women with young children.

Similarly, as part of state-owned enterprise restructuring, much welfare that was provided by the state has been withdrawn and, in lieu the government, enterprise and individual are each expected to make contributions to a social security fund to cover industrial injury, maternity, medical, pension and unemployment insurance. However, firm compliance rates are low. Even in a city such as Shanghai which has resources at its disposal that are the envy of many other cities, studies suggest that 70–80% of firms do not comply with minimum prescribed social insurance contributions (Nyland et al. 2006; Maitra et al. 2007). This trend has resulted in urban employees feeling insecure about future housing, medical and pension entitlements (Appleton and Song 2008). The insecurity generated by the withdrawal of the State from provision of 'cradle to grave socialism' and guaranteed lifetime employment in the state-owned sector, coupled with faster pace of urban life since market reforms has contributed to place increased stress on China's urban residents. Thus, while life expectancy and the human development index have increased, so has the suicide rate. China has between 250,000 and 300,000 suicides per annum, accounting for a quarter of the global total. Suicide is the main cause of death in the 15–34 age group (Trouillaud 2008).

Most studies of personal well-being and its determinants are for developed countries. There are relatively few studies for developing or post-socialist transition countries. The study of personal well-being in China is still fairly embryonic with few studies that use datasets that are representative of the general public and have broad geographical scope (Shek et al. 2005a, b). Chen and Davey (2008) noted that over the last decade a burgeoning literature on personal well-being in China has emerged in Chinese language journals. Most of these studies, however, are restricted to particular segments of the population—students, teachers, the elderly or hospital patients—and specific geographic areas such as Guangdong and Shandong provinces. Similarly, many studies of personal well-being in China in the English language literature by psychologists have been confined either to clinical samples (e.g., Xu et al. 2006; Yan and Sellick 2004); age-specific samples, such as adolescents (e.g., Edwards et al. 2005) or the elderly (e.g., Chen 2003). There are a series of studies of personal well-being done by economists, which use large datasets that are broadly representative of the general public. These include studies for urban residents (Appleton and Song 2008; Smyth and Qian 2008; Smyth et al. 2008); rural residents (Knight et al. 2009) and rural–urban migrants (Knight, and Gunatilaka 2007). The problem with these studies, though, is that they use a single item indicator to measure personal well-being.

In this study we employ the personal well-being index (PWI) to examine personal well-being and its determinants using data collected from six Chinese cities. The PWI is a multi-item indicator of personal well-being that probes participants' level of life satisfaction along seven domains: standard of living, personal health, achievement in life, personal relationships, personal safety, community-connectedness and future security. These areas of satisfaction should collectively indicate people's satisfaction with their life as a whole (International Wellbeing Group 2006). In November 2006 an eighth domain centered on religion and spirituality was added (International Wellbeing Group 2006), but it does not form part of the current study. The PWI was first developed in Australia as part of the

Australian unity wellbeing index (Cummins et al. 2003). As of 2005, the PWI was being used by over 100 researchers in 50 countries (International Wellbeing Group 2006) and has been translated into several languages, including Chinese (Mandarin, Cantonese and Tibetan, International Wellbeing Group 2006; Davey et al. 2009). The psychometric properties of the PWI are well established in a series of studies listed in International Wellbeing Group (2006: 20–23).

The PWI has previously been tested using urban samples from Hong Kong (Lau et al. 2005, 2008), Macau (Macau Inter-University Institute 2007), a rural sample from Mainland China (Davey et al. 2009) and the Tibetan Plateau (Webb 2009) and been found to have good validity, reliability and discrimination and similar psychometric properties to its use in western samples. However, in terms of objective measures of well-being, urban Mainland Chinese differ from both rural Mainland Chinese and residents in Hong Kong, Macau and the Tibetan Plateau. Income in urban Mainland Chinese cities is higher than in rural Mainland China or the Tibetan Plateau. Chen and Ravallion (2007) reported that per capita income in rural China is 58% that in urban areas. Park (2008) reported that, according to unpublished World Bank data, rural–urban differences accounted for 40% of income inequality in 2003. However, income in Mainland Chinese cities is still lower than Hong Kong and Macau. Attitudes and behaviour are also likely to differ. Lifestyles and attitudes in rural China are traditional (Cohen 2002; Davey et al. 2009). Lifestyles and attitudes in Hong Kong and Macau are likely to be largely westernized (see e.g., Chan and Cheng 2002; Yee et al. 1993). While urban Chinese have undoubtedly become more consumer oriented and westernized in the three decades since market reforms commenced (Davis 2005), attitudes and behaviour in Mainland Chinese cities are likely to sit somewhere in the middle between rural China and those in Hong Kong and Macau (Chen and Davey 2009a).

To this point there are two published studies administering the PWI to samples in urban Mainland China, of which we are aware. One study administers the PWI to an urban sample in Jinan in Shandong province (Huang and Xing 2005). The other administers the PWI to an urban sample in Zhuhai in Guangdong province (Chen and Davey 2009a). Both studies found that the PWI had good psychometric properties, but these findings are restricted to single cities. As Chen and Davey (2009a, b) noted, research on application of the PWI to Chinese samples is encouraging, but should be seen as a work in progress. More work is needed using larger representative samples to build on the existing limited evidence.

The 'Theory of Subjective Wellbeing Homeostasis' (Cummins 1998; Cummins and Nistico 2002; Cummins et al. 2002) suggests that personal well-being should be maintained within a narrow, positive range. For the western population, the normative range has been found to be 70–80 points on a 0–100 scale distribution with a mean of 75 (Cummins et al. 2003). These values are generally about 10 points lower in Chinese samples (Chen and Davey 2009a, b; Davey et al. 2009; Huang and Xing 2005; Lau et al. 2005; Macau Inter-University Institute 2007). Webb (2009) found that the overall magnitude of life satisfaction of ethnic Tibetans was more consistent with western than Asian populations, but his sample was small ($n = 102$). A proviso to the normative range for samples in China is that, as noted above, as a combined body of work, the literature tends to be restricted to certain populations and geographical areas. One reason why Chinese participants self-report lower scores in the PWI is possibly the high value attached to modesty in Chinese culture (Lau et al. 2005). Equally, there are other possible explanations for this result as well, such as social desirability. Ng (2002) offers several possible explanations for the

'East Asian happiness gap' such as congestion in Asian cities and Asians being too competitive and too much focused on losing face.

The specific aims of this research are as follows:

a. Ascertain whether Chinese urban residents are satisfied with their lives.
b. Validate the PWI using a sample from six Mainland Chinese cities (Chengdu, Dalian, Fushun, Fuxin, Fuzhou and Wuhan) that is representative of the urban population and larger in size than that which has been utilized in existing studies.
c. Compare the results to existing studies for Hong Kong, Macau, rural China and single city studies which have administered the PWI in Guangdong and Shandong.
d. Examine whether the responses to the PWI from participants falls within the narrow range predicted by the 'Theory of Subjective Wellbeing Homeostasis' and provide further evidence on whether this framework is applicable to Chinese samples.
e. Examine which participant characteristics predict personal well-being, examine whether own income and/or relative income predicts personal well-being and compare these results with previous studies for China and other countries.

2 Methodology

2.1 Instrument

The PWI was used in the present study to measure domain-level representation of personal well-being. The Chinese (Mandarin) version of the PWI, which can be downloaded from the web[1] was used for this purpose. The Mandarin version of the PWI has been translated previously using a rigorous procedure to ensure all items have valid meanings (Huang and Xing 2005; Chen and Davey 2009a). The PWI used in the present study consisted of seven domains, measured on an 11-point end defined Likert scale, with numerical ratings ranging from 0 (extremely dissatisfied) to 10 (extremely satisfied). An additional item, which was administered first, was included to probe participants' satisfaction with their life as a whole. While not part of the PWI, inclusion of this item facilitated testing for construct validity. It has been used previously in PWI surveys administered in Australia (International Wellbeing Group 2006) and in PWI surveys administered in China (e.g., Chen and Davey 2009a).

2.2 Participants and Procedure

Surveys were administered to individuals with an urban *hukou* (household registration) in six Chinese cities; namely, Chengdu, Dalian, Fushun, Fuxin, Fuzhou and Wuhan in 2007. Convenience sampling was used to recruit participants in each of the six cities. The PWI was administered in written format and self-completed by participants following the instructions specified by the International Wellbeing Group (2006, pp. 15–16). In addition to administering the PWI, information was collected on the socioeconomic characteristics of participants (age, education, gender, marital status, their number of children and their average monthly income). Each participant was assured that individual data would remain anonymous.

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[1] http://acqol.deakin.edu.au/inter_wellbeing/index.htm

A total of 3,390 surveys were administered, consisting of 500 in Chengdu, 558 in Dalian, 515 in Fushun, 498 in Fuxin, 500 in Fuzhou and 819 in Wuhan; of which 3,050 valid responses were received. Table 1 summarizes the demographic characteristics of participants.

2.3 Data Analysis

The data were checked prior to analysis to ensure that there was no response bias that could confound the results. The Likert scale data were standardized into units of %SM on a 0–100 distribution. Descriptive statistics and multiple regression analyses were used to examine the relationship between satisfaction ratings and socioeconomic variables. Cronbach α, item total correlations and item domain correlations were calculated to determine the internal reliability of the PWI. Exploratory factor analysis was used to assess the structure of the PWI. Bivariate correlations and multiple regression analyses were conducted to study the inter-relationships between the domains of the PWI and their contributions to 'satisfaction with life as a whole' to establish construct validity, i.e., their contribution to unique variance.

Table 1 Demographic characteristics of participants

	Fuzhou	Chengdu	Wuhan	Fushun	Dalian	Fuxin
Gender (%)						
Male	49.8	53.5	40.6	46.6	40.5	59.0
Female	50.2	46.5	59.4	53.4	59.5	41.0
Marital status (%)						
Single	46.9	43.8	34.2	26.8	43.2	14.8
Married	53.1	56.2	65.8	73.2	56.8	85.2
Age						
Mean	32.93	29.85	33.72	35.37	31.84	36.00
SD	10.72	8.23	10.29	8.38	7.93	7.31
Number of children (%)						
Zero	46.6	48.7	37.6	35.7	59.6	29.6
One	45.9	43.8	51.6	62.5	38.7	67.8
More than one	7.5	7.5	10.8	1.8	1.6	2.7
Educational level (%)						
Junior middle school or below	5.9	11.1	8.7	4.3	4.2	13.4
Senior middle school	14.2	29.3	25.1	17.8	6.3	29.1
Technical school	28.9	26.1	30.4	34.8	21.2	27.1
Bachelor degree	41.8	29.0	29.1	38.9	53.4	26.9
Masters or PhD	9.2	4.4	6.6	4.2	14.9	3.5
Average monthly income (RMB %)						
500 or below	1.8	5.0	3.9	2.7	0.2	9.0
501–1,000	17.3	25.3	27.1	14.1	6.1	30.1
1,001–1,500	22.2	18.0	23.8	23.7	14.6	27.3
1,501–2,000	22.4	24.6	16.9	23.5	23.6	21.0
2,001–5,000	29.2	22.4	24.1	35.4	47.7	11.0
Over 5,000	6.9	4.7	4.1	0.6	7.8	1.6

3 Results

3.1 Satisfaction Ratings of the PWI

The means and standard deviations of the domains of the PWI are given in Table 2. The mean domain scores ranged from 61.5 (SD = 19.7) to 75.3 (SD = 15.5) and the PWI score was 67.1 (SD = 13.6). This score is within the normative range of 60–70 points for Chinese societies (Chen and Davey 2008, 2009a, b; Davey et al. 2009; Huang and Xing 2005; Lau et al. 2005, 2008; Macau Inter-University Institute 2007). Satisfaction with personal health, personal relationships and personal safety lie above the PWI score, while standard of living, life achievement, community connectedness and future security lie below the PWI score. This result is consistent with previous findings for urban China (Chen and Davey 2009a).

3.2 Socioeconomic Variables and Satisfaction Ratings: Means and Standard Deviations

3.2.1 Gender and Wellbeing

Table 3 presents participants' satisfaction ratings broken down according to gender. There were no significant gender differences in the PWI score, which is consistent with the previous findings of Chen and Davey (2009a) for urban China. There were, however, statistically significant differences in five of the seven domains at the $p < 0.05$ level. Males scored statistically higher in personal health and future security, while females scored statistically higher in standard of living, life achievement and personal relationships.

3.2.2 Age and Wellbeing

Table 4 presents participants' satisfaction ratings broken down according to age. The highest mean score was reported by the eldest age group (56–60): 69.9 (SD = 15.6), while the lowest mean score was reported by the youngest age group (18–25): 65.7 (SD = 13.6), with generally older age groups reporting a higher mean score. There were significant differences in the PWI scores between age groups ($F(1, 3042) = 2.53$, $p = 0.01$). A Tukey's HSD post hoc test found that those aged 46–50 scored higher than those aged 18–25, $p = 0.02$.

Variable	Six cities [mean (SD)]
Satisfaction with…	
Standard of living	61.5 (19.7)
Health	70.6 (19.3)
Life achievement	64.7 (20.6)
Personal relationships	75.3 (15.5)
Personal safety	71.2 (19.8)
Feeling part of the community	64.6 (21.5)
Future security	61.7 (22.8)
Personal wellbeing index	67.1 (13.6)

Table 2 Satisfaction ratings of the PWI

Table 3 Personal wellbeing and gender

	Males (N = 1,457)		Females (N = 1,593)		t-statistic	Sig.
	Mean	SD	Mean	SD		
Satisfaction with…						
Standard of living	60.6	20.1	62.4	19.4	−2.47	0.01
Health	71.3	19.2	69.9	19.4	2.05	0.04
Life achievement	63.9	20.7	65.4	20.5	−1.97	0.05
Personal relationships	74.7	15.6	75.9	15.5	−2.04	0.04
Personal safety	71.9	19.9	70.6	19.7	1.78	0.08
Feeling part of the community	65.0	21.1	64.2	21.8	1.02	0.31
Future security	62.5	23.5	60.9	22.3	2.00	0.05
Personal wellbeing index	67.1	13.7	67.0	13.6	0.23	0.82

Table 4 Personal wellbeing and age

Age group (years)	N	%	Mean	SD
18–25	680	22.30	65.7	13.6
26–30	825	27.05	66.8	13.4
31–35	504	16.52	67.1	12.9
36–40	431	14.13	67.4	14.2
41–45	271	8.89	68.1	14.1
46–50	184	6.03	69.4	12.9
51–55	101	3.31	68.2	14.2
56–60	54	1.77	69.9	15.6
Total	3,050		67.1	13.6

$F(7,3042) = 2.53$, $p = 0.01$. Tukey's HSD test: age 46–50 > 18–25, $p = 0.02$

3.2.3 Education and Wellbeing

Table 5 presents participants' satisfaction ratings broken down according to education. The highest mean score was reported by those with a postgraduate qualification (70.5, SD = 12.4), while the lowest mean score was reported by those for whom their highest qualification was junior middle school or below (65.4, SD = 14.2). A one way ANOVA found that there were significant differences in reported personal wellbeing scores according to highest educational qualification at $p < 0.01$ level. A Tukey's HSD post hoc test found that those with a Masters or PhD qualification had higher satisfaction ratings than those with lower qualifications.

3.2.4 Income and Wellbeing

Table 6 presents participants' satisfaction ratings broken down according to income. The highest income category (participants earning more than 5,000 RMB per month) had the highest mean (72.0, SD = 11.6). The second lowest income category (participants earning

Table 5 Personal wellbeing and education

Highest qualification	N	%	Mean	SD
Junior middle school or below	238	7.80	65.4	14.2
Senior middle school	622	20.39	66.2	14.5
Technical school	855	28.03	67.0	13.5
Bachelor degree	1,114	36.52	67.3	13.2
Masters or PhD	221	7.25	70.5	12.4
Total	3,050		67.1	13.6

Welch (4, 844) = 5.74, $p = 0.00$. Tukey's HSD test: Masters or PhD > Junior middle school or below $p = 0.00$; Masters or PhD > Senior middle school $p = 0.00$; Masters or PhD > Technical school $p = 0.01$; Masters or PhD > Bachelor degree $p = 0.01$

501–1,000 RMB per month) had the lowest mean (63.8, SD = 14.9). In general, higher income earners reported higher personal wellbeing. A one way ANOVA found that there were significant differences in reported wellbeing across income groups at $p < 0.01$ level. A Tukey's HSD post hoc test found that those earning >5,000 RMB per month scored higher than lower income groups. Those earning 2,001–5,000 RMB per month scored higher than those earning 501–1,000 RMB per month and those earning 1,501–2,000 RMB per month. Those earning 1,501–2,000 RMB per month scored higher than those earning 501–1,000 RMB per month.

3.3 Internal Reliability of the PWI

3.3.1 Cronbach α

The Cronbach coefficient for the PWI among this sample is 0.81. This demonstrates good reliability and is comparable to the findings of pre-existing studies for the adult population in Australia (Cummins et al. 2003), Hong Kong (Lau et al. 2005, 2008), urban China (Chen and Davey 2009a; Huang and Xing 2005) and rural China (Davey et al. 2009).

Table 6 Personal wellbeing and income

Average monthly income (RMB)	N	%	Mean	SD
500 or below	105	3.44	66.2	16.6
501–1,000	601	19.70	63.8	14.9
1,001–1,500	658	21.57	65.7	13.3
1,501–2,000	676	22.16	67.7	13.0
2,001–5,000	875	28.69	69.2	12.6
Over 5,000	135	4.43	72.0	11.6
Total	3,050		67.1	13.6

Welch (5, 602) = 16.86, $p = 0.00$. Tukey's HSD test: >5,000 RMB per month > 500 RMB and below, $p = 0.01$; >5,000 RMB per month > 501–1,000 RMB per month $p = 0.00$; >5,000 RMB per month > 1,001–1,500 RMB per month $p = 0.00$; greater than 5,000 RMB per month > 1,501–2,000 RMB per month $p = 0.01$; 2,001–5,000 RMB per month > 501–1,000 RMB per month, $p = 0.00$; 2,001–5,000 RMB per month > 1,001–1,500 RMB per month, $p = 0.00$; 1,501 RMB per month > 501–1,000 RMB per month $p = 0.00$

Table 7 Item-total correlations of each domain of the PWI

	Item total correlation
Standard of living	0.578
Health	0.498
Life achievement	0.609
Personal relationships	0.489
Personal safety	0.585
Feeling part of the community	0.508
Future security	0.536
Cronbach's alpha	0.807

All the correlations are significant at $p < 0.01$ level

3.3.2 Item-total Correlations

The item-total correlations are reported in Table 7. These ranged from 0.49 to 0.61, with most having a moderate correlation around 0.5. This is similar to previous studies for Chinese societies; for example, for urban China (0.50–0.61 in Chen and Davey 2009a) and Hong Kong (0.33–0.69 in Lau et al. 2005). It is also similar to Australia (0.21–0.66 in Lau et al. 2005), but slightly lower than Algeria (0.71–0.75 in Tiliouine et al. 2006).

3.3.3 Domain Inter-correlations

The domain inter-correlations reported in Table 8 ranged between 0.29 and 0.58. The highest correlations were standard of living with life achievement: 0.58; standard of living with future security: 0.44 and community connectedness with future security: 0.43.

3.4 Validity of the PWI

3.4.1 Factor Analysis

To determine the structure of the instrument, the domain items were subjected to a principal components analysis. All assumptions for the performance of this analysis were met. All variables inter-correlated with at least one other variable at >0.30. The Kaisen-Meyer-Oklin value was 0.85, which was similar to that found by Chen and Davey (2009a) and

Table 8 Domains inter-item correlations

Variable	Stand	Hlth	Ach	Rel	Saf	Com	Sec
Stand	1.00						
Hlth	0.37	1.00					
Ach	0.58	0.39	1.00				
Rel	0.29	0.38	0.37	1.00			
Saf	0.39	0.41	0.43	0.40	1.00		
Com	0.29	0.29	0.33	0.37	0.42	1.00	
Sec	0.44	0.29	0.42	0.26	0.38	0.43	1.00

Stand, standard of living; Ach, life achievement; Rel, personal relationships; Saf, personal safety; Com, part of community; Sec, future security

All the correlations are significant at $p < 0.01$ level

Table 9 Factor analysis for the PWI items

Item	Factor loading
Life achievement	0.75
Personal safety	0.72
Standard of living	0.71
Future security	0.67
Feeling part of the community	0.65
Health	0.64
Personal relationships	0.63
Eigenvalues	3.27
Percentage of variance explained	46.68

exceeded the minimum recommended value of 0.60 (Tabachnick and Fidell 2005). The PWI was significant ($p < 0.01$) for Bartlett's test of sphericity. The analysis revealed the emergence of one component, similar to Australia (Cummins et al. 2003), Hong Kong (Lau et al. 2005, 2008) and rural China (Davey et al. 2009). The seven items of the PWI loaded 0.63–0.75 on this component and explained 47% of the variance (see Table 9). This is the same as the 47% found by Lau et al. (2005) for Hong Kong, but is 9–14% higher than previous studies have found for urban China (35% in Chen and Davey 2009a), rural China (34% in Davey et al. 2009) and Australia (38% in Cummins et al. 2003).

3.4.2 Shared Contributions of Domains to Life as a Whole: Bivariate Correlation

The seven domains of the PWI correlated significantly with the general item of 'life as a whole'. They ranged from 0.31 to 0.62 (see Table 10). This result is similar to Australia and Hong Kong, for which Lau et al. (2005) found the range was 0.30–0.70.

Table 10 Regression of 'satisfaction with life as a whole' on personal domains

Variables	Correlation with 'life as a whole'	Regression: 'life as a whole' is dependent variable		
		β	Sig.	sr^2
Stand	0.62	0.40	0.00	0.10
Hlth	0.32	0.01	0.66	0.00
Ach	0.55	0.22	0.00	0.03
Rel	0.32	0.07	0.00	0.00
Saf	0.36	0.02	0.22	0.00
Com	0.31	0.03	0.03	0.00
Sec	0.42	0.11	0.00	0.01
R^2		0.46		
Adjusted R^2		0.46		
Unique variability		0.14		
Shared variability		0.32		

Stand, standard of living; Ach, life achievement; Rel, personal relationships; Saf, personal safety; Com, part of community; Sec, future security

All correlations are significant at $p < 0.01$ level

3.4.3 Shared Contributions of Domains to Life as a Whole: Multiple Regression

To determine the unique contribution of the domains of the PWI to 'satisfaction with life as a whole', the latter was regressed on the domain items of the former (see Table 10). The model explained 46% of the variance. This sits within the range of findings from previous studies. This is consistent with findings for Australia (43%), is higher than Austria (38%) and lower than Hong Kong (50–56%) and Algeria (57%) (Lau et al. 2005, 2008; Renn et al. 2009; Tiliouine et al. 2006). Five domains, namely, standard of living ($\beta = 0.40$), life achievement ($\beta = 0.22$), personal relationships ($\beta = 0.07$), community connectedness ($\beta = 0.03$) and future security ($\beta = 0.11$) were found to make a significant contribution to life as a whole. Previous studies have also found standard of living and life achievement make the largest unique contribution to predicting life as a whole (Lau et al. 2005; Renn et al. 2009; Tiliouine et al. 2006). Most studies have found that standard of living makes the largest contribution followed by life achievement, consistent with the results reported here; however, Lau et al. (2008) found that in their sample of elderly people in Hong Kong the order was reversed. The two domains that made no significant contribution to life as a whole were personal health and personal safety. Personal safety has generally been found to not contribute unique variance in previous studies. This is true for Australia (Lau et al. 2005), Algeria (Tiliouine et al. 2006) and two Hong Kong samples (a study of the general population by Lau et al. 2005 and a study of younger adults by Lau et al. 2008). Nevertheless, it was found to be a unique contributor in the study of elderly Hong Kong residents reported by Lau et al. (2008). Lau et al. (2008: 751) suggest that their finding for elderly Hong Kong residents might reflect the impact of the Severe Acute Respiratory Syndrome in Hong Kong in 2003 on the personal well-being of elderly people. The seven domains contribute 14% in unique variance, sharing 32% of variance between them. The unique and shared variance explained is similar to previous studies for Hong Kong (see Lau et al. 2005, 2008), Australia (Lau et al. 2005) and Austria (Renn et al. 2009).

3.5 Which Socioeconomic Characteristics Predict Personal Wellbeing?

To examine which socioeconomic factors predict personal well-being, the PWI was regressed on age, age squared, education, gender, marital status, number of children, average monthly income of the participant and average monthly income of the city in which the participant lived. The relationship between age and personal well-being is expected to exhibit a U-shape relationship with higher levels of well-being at the younger and older age points and lower well-being occurring in middle-age (see e.g., Clark et al. 1996). There is expected to be a positive relationship between education and personal well-being (see e.g., Blanchflower and Oswald 2004). Females are expected to report higher personal well-being than males (Appleton and Song 2008; Knight et al. 2009). Participants who are married are expected to have higher personal well-being than those who are single (see e.g., Blanchflower and Oswald 2004). Having children is expected to be positively correlated with personal well-being (Spector et al. 2004). Average income in the city in which the respondent lived was included to examine the effect of relative income on personal well-being (see e.g., Luttmer 2005; Graham and Felton 2006). Own income is expected to be positively correlated with personal well-being while the effect of relative income is unclear (Clark et al. 2008). The definition and descriptive statistics of the explanatory variables are provided in Table 11. The results of the regression models are reported in Table 12. Two specifications are reported. In the first specification, the dependent variable is the PWI. To ease the interpretation of the coefficients, in the second

Table 11 Definition and descriptive statistics of the explanatory variables

Variable	Definition	Descriptive statistic
Gender	A dummy variable where 1 = male; zero = female	48.11% of participants were male
Age	Age of the participant in years	Min = 18, Max = 60, Mean = 33.16, SD = 9.154
Married	A dummy variable where 1 = married; zero otherwise	64.7% of participants were married
Children	Number of participant's children where 0 = zero, 1 = one and 2 = more than one	0 = 43.1%, 1 = 51.4%, 2 = 5.5%
Education	Education of the participant (1 = junior middle school or below; 2 = senior middle school; 3 = technical school; 4 = bachelor's degree; 5 = higher degree)	1 = 8%, 2 = 20.6%, 3 = 28%, 4 = 36.3%, 5 = 7.1%
Income	Participant's average monthly income (RMB) (1 = 500 RMB or less, 2 = 500–1,000 RMB, 3 = 1,000–1,500 RMB, 4 = 1,500–2,000 RMB, 5 = more than 2,000 RMB)	1 = 3.8%, 2 = 20.2%, 3 = 21.4%, 4 = 21.9%, 5 = 32.7%
Average income	Average monthly income (000' RMB) in the city in which the participant lives	Min = 0.633, Max = 1.194, Mean = 0.972, SD = 0.190

Table 12 Regression of PWI on participants' socioeconomic characteristics and reference group income

	PWI is dependent variable		Log(PWI) is dependent variable	
	β	Sig.	β	Sig.
Constant	7.85	0.00	2.04	0.00
Gender	−0.05	0.29	−0.01	0.22
Age	−0.09	0.00	−0.01	0.00
Age^2/100	0.11	0.00	0.02	0.00
Married	0.29	0.00	0.04	0.00
Children	0.18	0.01	0.03	0.01
Education	0.04	0.14	0.01	0.16
Income	0.17	0.00	0.03	0.00
Average income	−0.03	0.01	−0.05	0.01
Adjusted R^2	0.036		0.203	

specification, the dependent is the natural log of the PWI. Taking the natural log of the PWI eases interpretation because the percentage change in the PWI can be measured in terms of a one unit change in each of the independent variables.

Using either PWI or log(PWI) as the dependent variable, age, age squared, marital status, number of children, average monthly income of the participant and average monthly income in the city in which the participant lived were found to make a significant contribution to personal well-being. The variables which were statistically insignificant were gender and education. A U-shape relationship between age and personal well-being was found. Based on the results when log(PWI) is the dependent variable, personal well-being was at its lowest at age 25. Participants who were married reported having 4% higher personal well-being than participants who were single. Participants who had one child,

then two or more children reported having 3% higher personal well-being. Moving into a higher income category (measured in blocks of 500 RMB per month) raised personal well-being 3%. For each additional 1,000 RMB in average monthly income in the city in which the participant lives, holding own income constant, decreased personal well-being 5%.

4 Discussion

The present study has examined personal well-being in urban China through administering a survey containing the PWI and questions on socioeconomic characteristics to participants in six Chinese cities. There are relatively few studies on personal well-being in Mainland China. The present study has employed a larger sample across more cities than previous studies that have used the PWI to measure personal well-being in China. The main aims of the present study were (a) to ascertain whether Chinese urban residents are satisfied with their lives; (b) to investigate the psychometric properties of the PWI in the data collected from the survey; (c) to compare the results of the survey with recent studies for Hong Kong, Macau and Mainland China; (d) to determine the applicability of the 'Theory of Homeostasis Wellbeing' in Mainland China; and (e) to examine which participant characteristics predict personal well-being, examine whether own income and/or relative income predicts personal well-being and compare these results with previous studies for China and other countries.

The personal well-being domain scores reported in Table 2 showed that on average participants were satisfied with their lives. The PWI score was 67.1 (SD = 13.6) and each of the seven domain scores were above 60 which is suggestive of a moderate positive level of personal well-being (Chen and Davey 2009a). This result is consistent with the normative range for the PWI for non-western countries, which is 60–70%SM. It conforms with findings for previous studies for Hong Kong (Lau et al. 2005, 2008), Macau (Macau Inter-University Institute 2007), rural China (Davey et al. 2009) as well as urban China (Chen and Davey 2009a; Huang and Xing 2005). The result also concurs with Chen and Davey's (2008, 2009b) conclusions that reported life satisfaction in studies of Chinese societies fall within a narrow range just above the midpoint on the scale. The result is similarly consistent with the conclusion in the literature that has administered the PWI to western samples, particularly several successive studies of the Australian population (see e.g., Cummins et al. 2003, 2004), that most people are fairly satisfied with their lives (Chen and Davey 2009a).

The PWI demonstrated good reliability and validity as a measure of personal well-being. The results concur with pre-existing psychometric data gathered on the PWI with adult populations in Mainland China (Chen and Davey 2009a; Davey et al. 2009; Huang and Xing 2005); Hong Kong (Lau et al. 2005, 2008), Macau (Macau Inter-University Institute 2007) and western countries (International Wellbeing Group 2006; Renn et al. 2009). The Cronbach α value of 0.81 demonstrates good internal reliability and is comparable to the findings of pre-existing studies for the adult population for western and non-western countries. The item-total correlations ranged from 0.49 to 0.61, which is similar to previous studies for Greater China and Australia. A coherent one-factor structure emerged for the PWI which explained 47% of the variance, the same as Lau et al. (2005) found for Hong Kong. The shared contributions of domains to life as a whole from bivariate correlations and multiple regression fell within the range from previous studies. To summarize, after concluding that the PWI demonstrated good psychometric properties for a sample drawn from Zhuhai in Guangdong, Chen and Davey (2009a: 15) suggested: 'Further work is now

needed to analyse the scale's efficacy in other locations in China, especially outside Guangdong Province'. The results reported here go some of the way to respond to this call for further research. The results of the current study provide further supportive evidence for the use of the PWI as a suitable cross-cultural tool to measure personal well-being.

That the PWI was found to fall within a narrow band and that the PWI demonstrated good reliability and validity as a measure of personal well-being suggests that the data obtained in the present study are consistent with the 'Theory of Subjective Wellbeing Homeostasis'. As discussed above, this theory proposes that, under normal circumstances, personal well-being is maintained within a limited positive range by neuro-psychological mechanisms analogous to the homeostatic management of body temperature. The positioning of the data from the six Chinese cities within the narrow range predicted by the theory for Chinese cities supports the proposition that a psychological homeostatic mechanism could be in operation. When wellbeing falls below the normal range, as it was found to do in Algeria, this was attributed to sufficiently adverse environmental factors that defeat the homeostatic mechanism (Tiliouine et al. 2006). This is not the case in urban China. Urban Chinese have been confronted with environmental degradation, rising crime rates and higher poverty that is a direct result of state-owned enterprise restructuring since the 1990s. However, living standards and opportunities for advancement in urban China are considerably higher after three decades of economic reforms. The living standards of the average urban Chinese living under Hu Jintao would be barely recognisable to the average Chinese living under Mao Zedong. Under Hu Jintao, there are opportunities for promotion in the state and fast-moving non-state sectors for the average urban resident that are relatively free of political interference and considerably enhanced compared with three decades ago. In this context, it is not surprising that standard of living and life achievement make the biggest contributions to explaining satisfaction with life as a whole. To summarize, there is nothing to suggest that the harsh economic and social conditions that have been predicted to defeat the homeostatic mechanism exist in urban China. On the contrary the rise in average incomes in urban China over the last three decades can be expected to act as an external buffer to minimize the inherent challenges which could impinge on life satisfaction (Chen and Davey 2009a).

The factors found to predict subjective well-being are generally consistent with findings from previous studies for China and other countries. A U-shape relationship was found between age and personal well-being with personal well-being at its lowest at age 25. This result is similar to that of Appleton and Song (2008) and Knight et al. (2009) who also found a U-shape relationship between age and personal well-being. Appleton and Song (2008) found that life satisfaction in urban China was at its lowest at age 40 while Knight et al. (2009) found that well-being was at its lowest in rural China between the ages of 33 and 38 depending on the exact empirical specification. The finding that married people have higher personal well-being than single people is consistent with several previous studies for western countries (see Dolan et al. 2008). Appleton and Song (2008) similarly found that marriage was associated with higher life satisfaction in urban China. However, as Appleton and Song (2008) noted, there might be an element of reverse causality affecting this outcome because it is likely that happier people will be more attractive as marriage partners. Having children predicts higher personal well-being in this study. While previous studies have reached mixed conclusions about the well-being effects of having children (Dolan et al. 2008), the results reported here are consistent with those in Appleton and Song (2008) and Spector et al. (2004) who also found that having dependent children was welfare-enhancing in urban China. This result may reflect the cultural importance that Chinese attach to family.

Those who had higher average income reported higher personal well-being ceteris paribus. This result is consistent with several previous studies that have used cross-sectional data for western countries (see Clark et al. 2008; Dolan et al. 2008) and Mainland China (Appleton and Song 2008; Smyth et al. 2008; Smyth and Qian 2008). The effect of reference income on personal well-being, holding own income constant, is not clear cut. Most studies for western countries have found that personal well-being is negatively correlated with reference group income: the more others earn the lower my personal well-being. This is the so-called 'jealousy effect' or 'status effect', where the higher earnings of my reference group make me more jealous, lowering my sense of well-being. Senik (2008) found that personal well-being is negatively correlated with reference group income in western Europe, but positively associated with reference group income in the transition economies of central and eastern Europe. Similarly, using Russian data, Senik (2004) found a positive relationship between reference income and life satisfaction. This is the so-called Hirschman (1973) 'tunnel effect' or 'signal effect' where higher incomes of my reference group increase my personal well-being because it provides information about my future prospects. Senik (2008) argued that such a result makes sense in an uncertain economic environment, such as Russia or central and eastern Europe, where it is reassuring to know that others are doing well. The reason is that in a volatile economic environment, where there are large fluctuations in income, there are good prospects that you will find yourself in their shoes in the not too distant future.

The results for average income found in this study are consistent with a 'jealousy effect' or 'status effect', in which higher average income in the city in which the participant lives, holding the participant's income constant, lowers the participant's well-being. While it is inconsistent with Senik's (2004, 2008) findings for Russia and central and eastern Europe, it concurs with Smyth and Qian (2008) who also found that in urban China having wealthier city-mates lowered reported well-being, controlling for own income. This result likely reflects concern about the massive increase in urban income inequality that has accompanied marketization. It might also reflect a perception amongst those who are not as well-off that those who have higher incomes have realized that income through corruption or other illegal means. Addressing corruption is at the forefront of the notion of an 'harmonious society' championed by the Chinese leadership team of Hu Jintao and Wen Jiabao. While not tested here, Smyth and Qian (2009) found that those who perceived corruption to be more rampant had lower levels of well-being and were more likely to support redistributive policies.

5 Conclusion

In conclusion, residents in the six Chinese cities considered in this study appear to be satisfied with their lives. The PWI demonstrated good reliability and validity and the PWI score fell within the normative range for non-western societies. It is similar to both rural China and Hong Kong and Macau, although on objective measures, quality of life in urban China is higher than in rural China and lower than in the special administrative regions. This finding is consistent with the 'Theory of Subjective Wellbeing Homeostasis'. The significant predictors of personal well-being were found to be age (with a nonlinear relationship), marital status, number of children, own income and reference group income.

The study contains some limitations. One limitation, which Davey et al. (2009) noted with respect to their study of personal well-being in rural China, is that Chinese society is less exposed to survey methods than participants in western countries. Thus, participants

may have been reluctant to answer fully or reported answers based on what they felt that they should say (Davey and Higgins 2005). While this is a limitation of all studies of this sort administered in China, to some extent this problem was mitigated in the current study by the fact convenience sampling was employed. Thus, participants were more likely to answer fully than if a mail out survey was used. Second, the survey did not include satisfaction with religion/spirituality, which has only been one of the domains of the PWI since November, 2006 (International Wellbeing Group 2006). Third, the survey is restricted to urban residents with an urban *hukou* (household registration). It does not include rural–urban migrants living in China's cities. China has an estimated 150 million rural–urban migrants who generally work in harsh conditions and have a relatively low quality of life based on objective measures relative to those with an urban *hukou*. China's rural–urban migrants, however, have been the engine room that has fuelled China's high growth rate. The limited existing research on personal well-being of China's rural–urban migrants has used a single item indicator to measure well-being (Knight and Gunatilaka 2007). Examining the personal well-being of China's rural–urban migrants using the PWI is a useful topic for future research.

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