



## Subjective Well-being, Personality and Environmental Satisfaction in Urban China

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**Abstract:** The aim of this study is to examine the influence of environmental satisfaction, job satisfaction, and Big Five personality traits on subjective well-being. Data were collected from white-collar workers across four Chinese cities in 2009. All the research variables were measured with multi-item instruments with good psychometric properties. The research found that environmental satisfaction, job satisfaction, conscientiousness and extraversion have a positive effect on subjective well-being. In addition, individuals married, managers and working in state sector were found to be happier in their lives than individuals who are single, in non-managerial position and in private sector. However, the research found no relationship between neuroticism, agreeableness and subjective well-being. The finding of a positive relationship between environmental satisfaction and subjective well-being suggests that by pursuing a balance between economic development and environmental protection, urban residents' SWB could be enhanced.

**Keywords:** Big Five personality traits, China, environmental satisfaction, subjective well-being

### 1 Introduction

Psychologist, sociologists and economist are all interested in the study of subjective well-being (SWB) [1-3]. SWB explores people's emotional responses, domain satisfactions, and global judgments of life satisfaction [1]. SWB has four common conceptualizations, which are happiness, positive affectivity, negative affectivity, and life satisfaction [4]. Theories and empirical evidence have demonstrated that SWB can be related to demographic profile, economic status, personality and job satisfaction [4-8]. Recently researchers have become interested in the influence of natural environment on SWB [9-13].

The prime aim of current study is to investigate the influence of people's satisfaction with environment on people's SWB, specifically the global judgment of life satisfaction. The second aim is to examine the influence

of personality on Chinese people's SWB. There are several contributions of the current research to the literature. First, this research adds to the scant literature on the determinant of natural environment or pollution on SWB in China [9, 14]. The second contribution is that unlike many of the existing studies on SWB and environment [9, 15], which used a single indicator measurement for SWB, the current study used a multiple-item measure for all the studied variables. The multiple indicator measure could be more advantageous than the single indicator approach in two aspects. First, the multiple indicator measurement is more reliable. For instance, Krueger and Schkade [16] reported a test-retest reliability of .82 to .84 with a time interval of 10 weeks for a multiple indicator measure of SWB, while a study by Andrew and Whitley [17] reported a test-retest reliability of .40 to .66 with a time interval of one hour for a single indicator measure of SWB. A second advantage of multiple indicator measure over a single indicator measure is that the former can tackle multiple dimensions of a construct. The third contribution of the current study is that personalities are incorporated in the study with environmental satisfaction and job satisfaction. None of the existing studies on the relationship between SWB and environment pollution incorporated personalities [9, 11, 13], although empirical evidences have demonstrated that personality could be a source of SWB [4, 7]. Introduction of the personality variables can eliminate the confounding role of personality on the relationship between satisfaction with environment and SWB. The fourth is that this study can tell whether the theories on personality and SWB can be generalized to a country like China with different culture and language.

The remainder of the article is set out as follows. The next section is the hypotheses. Section three is the research methodology, followed by the results and discussion. The last section contains a discussion of limitations and directions for future research.

## 2 Literature review and hypotheses

### 2.1 SWB and environmental quality

SWB is linked to environmental quality through environmental goods and environmental bads. Increasing environmental goods and decreasing environmental bads can enhance SWB<sup>[11]</sup>. There are two channels to enhance SWB via access to environmental goods. First, access to high quality natural environment can enhance SWB through biophilia, which is the psychological benefit for people to interact with other living organism<sup>[18]</sup>. Second, open space for social interaction, recreation and exercise can help reduce anxiety and depression levels and improve mental and physical health<sup>[19]</sup>. Environmental bads include pollution. Pollution can lower SWB through its adverse effects on health. Empirical evidences have supported the negative effect of pollution on SWB<sup>[9, 11, 13, 20, 21]</sup>. Therefore, the following hypothesis is proposed on the relationship between environmental satisfaction and SWB.

H1: Environmental satisfaction will be positively related to SWB.

### 2.2 Job satisfaction and SWB

Job satisfaction is defined as a pleasurable or positive emotional state resulting from the appraisal of one's job or job experience<sup>[22]</sup>. Review of more than 30 years research on the relationship between job satisfaction and life satisfaction have concluded that job satisfaction is positively related to life satisfaction<sup>[6, 8]</sup>. There are two perspectives on the positive relationship between job satisfaction and life satisfaction. One perspective is the "spillover" perspective, which means that life satisfaction could spillover to job satisfaction or vice versa<sup>[8]</sup>. Another perspective is that both job and life satisfaction may have some common environmental, and dispositional causes, as a result job and life satisfaction are positively correlated<sup>[23]</sup>. Therefore, job and life satisfaction are hypothesized to be positively related.

H2: Job satisfaction will be positively related to SWB.

### 2.3 Big Five personality traits and SWB

The Big Five personality traits, which have become well-established in recent decades consist of extraversion, neuroticism, conscientiousness, agreeableness and openness to experiences<sup>[24]</sup>. The potential relationships between each of the personality traits and SWB will be discussed in the following paragraphs.

Extraversion which reflects the extent to which one is talkative, social, gregarious, and assertive<sup>[24]</sup> is expected to be positively related to SWB. There are two theories to support this relationship, the instrumental theory and temperament theory<sup>[25]</sup>. The instrumental theory suggest that personality influences people's actions or circumstances, which in turn have an effect on SWB<sup>[25]</sup>. Watson and Hubbard<sup>[26]</sup> found that in handling stress extraversion was associated with social

support-seeking and positive reappraisal coping styles. The use of more adaptive coping styles, in turn, was associated with higher levels of well-being<sup>[27]</sup>. The temperament theory suggest that personality could influence SWB because of (a) emotional reactivity, and (b) cognitive processing of emotional information<sup>[28]</sup>. Derryberry & Reed<sup>[29]</sup> found that extraverts were slower than introverts to shift their attention away from rewarding stimuli. Empirical evidence also provides support for a positive relationship between extraversion and SWB. For example, a meta-analysis by steel et al.<sup>[7]</sup> have found a statistically significant corrected correlation of .25 to .35 between extraversion and life satisfaction for three kinds of measures of extraversion. Therefore, the following hypothesis is proposed on the relationship between extraversion and SWB.

H3: Extraversion will be positively related to SWB.

Neuroticism reflects the extent to which one is anxious, self-conscious, moody and insecure<sup>[24]</sup>. There are two reasons to expect that neuroticism will be negatively related to SWB. First, individuals high in neuroticism are more likely to be in unfavorable situations<sup>[30]</sup>. For example, Watson and Hubbard<sup>[26]</sup> found that in handling stress neuroticism is associated with passive emotion focused forms of coping. Second, high neuroticism individuals are more likely to process information in a negative way irrespective of the objective situation<sup>[30]</sup>. For example, neurotic individuals are more reactive to unpleasant emotional stimuli than are stable individuals<sup>[31, 32]</sup>. Empirical studies also provide support for a negative relationship between neuroticism and SWB. For example, a meta-analysis by steel et al.<sup>[7]</sup> have found a statistically significant corrected correlation of -.42 to -.49 between neuroticism and life satisfaction for three kinds of measures of neuroticism. Therefore, the following hypothesis is proposed on the relationship between neuroticism and SWB.

H4: Neuroticism will be negatively related to SWB.

Conscientiousness which reflect the extent to which one is likely to be dependable, responsible, rule abiding, and achievement-oriented<sup>[24]</sup> is expected to be positively related to SWB. Individuals high in conscientiousness are more likely to be in more favorable situations. Watson and Hubbard<sup>[26]</sup> found that in handling stress conscientiousness was associated with social support-seeking and positive reappraisal coping styles, which in turn, was associated with higher levels of well-being<sup>[27]</sup>. Empirical studies also provide support for a positive relationship between conscientiousness and SWB. For example, a meta-analysis by steel et al.<sup>[7]</sup> have found a statistically significant corrected correlation of .27 between conscientiousness and life satisfaction across 25 studies. Therefore, the following hypothesis is proposed on the relationship between conscientiousness and SWB.

H5: Conscientiousness will be positively related to SWB.

Agreeable people are generally good-natured,

cooperative, supportive, caring and concerned for others [24]. Agreeableness fosters more and better relationships [4], which in turn are associated with increased SWB. A recent meta-analysis by steel [7] have found a statistically significant correlation of .19 between agreeableness and life satisfaction. Therefore, the following hypothesis is proposed on the relationship between agreeableness and SWB.

H6: Agreeableness will be positively related to SWB.

Individuals who are open to experience tend to be curious, imaginative, broad-minded, and unconventional [24]. The relationship between openness to experience and SWB is unclear. According to McCrae and Costa [33], openness to experience leads to an increase of all emotions, both positive and negative. A meta-analysis by Steel et al. [7] found a weak correlation of .04 between openness to experience and life satisfaction. As openness is correlated to the other four personality traits in the Big Five, it will be used as control variable in the analysis.

### 3 Method

#### 3.1 The sample and procedure

A convenience sampling method was used to collect data from white collar-employees working in a wide range of industry groups across a range of sectors including manufacturing, health services, education, and government branches in four Chinese cities in the Northeast: Changchun, Dalian, Harbin and Shenyang in 2009. Altogether 413 surveys were completed, consisting of 106 in Changchun, 160 in Dalian, 114 in Harbin and 33 in Shenyang. The characteristics of the participants are reported in Table 1.

Tab. 1 indicates that the proportion of men is a little higher than that of women. About 80% of the respondents are under age 35. About half of the respondents are single. The sample was relatively well-educated, with 68.8 % with four years higher education or more. The majority of the respondents earned 1000 to 3000 RMB per month. About one third of them are managers and about half of them from state sector. There is no general information about the white collar workers in the four cities. In terms of educational level, the current sample is similar to a previous study on white-collar workers job satisfaction in Xi'an [34], where over 74% respondents have bachelor degree or higher.

#### 3.2 Measures

##### 3.2.1 Subjective well-being

SWB was measured with PWI [35]. There are eight domains in the PWI: satisfaction with standard of living, with personal health, with achievement in life, with personal relationships, with personal safety, with community-connectedness, with future security and with spirituality. Response is obtained on a 11-point Likert-type scale. The average of the eight domains is used as a composite measure of global life satisfaction. The reliability and validity of PWI has been

well-established in previous studies both within and outside China.

##### 3.2.2 Job satisfaction

Job satisfaction was measured with the five-item scale developed by Tsui, Egan and O'Reilly [36]. The five-items are satisfaction: with work, with supervisor, with co-workers, with pay and with promotion. Response is obtained on a 5-point Likert scale. The average of the five items is used as a composite measure of global job satisfaction. The Cronbach's alphas ranged from .73 to .78 [37].

**Tab.1 Profile of the respondents**

Variables	N	%
<b>Gender</b>		
Male	239	58.6
Female	169	41.4
<b>Age (years)</b>		
<25	101	24.5
26-30	170	41.3
31-35	47	11.4
36-40	27	6.6
41-45	19	4.6
46-50	23	5.6
51-55	20	4.9
56-60	5	1.2
<b>Marital status</b>		
Single	205	51.1
Married	196	48.9
<b>Education</b>		
Junior secondary	12	2.9
Senior secondary	32	7.7
Polytechnic	85	20.6
Bachelor	236	57.1
Master	44	10.7
PHD	4	1.0
<b>Income RMB</b>		
<500	10	2.4
501-1000	24	5.8
1001-1500	65	15.7
1501-2000	78	18.9
2001-2500	49	11.9
2501-3000	50	12.1
3001-3500	36	8.7
3501-4000	41	9.9
4001-4500	20	4.8
4501-5000	8	1.9
Over 5000	32	7.7
<b>Position</b>		
Ordinary employee	286	69.8
Cadre	124	30.2
<b>Ownership</b>		
Non-state sector	196	48.3
State sector	210	51.7

##### 3.2.3 The Big Five

The Big Five factor personality traits were measured with Big Five Index (BFI) [38]. There are 44 items to measure the five factors of extraversion, neuroticism, conscientiousness, agreeableness, openness to experience. Existing studies have supported the reliability and validity of the 44-BFI scales [39].

### 3.2.4 Environmental satisfaction

The measure of environmental satisfaction was a new scale, which includes five items: satisfaction with air quality, solid waste treatment, parks, waste water treatment and noise control. The response is a 5-point Likert scale. The average of the five items is used as the score for environmental satisfaction. To determine the structure of the scale, the five items were subjected to a principal component analysis (PCA). All assumptions for the performance of this analysis were met. All items inter-correlated with at least one other item at  $> .30$ . The Kaiser-Meyer-Olkin value was .85, which exceed the minimum recommended value of .60<sup>[40]</sup> and Bartlett's test of sphericity indicated the factorability of the data. Using Kaiser's criterion of eigenvalues greater than 1.00, one component was extracted that explained 62.34% of the total variance. The five-items loaded from .73 to .85. The PCA result supports the uni-dimensionality of this scale.

The measure for environmental satisfaction is in Chinese. There is a Chinese version of PWI<sup>[35]</sup>. The job satisfaction and the BFI measures are in English. Translation and back translation were used for these two measures. One of the researchers translated the original English version into Chinese and subsequently back translated by a second bilingual speaker. The back-translation and the original were compared, and discrepancies between those two versions were resolved through discussion between translators to ensure equivalence of both Chinese and English versions.

### 3.3 Method for data analysis

Standard regression is used to analyze the relationship between the studied variables. Because of the possible influences of gender, age, marital status,

educational level, ownership of the organization, job position, pay, and location of the respondents on SWB<sup>[19, 41]</sup>, these variables were used as control variables in the analysis.

## 4 Results

The means, standard deviation, and Cronbach's alphas of the studied variables are presented in Tab. 2. The PWI score was 64.85 (SD = 15.33). This score is within the normative range of 60-70 points for Chinese society<sup>[42, 43]</sup>. The Cronbach's alphas ranged from .68 to .85, which are close to or above the hurdle of .70 for social science research<sup>[44]</sup>. Therefore, the variables can be subjected to further research.

**Tab.2 Descriptive of the variables**

Variables	Number of items	mean	s. d.	Alpha
Extraversion	8	3.26	.55	.71
Agreeableness	9	3.52	.48	.69
Conscientiousness	9	3.38	.55	.78
Neuroticism	8	2.78	.52	.69
Openness to experience	10	3.34	.49	.75
Job satisfaction	5	3.30	.60	.66
Environmental satisfaction	5	3.16	.87	.85
PWI	8	64.85	15.33	.86

The inter-correlations between the studied variables are shown in tab. 3. As shown in tab. 3, SWB is positively correlated to extraversion, agreeableness, conscientiousness, openness to experience, job satisfaction, environmental satisfaction, but negatively correlated to neuroticism.

**Tab.3 Correlation among all the studied variables**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Female														
2 Age	-.09													
3 Married	.07	.57												
4 Education	.07	-.19	-.15											
5 Manager	-.10	.33	.20	.06										
6 State sector	-.05	.21	.24	.13	.07									
7 Pay	-.10	.35	.30	.33	.33	.27								
8 Extraversion	.04	.05	-.02	.02	.12	.04	.01							
9 Agreeableness	.05	.12	.05	.12	.08	.09	.14	.34						
10 Conscientiousness	-.08	.26	.17	-.06	.21	.10	.09	.53	.44					
11 Neuroticism	-.03	-.16	-.07	.01	-.15	-.08	-.04	-.52	-.45	-.49				
12 Openness	-.01	-.14	-.16	.21	.07	.08	-.01	.31	.35	.15	-.17			
13 Job satisfaction	.00	.00	-.06	.10	.14	.13	.20	.15	.13	.06	-.04	.19		
14 ES	.09	.00	-.04	.13	.12	-.13	.07	.14	-.12	.00	.03	.11	.20	
15 PWI	-.09	.17	.20	-.01	.28	.27	.15	.34	.17	.39	-.24	.14	.31	.21

For  $r > .11, p < .05$ ; For  $r > .13, p < .01$

Before running a regression on the studied variables, assumptions for linear regression were tested. The assumptions include missing values, outliers, normality of dependent variable, multilinearity and linearity for the relationship between dependent and independent variables [40]. There were less than 5% missing data. No univariate outliers were present in the continuous data. Normality of the dependent variables was confirmed through skewness and Kurtosis indices. All the data demonstrated acceptable linearity. The regression results are displayed in tab. 4.

**Tab.4 Regression results**

Variables	beta
Female	-.08
Age	-.09
Married	.15**
Education	.01
Manage	.13**
State sector	.16**
Pay	-.05
Extraversion	.12*
Agreeableness	.01
Conscientiousness	.22**
Neuroticism	-.02
Openness to	-.02
JS	.19**
ES	.25**
Changchun	.04
Dalian	-.15
Harbin	.06
R <sup>2</sup>	.391

\*  $p < .05$ ; \*\*  $p < .01$

The regression results demonstrate that the model can explain 39.1% of the variance in PWI. The research found that job satisfaction, environmental satisfaction, extraversion and conscientiousness are positively related to SWB. So hypotheses on the relationship between SWB and these four variables are supported. The research found a non-significant relationship between SWB and neuroticism, and agreeableness, so hypothesis on the relationship between SWB and these two variables were not supported. In addition, the research found that people who are married, in managerial position and working in state sector are happier in their lives than people who are single, working in non-state sector and in non-managerial positions.

## 5 Discussion

### 5.1 The effect of environmental satisfaction on SWB

One of the main findings of this study is that SWB is found to be positively related to environmental

satisfaction. The finding of a positive relationship between satisfaction with environment and SWB is congruent with previous studies in China [9, 14]. As this study controlled variables such as personality, job satisfaction and pay level, the finding on the positive relationship between environmental satisfaction and SWB is more convincing. Even though China's economy is growing rapidly, its economic growth has come at the expense of heavy pollution. The heavy pollution has influenced people's well-being negatively. The findings support the central government's policy of a "harmonious society", where economic development and environmental protection are balanced. The strength of the relationship between SWB and environmental satisfaction is even stronger than the relationship between SWB and job satisfaction. The stronger relationship between SWB and environmental satisfaction could be related to the selection of a sample of young people. Young people could be more concerned about environment, as a result the relationship between environmental satisfaction and SWB is stronger. According to Di Tella and Macculloch [45] the relationship between SWB and environmental satisfaction is stronger for the younger people than older people.

### 5.2 The effect of job satisfaction on SWB

The finding of a positive relationship between job satisfaction and SWB is consistent with previous study [46, 47] and support the spillover theory on the relationship between job satisfaction and well-being. The finding indicates that people's positive attitude in work may spillover to life or vice versa.

### 5.3 The effect of Big Five on SWB

As predicted, extraversion and conscientiousness were found to be significantly related to SWB. The explanation for this finding may be that individuals high in conscientiousness are more successful in their careers, and live a higher living standard and be happier with their life. Nevertheless, contrary to prediction, neuroticism and agreeableness were not found to be significantly related to SWB. The zero-order correlations between neuroticism, agreeableness and SWB were statistically significant which were very similar to that found in previous meta-analysis [7], suggesting that the finding in the current study is not due to any anomaly in the data, but rather to the inclusion of the many other variables such as job satisfaction and environmental satisfaction. The result implies that neuroticism and agreeableness may have an indirect effect on SWB through job satisfaction and environmental satisfaction, i.e. job satisfaction and environmental satisfaction may mediate the relationship between these two personality traits and SWB.

## 6 Conclusion

This paper makes several contributions to the

literature. First, this research use multiple-item measures to measure the studied variable, which is more accurate than most of existing studies on environmental protection and SWB, which use single item indicator measures for SWB. Secondly, in this research, variables such as personality, job satisfaction are also included, which can make the findings on the relationship between environmental satisfaction and SWB more convincing.

This research also has its limitations. First, because this research employs a cross-sectional survey, it is difficult to make definite causal claims on the relationship between the studied variables. Second, as data were collected from a single source and at a single point of time, there may be common method variance<sup>[44]</sup>. Third, as all the data are mainly collected from the young and well-educated, it may limit the generalizability of the findings. Future study can overcome these limitations by adopting a longitudinal study and targeting people more representative of the urban workforce.

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