

DEVELOPMENT OF THE REVISED WELL-BEING SCALE FOR CHINESE CITIZENS

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ABSTRACT

This paper presents results of a second round of the studies in which a subjective well-being scale for Chinese citizens (SWBS-cc) has been developed in two consecutive steps. First, the scale composed of 54 items was applied to a sample of adult persons living in Shandong province, and a local norm was achieved. Next, a sample from a wider area in mainland of China was taken, and the psychometrics of SWBS-cc was examined. Based on that research, the scale was revised and improved through factor analysis and logical analysis. The revised SWBS-cc included 40 items, and shown good psychometric properties. The standard norm sample was expanded to six metropolitan areas (capital cities) from the whole country, and the nationwide norm was achieved.

Key words: Subjective well-being, Psychological testing, Item analysis, norm.

1 Introduction

The subjective well-being (SWB) measures research appeared in the mid-20th century along with the research of SWB, and researchers from different traditions developed some widespread instruments (Bradburn & Caplovitz, 1965; Kozma & Stones, 1980; Ryff & Singer, 1996; Stones et.al., 1996; Diener et al., 1996; Cummins, 1996; Luo, 1998). In previous studies, we have developed a 54 items subjective well-being scale for Chinese citizens (SWBS-cc) based on these research. The SWBS-cc was developed through the view of experience. According to this view, subjective well-being is a positive or greatly satisfying state of existence that people experienced. This state of existence indicated if a person lived normally and at which degree a normal person achieved in material and spirit. The former indicated the people's state of physical and mental health. The later indicated the people's state of enjoyment and development, and it covers the main aspects of a human being's activity that he takes in a particular historical background (Zhanjun & Liqing, 2007). The regional norm of the scale has been established based on a sample from Shandong province (Zhanjun, 2005).

A number of studies have showed that SWBS-cc has good measurement properties when applying to some special groups, such as the aged, youth, women, college student groups, post-graduate, teachers, rural residents and Christian group(Zhanjun,2003; Liqing,2004; Yu & Zhanjun, 2005;Huixiong & Limin,2005;Xinhua & Yu,2008; Yuanjiang & Zhanjun, 2009). However, there is still an obvious problem in these studies, that is mostly used samples from specific regions, thus, there is a big limitation to spread the scale to the nationwide. It is necessary to determine if the scale could be applied to the whole country and if it need to be revised. Moreover, the national norm of the revised scale also need to be established.

This paper consists of four relatively independent studies. Firstly the psychometric properties of SWBS-cc were examined in a broader area by sampling from another two capital cities. And then, as a clue, the outcomes of the psychometric properties examining were used to revise the scale to be more perfect. Finally, sampling from all the capital cities in Chinese mainland, we obtained the standard norm sample group to establish the national norm of revised SWBS-cc.

2 Study 1

2.1 Objective

Sampling in a broader area of Chinese mainland, we would test the psychometric properties of SWBS-cc(54 items) and examine the feasibility of its applying to further nationwide study. Study 1 was also designed to obtain clues for further revising of SWBS-cc through its psychometric properties examination.

2.2 Method

2.2.1 Participants

The participants were adult inhabitants from Shenyang (the capital city of Liaoning province) and Kunming (the capital city of Yunnan province) who lived there more than half a year and whose age were above 18 years (including 18 years). The sample size was 1244, and the demographic and social-economic characteristics could be summarized as following: Gender: male, 50.0%; female, 49.0%; missing,1.0%. Age: 18–34 years old, 42.4%; 35–54 years old, 47.6%; 55 years old and above,9.4%; missing,0.6%. Education: primary, 19.2%; secondary, 29.8%; higher, 49.5%; missing,1.5%.

2.2.2 Instruments

SWBS-cc. The scale consists of 54 items, and the respondent are required to respond to each item with 6-grade selection. The ten subscales are as following: experience of satisfaction and abundance, experience of mental health, experience

of growth and progress, experience of confidence towards society, experience of goal and personal value, experience of self-acceptance, experience of adaptation to interpersonal relation, experience of physical health, experience of psychological balance, experience of family atmosphere(Zhanjun,2005).

Personal Well-being Index(PWI). The PWI scale contains seven items of satisfaction, each one corresponding to a quality of life domain as: standard of living, health, life achievement, personal relationships, personal safety, community-connectedness, and future security(Cummins,1996).

Satisfaction with life scale (SWLS). The scale was developed by ED Diener. It consists of five items, and the respondent are required to respond to each item with 7-grade selection response (Diener et al.,1985).

Singer-item self-report SWB scale (SISRWB). The scale contains only one question: "Overall, I am a happy people". The respondent are required to respond with a 7-grade likert-style selection.

2.3 Result

2.3.1 Reliability Analysis

Using the data of the sample from Shenyang and Kunming, we examined the internal consistency reliability of SWBS-cc and its ten subscales. The outcome showed that the full scale and its subscales have favorable reliability. The Cronbach's alpha coefficient of the full scale was 0.919, and the Cronbach's alpha coefficients of every subscale were also above 0.638 (see Table 1).

Table 1. The internal consistency reliability of ten subscales

Sub-scale1	Sub-scale2	Sub-scale3	Sub-scale4	Sub-scale5	Sub-scale6	Sub-scale7	Sub-scale8	Sub-scale9	Sub-scale10
0.851	0.797	0.829	0.814	0.820	0.723	0.740	0.736	0.683	0.638

*Data in the table were Cronbach's alpha coefficients.

2.3.2 Criterion Validity Analysis

We used the pearson correlation coefficient between the scores on the full SWBS-cc (including the scores of its subscales) and the scores on PWI, SWLS and SISRWB as criterion index. The criterion validity of SWBS-cc applied to Shenyang and Kunming sample were 0.633, 0.400 and 0.520 respectively. All of the correlation coefficients were significant at 0.000 level. The SWBW-cc and its subscales showed favorable criterion validity (see Table 2).

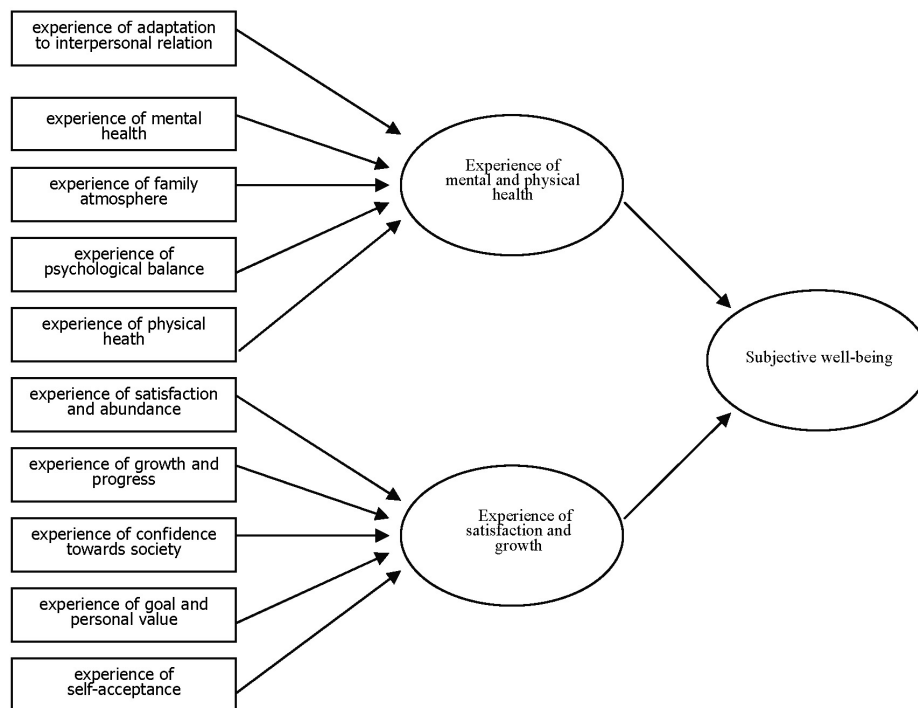
Table 2. The criterion validity of SWBS-cc and its ten subscales

SWBS-cc	Sub-scale1	Sub-scale2	Sub-scale3	Sub-scale4	Sub-scale5	Sub-scale6	Sub-scale7	Sub-scale8	Sub-scale9	Sub-scale10
PWI	0.523	0.387	0.345	0.352	0.321	0.393	0.411	0.376	0.324	0.331
SWLS	0.594	0.148	0.242	0.118	0.158	0.202	0.131	0.334	0.032	0.144
SISRSWBS	0.402	0.243	0.300	0.383	0.250	0.340	0.275	0.343	0.251	0.449

**Data in the table were correlation coefficients.*

2.3.3 Structural Validity Analysis

Based on the former theory hypothesis and empirical exploration, we put forward a model of Chinese citizens' subjective well-being (see Chart 1).

Chart 1. The original structural model of Chinese people's subjective well-being

According to the model, the Structure of Chinese people's subjective well-being might be regard as two basic components. The first component was the experience of mental and psychological health(including experience of adaptation to interpersonal relation, experience of mental health, experience of family atmosphere, experience of psychological balance, and experience of physical health), and the second one was the experience of satisfaction and growth

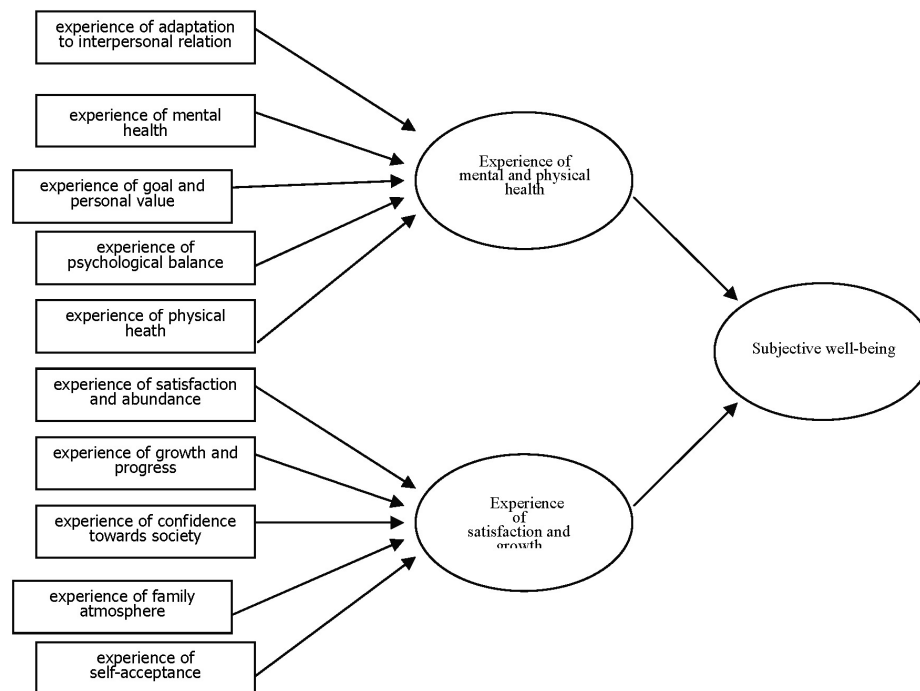
(including experience of satisfaction and abundance, experience of growth and progress, experience of confidence towards society, experience of goal and personal value, experience of self-acceptance). The model's goodness-of-fit was testified through confirmatory factor analysis. It showed that the main goodness-of-fit index of the original model were unsatisfactory (see Table 3).

Table 3. The main goodness-of-fit index of the original model's testifying

χ^2/df	GFI	AGFI	NFI	NNFI	CFI	IFI	RFI	RMR
20.9	0.88	0.82	0.77	0.73	0.77	0.78	0.72	0.13

2.3.4 Modification of SWB model and its Goodness-of-fit testing

According to the modification information provided by confirmatory factor analysis, the goodness-of-fit would be more satisfactory while the experience of goal and personal value adjusted to the first component and the experience of family atmosphere adjusted to the second component. In previous studies, secondary factor analysis showed that experience of family atmosphere and experience of goal and personal value both had heavy factor loading on the two principal components. Because the experience of goal and personal value has an important impact on a person's development experience, it is logically classified as an element of the second component. Actually, in a sense, the state of a person's experience of goal and personal value may be more affected to his basic living conditions, it is likely to affect his mental health. If a person lost his goal and no longer felt his own value, he is likely to face mental health problems. On the contrary, if a person has a realistic goal and aware of his own value clearly, he is more likely to be on the positive emotional adjustment and more easily adapts to the surrounding social environment, and maintains good mental health situation. As to the experience of family atmosphere, we classified it as the first component at first, mainly because this indicator is usually reflected the status of interpersonal adaptation in family environment. We assumed that a person's experience of the situation of his family atmosphere might much more affect his health. But in fact, through Chinese people's cultural value, family happiness has been regarded as an important index to evaluate one's life achievement. Thus, in Chinese cultural background, if a person enjoyed his good experience of family atmosphere, it not only means one of his basic need has been satisfied, but also indicate that his self-potential has been fulfilled. Based on the above analysis, it is more convincing to classify this indicator as the second principal component, that is experience of satisfaction and growth. So the classification of the two indicators should be adjusted, and a modified model of Chinese people's subjective well-being is brought forward here(see Chart 2). Using the data collected from Shenyang and Kunming, the goodness-of-fit of the modified model was initially testified through confirmatory factor analysis. It showed that the main goodness-of-fit of the modified model were favorable (see Table 4).

Chart 2. The modified structural model of Chinese people's subjective well-being**Table 4.** The main goodness-of-fit index of the modified model's testifying

χ^2/df	GFI	AGFI	NFI	NNFI	CFI	IFI	RFI	RMR
4.31	0.91	0.85	0.82	0.80	0.85	0.85	0.76	0.07

3 Study 2

3.1 Objective

Based on the result of the SWBS-cc applying to Chinese citizens in a broad area, this study was designed to form an ideal revised edition of SWBS-cc to satisfy the needs for national SWB research.

3.2 Method

3.2.1 Participants and instruments

The same as study 2.

3.2.2 The method of item analysis

3.2.2.1 Discrimination analysis

Item discrimination is an important index for item analysis. We examined the discrimination of each item in SWBS-cc by calculating the item-total correlation. The item selection criterions were as following:

- 1) Item scores and the full scale scores relate significantly;
- 2) Item scores and the subscale scores relate significantly;
- 3) The correlation coefficient between item scores and subscale scores is above 0.60;
- 4) The correlation coefficient between item scores and subscale scores is far lower than the correlation coefficient between item scores and other subscale scores.

3.2.2.2 Factor analysis and logical analysis

Exploratory factor analysis and logic analysis were used to further item analysis to ensure the revised SWBS has ideal structural validity. Items excluded criterions were as follows:

- 1) The number of extracted component would be decreased distinctly when the item was deleted;
- 2) The items whose factor loading in the principal component were less than 0.30;
- 3) Although an item influenced a certain principal component, but it was obviously different from other items influencing the same principal component ;
- 4) When several items influenced the same principal component, some of them were higher homogeneity or had containment relation;
- 5) Items originally belonged to a certain dimension, and now vested in another dimension.

3.2.2.3 The principle of optimization

In the process of the item selection according to the criterions listed above, we always insisted the principle of optimization. In order to keep balance on the number of items in each subscale, those sub-optimal items were deleted.

3.3 Result

3.3.1 Discrimination Analysis

In this research we used item-total correlation coefficient as the discrimination analysis index. Table 5 shows the correlation coefficient between item scores, full scale scores and total scores that item belongs to, in which A_i , B_j , $C_i \dots \dots$, J_i stand for item number in each subscale, corresponding to the ten subscales of SWBS-cc. In the table, we could find that all the correlation coefficients to be

examined reached statistically significant (two-tailed test). But In subscale experience of satisfaction and abundance, the correlation coefficient between item A9 and the subscale were below 0.60. In subscale experience of mental health, the correlation coefficients between item B2, B7, B9 and the subscale were also below 0.60. In subscale experience of self-acceptance, the correlation coefficients between item F4 and the subscale was below 0.60, and it was lower than its correlation coefficients with subscale experience of growth and progress. The items mentioned here need to be deleted according to the criterions, but the discrimination index number of B2 was 0.598, very close to 0.60, and in former studies it showed good psychometric properties, so it was reserved temporarily. After discrimination analysis, 50 items were reserved.

Table 5. Correlation coefficient between item scores and subscale scores

[illegible]

3.3.2 Factor Analysis and logical analysis

By means of facotr analysis and logical analysis, the reserved 50 items of SWBS-cc were further analyzed. Data analysis showed that the KMO value was 0.917, Barlett spherical value of chi-square test was at significant level, indicating that factor analysis was suitable. With the factor analysis (principal component/varimax), 10 factors whose eigenvalue over 1 were extracted, and these factors could account for 56.369% of the total variance (Table 6).

In the former discussion about the method of item analysis, we have proposed five criterions for item selection by means of exploratory factor analysis and logical analysis. Item B6 and B8 were deleted according to criterion 5. Items A5 and C2 were deleted according to criterion 4. Items A4 and D2 were deleted according to criterion 3. Item A3 A8 B3 E1 were deleted to maintain balance on the number of items in each dimation. After the above item analysis, the revised SWBS-cc was made up of 40 items.

4 Study 3

4.1 Objective

Study 3 was designed to make a further examination on the psychometric properties of revised SWBS-cc(40 items). In this study, we selected another sample from six capital cities through random sampling technique. We examined the internal consistency reliability, criterion validity, and the construct validity of the scale.

4.2 Method

4.2.1 Participants

The participants were adult inhabitants from Beijing, Shenyang, Xian, Guangzhou and Kunming. The valid sample size was 3090, and the demographic and social-economic characteristics could be summarized as following: Gender: male, 50.9%; female, 48.2%; missing,0.9%. Age: 18–34 years old, 49.5%; 35–54 years old, 39.7%; 55 years old and above, 10.7%; missing, 0.1%. Education: primary, 17.3%; secondary, 32.2%; higher, 48.2%; missing, 2.5%.

Table 6. Rotated component matrix of 50 items SWBS-cc

[illegible]

4.2.2 Instruments

SWBS-cc(revised). The scale consists of 40 items, and the respondent are required to respond to each item with 6-grade selection. See study 2.

PWI. See study 1.

SISRSWBS. See study 1.

4.3 Result

4.3.1 Reliability Analysis

Using the data of the sample from five capital cities, we examined the internal consistency reliability of the full scale (40 items) and its ten subscales. The outcome showed the full scale and its subscales had favorable reliability. The Cronbach's alpha coefficient of the full scale was 0.895, and the Cronbach's alpha coefficients of every subscale were also above 0.650 (see Table 7).

Table 7. The internal consistency reliability of ten subscales(revised)

Sub-scale1	Sub-scale2	Sub-scale3	Sub-scale4	Sub-scale5	Sub-scale6	Sub-scale7	Sub-scale8	Sub-scale9	Sub-scale10
0.769	0.689	0.743	0.738	0.805	0.650	0.689	0.689	0.725	0.668

**Data in the table were Cronbach's alpha coefficients.*

4.3.2 Criterion Validity Analysis

We used the pearson correlation coefficient between the scores on the full revised SWBS-cc (including the scores of its subscales) and the scores on PWI and SISRSWBS as criterion index. The criterion validity of revised SWBS-cc applied to the sample from five capital cities were 0.665 and 0.517 respectively. All of the correlation coefficients were significant at 0.000 level. The revised SWBW-cc and its subscales showed favorable criterion validity (see Table 8).

Table 8. The criterion validity of revised SWBS-cc and its ten subscales

SWBS-cc	Sub-scale1	Sub-scale2	Sub-scale3	Sub-scale4	Sub-scale5	Sub-scale6	Sub-scale7	Sub-scale8	Sub-scale9	Sub-scale10
PWI	0.343	0.342	0.377	0.389	0.434	0.397	0.462	0.463	0.408	0.406
SISRSWBS	0.305	0.173	0.339	0.452	0.256	0.370	0.294	0.288	0.255	0.417

**Data in the table were correlation coefficients.*

4.3.3 Structural Validity Analysis

Using the data collected from five capital cities, the goodness-of-fit of the modified structure model of Chinese people's SWB was further testified through confirmatory factor analysis. It showed that the main goodness-of-fit of the modified model were favorable (see Table 9).

Table 9. The main goodness-of-fit index of the modified model's testifying

χ^2/df	GFI	AGFI	NFI	NNFI	CFI	IFI	RFI	RMR
5.8	0.96	0.93	0.89	0.86	0.90	0.90	0.86	0.057

5 Study 4

5.1 Objective

This study was designed to establish the nationwide norm of Chinese capital cities through applying the revised SWBS-cc to a standard normal sample group.

5.2 Method

5.2.1 Sampling method

Multistage stratified sampling method was used to obtain the normal sample group. In the first stage, according to purposive sampling and based on the opinions of experts from related subjects, Beijing, Shenyang, Shanghai(which was replaced by Hangzhou later), Guangzhou, Xian and Kunming were selected. From the geographical point of view, the six cities are located in six geographic regions of Chinese Mainland, that is North China, North East, East China, South Central, North West, South West. The six geographic regions are in accordance with the six large administrative regions established early days of P.R.China, which have great impact on regional economic and social development for a certain period, and the impact has been even to this day. From the regional differences of economic and social development, three of six cities belong to the eastern area, and two cities belong to the central and western area. Although Shenyang is located in Northeast, its current degree of economic and social development is closer to the central city. From the historical and cultural point of view, the selected cities also have strong representation. Random sampling method was used to determine the sampling points in the second stage. In the third stage, according to the Fifth Census data, about 620 citizens whose age were above 18 years old before the survey were selected randomly from the sample points in each selected city.

5.2.2 Instruments

The living conditions of Chinese citizens questionnaire The questionnaire was made up of two parts. The first part was basic individual condition, such as birth, gender, education, and so on. The second part was the revise SWBS-cc and SISRSWBS. Here subjective well-being was replaced by living condition to reduce the face validity of the survey.

5.3 Result

5.3.1 Description of the nationwide normal sample group

The valid size of nationwide normal sample was 3710, and the demographic and social-economic characteristics could be summarized as following: Gender: male, 50.9%; female, 48.3%; missing, 0.8%. Age: 18–34 years old, 49.5%; 35–54 years old, 39.7%; 55 years old and above, 10.7%; missing, 0.1%. Education: primary, 17.6%; secondary, 30.4%; higher, 49.6%; missing, 2.4%. Table 10 showed the occupational composition of the nationwide normal sample group.

Table 10. The occupational composition of the normal sample (N = 3710)

Career	Sample size	Percentage of the total sample
Individual labourer	427	11.5
The laid-off, Unemployed and Underemployed	274	7.4
Manufacturing	806 (retired 133)	21.7
Electricity, Gas and Water supplying	63	1.7
Construction	278 (retired 33)	7.5
Traffic, Transport, Storage and Post	234 (retired 32)	6.3
Wholesale and Retail trades	311 (retired 38)	8.4
Financial intermediation	81	2.2
Real Estate	62	1.7
Social Service	301	8.1
Health, Sports and Social welfare	126 (retired 5)	3.4
Education and Culture	260 (retired 53)	7.0
Science institute	171	4.6
Party and Government	196 (retired 35)	5.3
College students	120	3.0

5.3.2 Description of the nationwide norm of revised SWBS-cc

Through the nationwide normal sample, we obtained the norm of revised SWBS-cc in national capital cities. The mean score of the full scale was 61.2 (total score is 100), and the standard deviation is 12.07. Table 11 was the descriptive statistics of its ten subscales. Thus, The amendment of SWBS-cc in the whole country was finished. The revised SWBS-cc contained 40 items, and consisted of ten subscales in accordance with that of SWBS-cc.

Table 11. The descriptive statistics of revised SWBS-cc's subscales

Subscale	Mean scores	Standard deviation
Experience of satisfaction and abundance	4.820	2.405
Experience of mental health	5.566	2.082
Experience of growth and progress	6.154	2.074
Experience of confidence towards society	6.876	1.830
Experience of goal and personal value	6.274	2.350
Experience of self-acceptance	6.613	1.761
Experience of adaptation to interpersonal relation	5.678	2.223
Experience of physical health	5.750	2.099
Experience of psychological balance	6.653	2.453
Experience of family atmosphere	6.812	1.951

6 Conclusion

In the research, we developed the 40 items revised SWBS-cc using the samples from capital cities in Chinese mainland. In the course of scale amendment, discrimination analysis, factor analysis and logical analysis were used to item analysis. The revised SWBS-cc was tested to have good psychometric properties. The nationwide norm of revised SWBS-cc was achieved through the scale's applying to a national normal group. But there are still some limitation in this research. Firstly, the normal group was selected merely from six capital cities, some important factors such as the size of the city were not taken into account, and the number of selected cities was still too few. Secondly, the items used to form revised SWBS-cc were not large enough, which was limited in the SWBS-cc's 54 items, and in some dimensions there were too few items to be selected. Thirdly, As a result of funding constraints, the data collected in some cities were re-used in later studies, and this would have some impact on the result.

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