

Measuring Older Adults' Individual Modernity: Validation of the Adapted Multidimensional Scale of Chinese Individual Modernity

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Abstract

Research shows that maintaining high individual modernity level can enable the shaping of positive self-image and boost life satisfaction for older people along with better adaptation to the process of societal modernization. This study examined the factorial structure and evaluated the psychometric properties of the adapted Multidimensional Scale of Chinese Individual Modernity (MS-CIM) in a sample of 445 elders (the finalized version is named “MS-CIME”) and added a self-constructed nine-item behavioral modernity domain. Principal component analysis suggested a conceptually meaningful seven-factor model, which was further supported by the results of the confirmatory factor analysis (CFA). The final 25-item MS-CIME indicated an acceptable level of reliability. The convergent validity was demonstrated by its associations with socio-economic status, participation in daily activities, self-image, and life satisfaction in expected directions.

Keywords

individual modernity, scale validation, psychometric properties, China, older people, modernization

Introduction

The age structure of the population in China is experiencing a dramatic change in which older people have become proportionally more numerous. In 2013, the proportion of older adults aged 65 and older reached 9.7%, with the annual growth rate being around 3% (National Bureau of Statistics of China, 2015). As China is becoming more modernized, profound changes have taken place in all realms of life: social, economic, and cultural (Bai, 2016). Traditionally, older adults in China were well respected both in family and in society (Bai, Lai, & Guo, 2016; Chow, 2007; Cowgill, 1972; Tsai & Lopez, 1997). However, traditional values of respect for older adults tend to be weakened in the context of rapid modernization process (Chiu & Yu, 2001; Chow & Bai, 2011). Age denial is reported among adult Chinese (Barak, Mathur, Lee, & Zhang, 2001), and similar experiences of the devaluation of old age are observed in other East Asian societies as well (Boduroglu, Yoon, Luo, & Park, 2006).

The rapid societal modernization process imposes new demands and challenges on older adults (Pavlova & Silbereisen, 2012). Despite the challenges, some older adults manage to maintain a positive self-image and optimal life satisfaction by adapting to this process with a relatively high level of individual modernity (e.g., Kunzmann, Little, & Smith, 2000; Toepoel, 2013). Individual modernity is defined

as the pattern of motivational, attitudinal, and behavioral characteristics that are commonly observed among people in modern societies (Yang, 2003). The process of social modernization represents the most pervasive and drastic socio-environmental changes that may negatively affect older adults (Chow, 2007; Chow & Bai, 2011; Cowgill, 1972; Lai, 2009). However, older adults' ability to adapt to transformations in values and behaviors to some extent determines the possibility of their maintaining positive life attitudes and achieving positive aging (Bengtson, Dowd, Smith, & Inkeles, 1975).

Individual modernity is found to be positively associated with one's ability to adapt (e.g., Kunzmann et al., 2000; Pillutla, Farh, Lee, & Lin, 2007; Xie, Schaubroeck, & Lam, 2008). Students with higher individual modernity levels are more willing to cooperate with others for group projects (Pillutla et al., 2007), and better individual modernity decreases job stress for workers, further contributing to better health outcomes (Xie et al., 2008). However, research is

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limited on the effects of individual modernity levels on older adults' various life domains, and most have focused predominately on the effect of behavioral modernity. For instance, studies have reported that older adults' use of information and communication technology (e.g., the Internet) can decrease the risk of social isolation (White et al., 1999), keep them connected with mainstream society, and promote empowerment (Fung, 2003).

However, most research on individual modernity and adaptation are youth-oriented (e.g., Cai, 2000; Xia, 1998; Y. Xu, 2000). Very few studies have focused on the measurement issues of older adults' individual modernity, despite the fact that they are often one of the most disadvantaged groups in the modernization process. To address this research gap, representing one of the first attempts, this study aims to develop and validate a Multidimensional Scale of Chinese Individual Modernity for Elders by (a) revising Yang's (2004) MS-CIM based on the findings of 30 pilot in-depth interviews and (b) testing the factorial structure and evaluating the psychometric properties of an adapted version (i.e., MS-CIME) with a sample of 445 older Chinese adults in China. Findings of this study could be seen as a ground work for future studies to examine older adults' individual modernity levels and its possible effects.

Measurements of Individual Modernity

A large group of Western scholars (e.g., Gough, 1977; Inkeles & Smith, 1976; Kahl, 1968; Lerner, 1958; Portes, 1973; Schnaiberg, 1970; Smith & Inkeles, 1966; Yang, 1998) have conducted a series of empirical studies in Third World societies to identify the characteristics of a truly modern person and spent a lot effort on exploring an appropriate multidimensional conceptualization of individual modernity by developing various versions of scales.

One of the most popular scales for measuring individual modernity is the Overall Modernity (OM) scale developed by Inkeles and Smith (1974). Via item analysis and criterion group methods, a more manageable short form of the OM scale has been developed later, and is now one of the leading and most widely used scales in measuring individual modernity. However, one major limitation is that Inkeles and Smith (1974) considered the concept of modernity to be universal and unidimensional, without taking into account the particular cultural and psychological characteristics involved in the structural and individual Westernization of target countries (Yogev, 1976). In addition, their scales were found to have questionable comparability of factorial structures and low reliabilities (Chiu, 1980).

To identify the principal values representing a modern view of work and life, Kahl (1968) interviewed more than 1,300 men from Mexico and Brazil with different occupational and residential characteristics. He devised a questionnaire to test several themes relevant to modernity, but his modernity scale primarily measured people's orientation

toward achievement. Subsequently, Schnaiberg (1970) developed a 46-item scale, which differed from other scales by focusing on the coherence of individuals' attitudinal and behavioral characteristics rather than only on attitudinal indicators. However, more than two thirds of Schnaiberg's items were designed to examine family attitudes and behaviors (Chiu, 1980). Based on a more diversified sample, Portes's (1973) instrument appears to have good internal reliability, but it is primarily a scale of fertility rather than modernity, as more than half of the questions addressed fertility attitudes and behaviors.

Representing more recent efforts, Yang (2004) further developed the MS-CIM, which focused predominately on five domains of attitudinal modernity: Affective Hedonism, Egalitarianism and Open-Mindedness, Self-Independence, Optimism and Assertiveness (OA), and Sex Equality, each containing 10 items. The Cronbach's alpha coefficients ranged from .65 to .77 for these five subscales (Yang, 2004). While the scale was constructed for measuring modernity in Chinese culture, it was designed specifically for youth in Taiwan.

All of these efforts to measure individual modernity have not identified older adults as the focal point. As measuring individual modernity is crucial to the promotion of positive aging, a validated scale for older people is in great need. This study attempted to answer three research questions:

Research Question 1: To what extent the MS-CIM, which was originally used to examine individual modernity of young people, can be applied or adapted to elders in Mainland China (i.e., MS-CIME)?

Research Question 2: What is the factor structure of the adapted MS-CIME?

Research Question 3: What are the psychometric properties of the adapted MS-CIME?

Method

Target Population and Sampling

This study was carried out in Wuhan, the provincial capital of Hubei situated along the Yangtze River in the central part of China. There are 13 districts, seven urban and six suburban in Wuhan. With more than eight million residents, Wuhan is experiencing rapid modernization and population aging. By the end of 2004, the development of advanced technological industries had accounted for 48.5% of the city's economy (China Urban Development Committee, 2005). In 2002, the GDP per capita in Wuhan was US\$2,370, the contributory rate of technological progress to the increase in GDP was 45%, the urbanization level had reached 60%, and the popularity rate of personal computers was 30.15% (Bureau of Statistics of Hubei Province, 2004). According to China's 2004 regional modernization indexes, Wuhan should be considered a moderately developed region in China. In

Table 1. Socio-Demographic Characteristics of Participants.

Characteristics	Categories	N (%)
Residence	Urban	295 (66.3)
	Suburban/rural	150 (33.7)
Age group	Young old (60-69, $M = 63.05$, $SD = 2.89$)	267 (60.0)
	Mid-old (70-79, $M = 73.46$, $SD = 2.87$)	127 (28.5)
	Old-old (80+, $M = 83.44$, $SD = 3.80$)	51 (11.5)
Sex	Male	224 (50.3)
	Female	221 (49.7)
Social-economic status	Low	141 (31.9)
	Moderate	221 (50.0)
	High	80 (18.1)
Working status	Retired or no longer working	280 (63.2)
	Still employed	144 (32.5)
	Doing other things	19 (4.3)
Marital status	Single	27 (6.1)
	Widowed	113 (25.5)
	Married	304 (68.5)
Living arrangement	Older adults homes	49 (11.0)
	Alone	61 (13.7)
	Only with spouse	131 (29.4)
	Multigenerational setting	204 (45.8)
Neighborhood relationship	Poor	59 (13.3)
	Normal	253 (57.2)
	Good	130 (29.4)
Chronic disease	No illness	161 (36.2)
	Moderate	174 (39.1)
	Severe	110 (24.7)
Daily activity	Inactive	63 (14.2)
	Moderate	237(53.3)
	Active	145 (32.6)

2009, the number of older adults aged 60 years and over in Wuhan was approximately 1.14 million, representing 13.8% of the population (CNHUBEI, 2009).

The target population of this study was older adults in both urban and suburban/rural Wuhan. The primary selection criteria for participants were (a) aged 60 years and older, (b) physically and mentally fit to answer survey questions, and (c) living in Wuhan. Multistage sampling was employed. Five districts in Wuhan were first randomly selected from the 13 administrative districts, three urban and two suburban/rural. Each district was then subdivided into communities, and lists of adults aged 60 years and older living in each of the selected communities were obtained with the support of local community offices. In total, five hundred potential respondents were identified and approached, and 445 older people were successfully interviewed. Of these participants, approximately 34% were from suburban/rural districts and 66% were from urban districts. Selected participant socio-demographic characteristics were summarized in Table 1. The study response rate was 89%, and participants' answers had missing values of less than 5%.

Measurement

In addition to the adapted MS-CIM (i.e., MS-CIME), socio-demographic items, the Chinese version of the Self-Image of Aging Scale (Bai, Chan, & Chow, 2012), and life satisfaction index-A (a shortened version [LSI-A]; Neugarten, Havighurst, & Tobin, 1961) were used to test the convergent validity of MS-CIME.

Socio-demographic characteristics. Participants were classified into young-old (60 to 69 years old), middle old (70 to 79 years old), and old-old (older than 80 years) groups. Participants' socio-economic conditions were measured in accordance with education level (primary school or below, middle school, college or above), annual income (i.e., <US\$800, US\$800-US\$2,400, >US\$2,400), and employment status (i.e., retired/no longer farming, still employed/farming, active in other business). These three measures were further grouped into three socio-economic levels. Participants' marital status was reported according to whether they had never married, were presently married, or divorced/bereaved. Whether they were living alone, with spouse, in extended

families, or residential care homes were used to determine their living arrangement. Respondents were asked to rate their neighborhood relationship as bad, normal, or good. They were divided into three health groups according to the number of illnesses reported, and were divided into three activity groups according to the number of daily activities (e.g., watching television [TV], listening to the radio, reading newspaper, and so forth) they participated in.

Self-image of aging. Self-image of aging was measured using the Chinese version of the Self-Image of Aging Scale (SIAS-C), validated in a recent study (Bai et al., 2012). The 14-item SIAS-C examines older adults' self-image in five domains, involving general physical health, social virtues, life attitudes, psychosocial status, and cognition. The scale has satisfactory internal consistency (Cronbach's $\alpha = .729$) and test-retest reliability ($r = .871$), as well as good convergent validity (Bai et al., 2012).

Life satisfaction. Life satisfaction was measured using a shortened form of the Chinese version of the LSI-A (Neugarten et al., 1961; Wang, Wang, & Ma, 1999). The internal consistency of the 10-item LSI-A was acceptable with Cronbach's $\alpha = .64$.

Data Collection Process

Step 1: Pilot interviews and scale revision. In-depth interviews were conducted prior to actual implementation of the main-round data collection with 30 participants. Fifteen older Chinese people from urban Wuhan districts and 15 from suburban/rural districts were selected to take part in these interviews. In the interviews, participants were asked to rate how strongly they agreed or disagreed with each of the 50 MS-CIM statements.

During these pilot interviews, there was a consensus among the participants that three items in the dimension of Egalitarianism and Open-Mindedness ("Parents should permit their children to have different religions," "Husband and wife should respect each other's religions," and "A political reformer or propagandist should have the right to give a speech in public") were not suitable for the Chinese population in Mainland China. Some older participants commented that the statement "Pornographic magazines cannot be prohibited as some people would need them" should be perceived as a measure of people's morality standard, but had nothing to do with individual modernity levels. Some older participants maintained that as students' hair length was not restricted by middle schools in Mainland China, it would be inappropriate to ask whether they agreed with the statement "It is not necessary to restrict the hair length of middle school students" in the dimension of Affective Hedonism. Similarly, two thirds of participants suggested that as it had not been a practice in China that a woman should take her husband's surname as her own after getting married, this item should

not be considered a measure of sex equality. Based on the result of the pilot interviews, these items were removed from the scale.

Some older participants criticized the use of the item "When a wife has different opinions from her husband, she should insist on her own" to examine a person's social independence level. They felt that on one hand, agreeing with this item might indicate a high level of self-reliance, but, on the other hand, it might indicate the lack of mutual respect in couples. In addition, another confounding item identified by some participants was "Regardless of who you are, more education is better." They maintained that education should be perceived as a process to enjoy rather than an outcome to show off, and that having a diploma should not be seen as the sole standard for evaluating a person's education level. As such, disagreeing with this item may not indicate that this person is less modern in his or her values. As agreeing with these items was not considered to be indicative of a higher modernity level, they were deleted from the scale. In addition, three interviewees suggested that the item "The economy can get prosperous only under a trade system with free competition" was not a good indicator of OA. Noting Hwang's (2003) critique of the MS-CIM, that people who agreed with this item could not be necessarily considered as having a high degree of modernity. Thus, based on the feedback from interviewees, these four items were dropped from the scale.

In addition to attitudinal modernity, which was covered in the original scale, 12 behavioral modernity items (Smith & Inkeles, 1966) were further included in the adapted scale. Based on the questionnaire developed by Smith and Inkeles (1966), the following variables were used to measure the behavioral modernity of older Chinese participants: access to mass media, number of organizations they belonged to, number of correct answers to general knowledge questions, number of digital products used, willingness to plan, investment interest, willingness to make friends with strangers, and rural-urban preference.

Step 2: Main-round data collection. In the main-round study, face-to-face structured interview was used to administer the 41-item modified MS-CIM as well as the other validity measures and questions related to demographic information. We recruited five undergraduate students from the Department of Sociology of Huazhong University of Science and Technology as interviewers. Training and ongoing supervision were provided by the primary author. Data were collected during the summer of 2009.

Data Analysis

Principal component analysis was first performed to examine the factor structure of the revised scale. Confirmatory factor analysis (CFA) was then used to further determine whether emerging factors were consistent with the model

suggested by the principal component analysis. Once the emerging factors were confirmed by CFA, the other important psychometric properties of scale were further examined, which included internal consistency, test–retest reliability, content validity, and convergent validity. The scale’s internal reliability was examined using Cronbach’s alpha coefficients and Guttman split-half. Corrected item-total correlations were then reported. Test–retest reliability and convergent validity were established by calculating Spearman’s correlation coefficients.

Results

Principal Component Analysis on the MS-CIME

Principal component analysis, a widely used statistical procedure in scale validation research (Costello & Osborne, 2005), was performed on all 41 items to examine the factor structure of the MS-CIM. Item analysis was conducted prior to principal component analysis to detect inappropriate items. The normality of each item was checked by its skewness and kurtosis (Hair, Black, Babin, & Anderson, 2010). The results showed that almost all of the items were within the +2 to –2 range in the skewness, but the eight items whose kurtosis was higher than 3 or lower than –3, indicating severe deviations from the normal distribution, were further removed from the scale. These items included, “If the leader of government makes mistakes in public, people have the right to criticize him” (kurtosis = 3.229), “Leaving one’s hometown for the purpose of study or employment is not a big deal” (3.930), “Students should have the right to argue with teachers over their faults” (4.352), “The progress of science and technology brings bright prospects for human beings” (4.219), “It is not a problem if the chairman of the government is female” (3.415), “Men and women should have equal opportunity to be well educated” (6.040), “For most occupations, women have the ability to serve in the same positions as men” (3.582), and “Men and women are equal to serve similar social status” (5.485). These eight items were excluded in later analysis, as they had poor discriminative power and severely deviated from normal distribution.

The principal component analysis with varimax rotation and Kaiser normalization of the remaining 33 items revealed that the Kaiser–Meyer–Olkin measure of sampling adequacy was 0.80 and Barlett’s test of sphericity reached statistical significance. This has supported the factorability of the correlation matrix (Ang & Huan, 2006; Hair et al., 2010; Jirapramukpitak, Darawuttimaprakorn, Punpuing, & Abas, 2009). Nine factors with eigenvalues greater than 1.0 emerged. The nine-factor model explained 52% of the total variance. However, three items (“Democratic politics is best as it facilitates the social development,” “The job can be considered as good only when you find you can learn new things from it,” and “Females and males should have the same right

in sexual life”) had factor loadings of less than 0.3 on all factors, and were deleted with reference to Floyd and Widaman’s (1995) suggested standard. Another round of principal component analysis was conducted on the remaining 30 items, and the results still suggested a nine-factor model, but as the reliability coefficients of the last two factors were less than .4, with poor content validity for forming factors, these two factors (containing five items in total) were eliminated.

Based on Hair et al.’s (2010) suggestion, 350 cases were selected for principal component analysis and CFA respectively, using SPSS random case selection function. This ensured that the sample for principal component analysis was not completely the same as the CFA sample, and that the data could be used as far as possible with a relatively safe variable-to-case ratio. Results of principal component analysis suggested a seven-factor solution (i.e., MS-CIME), which accounted for 53% of the total variance. The varimax rotated factor loadings and communalities for each item are presented in Table 2. The factor loadings for the variables ranged from 0.455 to 0.823. Although cross-loadings were discerned for three variables with significant loadings (>0.40) on two factors, considering the significant correlations between the factors assumed in Yang’s study, these items were retained for subsequent confirmatory analysis. The communalities of most variables were greater than or close to 0.50, which indicated that this factor solution adequately accounted for all variables (Hair et al., 2010).

Factor 1 consisted of five items, while Factor 2 consisted of two. Factors 3, 4, and 5 consisted of four items each, and both Factors 6 and 7 consisted of three items. They each accounted for 8.626%, 8.000%, 7.882%, 7.395%, 7.381%, 7.279%, and 6.477% of the total variance, respectively. Based upon factor items, names were assigned to each factor. Factor 1 was named Affective-Hedonism–Freedom of Marriage (AH-FOM); Factor 2, Affective-Hedonism–Respect for Affection (AH-RFA); Factor 3, Egalitarianism and Open-Mindedness–Egalitarianism (EOM-E); Factor 4, Social Isolation and Self-Reliance–Social Isolation (SISR-SI); Factor 5, OA; Factor 6, Egalitarianism and Open-Mindedness–Open-Mindedness (EOM-OM); and Factor 7, Social Isolation and Self-Reliance–Self-Reliance (SISR-SR; See Table 2). Correlations between these factors, item means, and standard deviations, and reliability coefficients of the scale and subscales will be reported after this factor structure is confirmed with CFA.

CFA on the MS-CIME

To determine whether or not the data of the present sample were consistent with the model (seven-factor model) suggested by the principal component analysis, CFA was conducted with the 25 items for another random 350 participants. This ensured not only a safe variable-to-case ratio but also a certain degree of difference between the samples for principal component analysis and CFA. Results showed an acceptable

Table 2. Principal Components EFA on the MS-CIM: Varimax Rotated Factor Structure and Communalities for Each Scale Item ($N = 350$).

Item = 25; $N = 350$	Component							
	Cmnt	1	2	3	4	5	6	7
Factor 1: Affective Hedonism–Freedom of Marriage								
AH6. If a couple loves each other, they can get married even if the wife is older.	0.590	0.713	−0.003	0.136	0.050	0.082	0.156	0.183
OA5. As long as they make efforts, the couple may enjoy harmonious sexual life.	0.530	0.604	0.264	0.220	0.077	0.090	−0.168	−0.090
AH2. As long as a couple loves each other, they may get married even if they have different educational backgrounds.	0.510	0.596	0.026	0.170	0.029	0.172	0.297	−0.073
AH9. It would be all right to marry a divorced person.	0.510	0.485	0.437	0.082	−0.026	0.069	0.035	0.273
AH8. If the wife has higher education level, the husband does not need to feel shamed.	0.400	0.455	0.127	−0.007	−0.197	0.225	−0.180	0.204
Factor 2: Affective Hedonism–Respect for Affection								
AH5. As long as a couple loves each other, it would be all right to have sex without legal marriage.	0.670	0.209	0.737	0.028	0.162	0.130	0.185	−0.014
AH3. As long as a couple love each other, they may get married without considering whether one spouse has had sexual relationships with others.	0.653	0.031	0.708	0.265	0.070	0.109	0.253	0.001
Factor 3: Egalitarianism and Open-Mindedness–Egalitarianism								
EO5. Children are supposed to argue against their parents if they consider their own opinions are reasonable.	0.580	−0.095	0.050	0.725	−0.021	0.067	0.028	0.186
SE3. A wife is supposed to have her own independence. She needn't be amenable to every word her husband says.	0.480	0.135	0.077	0.645	0.090	0.004	−0.165	0.018
SE7. Husband and wife may have their own friends.	0.450	0.320	−0.022	0.569	0.069	0.021	0.130	0.071
SE1. If the wife wants to work outside, the husband shouldn't be against.	0.420	0.224	0.187	0.557	−0.023	0.135	−0.080	−0.065
Factor 4: Social Isolation and Self-Reliance–Social Isolation								
SI7. One may know fewer people when living in the city, thus, it may save a lot unnecessary social interactions.	0.500	0.021	0.032	0.026	0.693	0.071	−0.091	0.015
SI1. Everybody has his own life, it is not necessary to get along with his or her neighbors.	0.540	0.059	−0.028	0.086	0.686	0.019	0.117	0.203
SI2. As family is only a part of one's personal life, one does not need to spend too much time with his or her family members.	0.480	0.064	0.047	0.041	0.583	0.066	0.344	−0.093
SI4. As long as it is not your business, you don't need to stop the couple next door when you hear them quarreling.	0.550	−0.199	0.336	−0.051	0.574	−0.162	−0.120	0.155
Factor 5: Optimism and Assertiveness								
OA1. No matter how terrible the environment is, as long as he tries his best, he may finally succeed.	0.530	0.102	0.004	0.032	−0.040	0.705	0.092	0.085
OA2. As long as people try hard, they can definitely establish a warm family.	0.580	0.317	−0.102	−0.011	0.164	0.649	−0.007	−0.130
OA9. Most of the social problems we have now will certainly gradually be resolved in the future.	0.610	0.117	0.389	0.029	−0.060	0.593	−0.287	0.030
OA8. Rich entrepreneurs deserve their wealth because it is the fruit of their hard work.	0.540	−0.012	0.186	0.345	0.058	0.591	0.158	0.104
Factor 6: Egalitarianism and Open-Mindedness–Open-Mindedness								
EO1. As long as needed, the scene about sex should not be cut from movies.	0.500	−0.041	0.108	−0.059	−0.031	0.049	0.690	−0.054
AH7. We should be more open on the issue of sex	0.520	0.222	0.272	−0.153	0.215	0.026	0.569	0.005
AH1. A couple who cohabit without being legally married should not be disparaged.	0.520	0.092	0.475	0.126	−0.020	−0.126	0.496	0.056

(continued)

Table 2. (continued)

Item = 25; N = 350	Cmnt	Component						
		1	2	3	4	5	6	7
Factor 7: Social Isolation and Self-Reliance–Self-Reliance								
SI5. After children get married, they should no longer live with their parents.	0.690	0.011	0.050	0.008	−0.003	−0.035	−0.082	0.823
SI9. Although parents are still alive, money earned by children should belong to them.	0.430	0.165	−0.005	0.214	0.138	0.043	−0.075	0.578
SI6. Making friends with the opposite sex is their own business; children don't need to tell their parents.	0.510	0.042	0.018	−0.008	0.182	0.134	0.409	0.534
% variance	53.040	8.626	8.000	7.882	7.395	7.381	7.279	6.477

Note. Kaiser–Meyer–Olkin Measure of Sampling Adequacy = 0.765; p value of Bartlett's Test of Sphericity < .001. EFA = exploratory factor analysis; MS-CIM = Multidimensional Scale of Chinese Individual Modernity; Cmmt = communality; AH = Affective Hedonism; OA = Optimism and Assertiveness; EO = Egalitarianism and Open-Mindedness; SE = Sex Equality; SI = Self-Independence.

overall fit ($\chi^2 = 376.604$, $df = 247$, $p < .001$, comparative fit index [CFI] = 0.900, goodness-of-fit index [GFI] = 0.923, and root mean square error of approximation [RMSEA] = 0.039) of the seven-factor model. The model emerging from principal component analysis was further confirmed to be a valid model through CFA. The CFA results with the path diagrams and factor loadings are presented in Figure 1.

Reliabilities of the MS-CIME

Descriptive statistics, internal consistency reliability estimates, and corrected item-total correlations for each of the seven MS-CIME subscales are summarized in Table 3. Mean scores on the seven scales ranged from 7.025 (e.g., AH-RFA) to 22.784 (e.g., AH-FOM). Standard deviations ranged from 2.540 (e.g., AH-RFA) to 4.017 (e.g., SISR-SI). Results of the MS-CIME reliability test were satisfactory. The overall scale had satisfactory internal reliability with Cronbach's alpha coefficient = .760, and Guttman split-half reliability = .667. The reliabilities of the seven subscales in MS-CIME were all acceptable, with the Cronbach's α coefficients for all the subscales except for the SISR-SR ($\alpha = .472$) being above .55. The Guttman split-half coefficients ranged from .412 to .685. Almost all the corrected item-total correlations were in the moderate range, and the test–retest reliability was .834.

Variables in the measure of behavioral modernity included access to mass media, number of organizations participants were attached to, number of correct answers to general knowledge questions, number of digital products used, willingness to plan, interest of investment, willingness to make friends with strangers, and rural–urban preference. The Cronbach's alpha coefficient and the Guttman split-half reliability for these variables reached .734 and .752, respectively.

In Table 4, the Pearson correlations of the MS-CIME total score and the seven subscale scores were AH-FOM ($r = .659$), AH-RFA ($r = .647$), EOM-E ($r = .531$), SISR-SI ($r = .506$), OA ($r = .556$), EOM-OM ($r = .539$), and SISR-SR

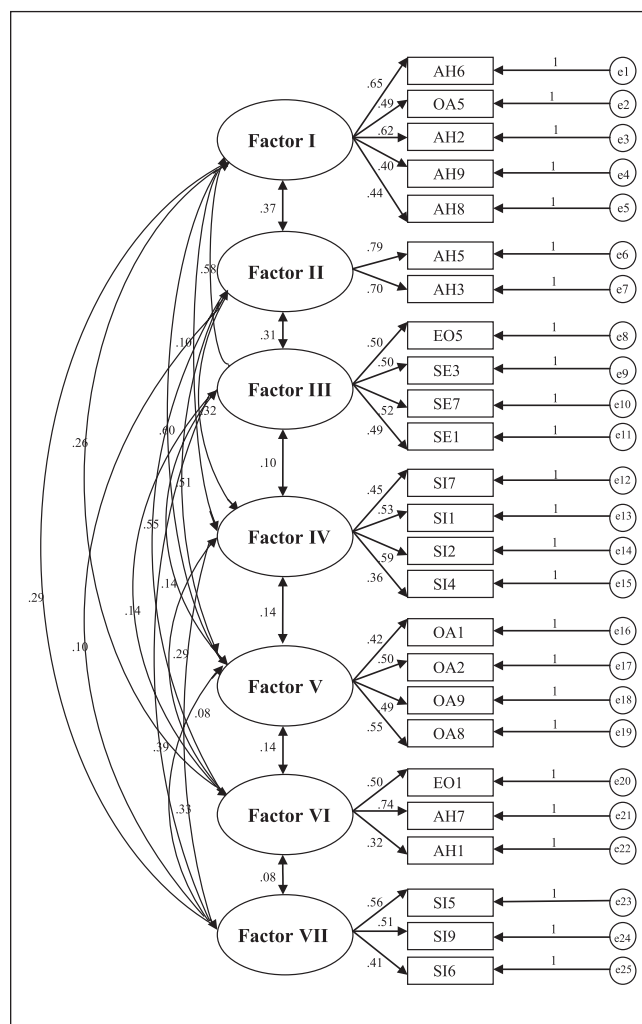


Figure 1. Confirmatory factor analysis results for the 25-item seven-factor model of MS-CIME.

Note. MS-CIME = Multidimensional Scale of Chinese Individual Modernity; AH = Affective Hedonism; OA = Optimism and Assertiveness; EO = Egalitarianism and Open-Mindedness; SE = Sex Equality; SI = Self-Independence.

Table 3. Results of Item Analysis and Internal Reliability of MS-CIME: Cronbach's alpha and Item-Total Correlation of MS-CIME and Its Subscales.

	M	SD	Overall	FOM	RFA	Item-total/subscale correlations				
						EOM-E	SISR-SI	OA	EOM-OM	SISR-SR
Cronbach's alpha coefficient			.760	.639	.685	.564	.582	.572	.546	.472
Guttman split-half reliability			.667	.603	.685	.604	.543	.501	.457	.412
Factor 1: Freedom of Marriage	22.784	3.609	0.444							
AH6. If a couple loves each other, they can get married even if the wife is older.	4.634	1.077	0.396	0.495						
OA5. As long as they make efforts, the couple may enjoy harmonious sexual life.	4.681	0.931	0.351	0.374						
AH2. As long as a couple loves each other, they may get married even if they have different educational backgrounds.	4.449	1.275	0.340	0.399						
AH9. It would be all right to marry a divorced person.	4.452	1.203	0.432	0.383						
AH8. If the wife has higher education level, the husband does not need to	4.569	1.126	0.212	0.328						
Factor 2: Respect for Affection	7.025	2.540	0.504							
AH5. As long as a couple loves each other, it would be all right to have sex without legal marriage.	3.551	1.481	0.503		0.522					
AH3. As long as a couple loves each other, they may get married without considering whether one spouse has had sexual relationships with others.	3.474	1.431	0.452		0.522					
Factor 3: Egalitarianism and Open-Mindedness–Egalitarianism	18.577	2.867	0.337							
EO5. Children are supposed to argue against their parents if they consider their own opinions are reasonable.	4.398	1.186	0.250			.359				
SE3. A wife is supposed to have her own independence. She needn't be amenable to every word her husband says.	4.753	1.058	0.223			.361				
SE7. Husband and wife may have their own friends.	4.649	1.060	0.337			.328				
SE1. If the wife wants to work outside, the husband shouldn't be against.	4.778	1.047	0.276			.342				
Factor 4: Social Isolation and Self-Reliance–Social Isolation	12.469	4.017	0.212							
SI7. One may know fewer people when living in the city, thus, it may save a lot unnecessary social interactions.	3.685	1.443	0.212				.372			
SI1. Everybody has his own life, it is not necessary to get along with his or her neighbors.	2.982	1.572	0.287				.441			
SI2. As family is only a part of one's personal life, one does not need to spend too much time with his or her family members.	2.912	1.447	0.274				.360			
SI4. As long as it is not your business, you don't need to stop the couple next door when you hear them quarreling.	2.890	1.562	0.133				.289			
Factor 5: Optimism and Assertiveness	18.409	3.128	0.348							
OA1. No matter how terrible the environment is, as long as he tries his best.	4.827	1.133	0.229					.341		
OA2. As long as people try hard, they can definitely establish a warm family.	4.899	1.051	0.242					.379		
OA9. Most of the social problems we have now will certainly gradually be resolved in the future.	4.476	1.246	0.250					.374		
OA8. Rich entrepreneurs deserve their wealth because it is the fruit of their hard work.	4.207	1.283	0.402					.332		

(continued)

Table 3. (continued)

	M	SD	Overall	FOM	RFA	Item-total/subscale correlations				
						EOM-E	SISR-SI	OA	EOM-OM	SISR-SR
Factor 6: Egalitarianism and Open-Mindedness–Open-Mindedness	9.925	3.198	0.320							
EO1. As long as needed, the scene about sex should not be cut from movies.	3.499	1.479	0.176						0.335	
AH7. We should be more open on the issue of sex.	3.252	1.430	0.356						0.413	
AH1. A couple who cohabit without being legally married should not be disparaged.	3.175	1.507	0.325						0.327	
Factor 7: Social Isolation and Self-Reliance–Self-Reliance	11.476	3.052	0.299							
SI5. After children get married, they should no longer live with their parents.	3.948	1.554	0.178							0.330
SI9. Although parents are still alive, money earned by children should belong to themselves.	4.124	1.421	0.244							0.296
SI6. Making friends in the opposite sex is their own business, children don't need to tell their parents.	3.404	1.396	0.338							0.263

Note. All the item-total/subscale correlations are statistically significant, at either $p < .01$ or $p < .05$ levels. MS-CIME = Multidimensional Scale of Chinese Individual Modernity for Elders; FOM = Freedom of Marriage; RFA = Respect for Affection; EOM-OM = Egalitarianism and Open-Mindedness–Open-Mindedness; SISR-SR = Social Isolation and Self-Reliance–Self-Reliance; EOM-E = Egalitarianism and Open-Mindedness–Egalitarianism; SISR-SI = Social Isolation and Self-Reliance–Social Isolation; OA = Optimism and Assertiveness; AH = Affective Hedonism; EO = Egalitarianism and Open-Mindedness; SE = Sex Equality; SI = Self-Independence.

Table 4. Bivariate Pearson Correlations Among the MS-CIME and Its Subscales, Socio-Economic Status, Daily Activities, Self-Image, and Life Satisfaction (N = 445).

	Overall	AH-FOM	AH-RFA	EOM-E	SISR-SI	OA	EOM-OM	SISR-SR
Attitudinal modernity								
1. Overall								
2. Affective Hedonism–Freedom of Marriage	0.659***							
3. Affective Hedonism–Respect for Affection	0.647***	0.335***						
4. Egalitarianism and Open-Mindedness–Egalitarianism	0.531***	0.360**	*0.243***					
5. Social Isolation and Self-Reliance–Social Isolation	0.506***	0.047	0.244***	0.043				
6. Optimism and Assertiveness	0.556***	0.387***	0.300***	0.278***	0.07*			
7. Egalitarianism and Open-Mindedness–Open-Mindedness	0.539***	0.211***	0.440***	0.054	0.201***	0.097**		
8. Social Isolation and Self-Reliance–Self-Reliance	0.512***	0.242***	0.125***	0.228***	0.19***	0.104**	0.146***	
9. Socio-Economic Status	0.138*							
10. Daily Activities	0.150***							
11. Self-Image	0.146***							
12. Life Satisfaction	0.096**							

Note. MS-CIME = Multidimensional Scale of Chinese Individual Modernity for Elders; AH-FOM = Affective-Hedonism–Freedom of Marriage; AH-RFA = Affective-Hedonism–Respect for Affection; EOM-E = Egalitarianism and Open-Mindedness–Egalitarianism; SISR-SI = Social Isolation and Self-Reliance–Social Isolation; OA = Optimism and Assertiveness; EOM-OM = Egalitarianism and Open-Mindedness–Open-Mindedness; SISR-SR = Social Isolation and Self-Reliance–Self-Reliance.

* $p < .05$. ** $p < .01$. *** $p < .001$.

($r = .512$). These correlations were all statistically significant. With the exception of (a) SISR-SI and AH-FOM, (b) SISR-SI and EOM-E, and (c) EOM-E and EOM-OM, all correlations between the subscales were statistically significant, reaching at least the level of $p < .05$ (see Table 4). These reliability results seemed to be adequate for the general research purpose (Henson, 2001) and indicated acceptable internal consistency of the MS-CIME and its subscales.

Convergent Validity

Convergent validity determines whether or not the scale demonstrates the relationships shown to exist based on theory or prior research (Hair et al., 2010). The last four rows in Table 4 report the correlations of the MS-CIME and other constructs that were hypothesized to be associated with individual modernity. As expected, overall MS-CIME scores correlated significantly with older adults' socio-economic status ($r = .138, p < .05$), participation in daily activities ($r = .150, p < .001$), self-image ($r = .146, p < .001$), and life satisfaction ($r = .100, p < .01$). This provides initial evidence of acceptable convergent validity of the MS-CIME. With respect to criteria-referenced validity of the behavioral modernity scale, it was also positively correlated with older people's socio-economic status ($r = .571, p < .001$), daily activity level ($r = .329, p < .001$), self-image ($r = .370, p < .001$), and life satisfaction ($r = .160, p < .01$).

Contrary to previous expectations, older adults' attitudinal modernity measured by the MS-CIME was not significantly correlated with behavioral modernity. Interestingly, when similar analyses were conducted for urban and suburban/rural older participants separately, attitudinal modernity and behavioral modernity were significantly correlated ($r = .245, p < .01$) among suburban/rural participants but not among urban participants. Moreover, urban and suburban/rural participants differed significantly in the domain of behavioral modernity (urban mean = 30.061, suburban/rural mean = 25.514, $F = 45.074, p < .001$). Suburban/rural participants reported higher scores in attitudinal modernity (urban mean = 99.603, rural mean = 102.760, $F = 6.314, p < .05$).

Discussion

A few limitations of this study should be noted when interpreting the findings. First, with the local nature of the sample, one should be cautious about generalizing the findings to all older Chinese adults. Second, although principal component analysis is one of the most widely used exploratory factor analysis, opinions are divided on whether it is the best practice for exploratory factor analysis and it may not yield the best results for this dataset. It would be desirable if future validation studies could be conducted using principal axis analysis (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Third, with only one sample included, the study was unable

to further validate the scale with an entirely different sample. Fourth, although several behavioral modernity items were added to the original scale (as did Smith & Inkeles, 1966, in developing the OM scale), the factorial structure of the behavioral modernity items needs to be further explored as they were not developed specifically for matching with the MS-CIME domains.

Despite these limitations, this study represents a first effort working on the measurement of older Chinese adults' individual modernity. The results of principal component analysis suggested a seven-factor solution with 25 items, while the subsequent CFA further confirmed that this seven-factor model fits the data obtained. Although the seven factors have almost covered the most important dimensions of individual modernity identified in previous studies (Yang, 2003, 2004), and the reported factor structure was slightly different from what was previously assumed in Yang's original version, indicating the uniqueness of the scale when used with the older Chinese. For instance, the Egalitarianism and Open-Mindedness aspect was separated into two dimensions: Egalitarianism and Open-Mindedness. Similarly, the Self-Independence aspect was divided into two individual dimensions: Social Isolation and Self-Reliance; and Affective Hedonism emerged as two factors: Respect for Love and Freedom of Marriage. In addition, Sex Equality was merged into Egalitarianism.

A closer look at the items in the separated domains indicated that slight differences do exist in the measurement foci in these domains. For instance, the Egalitarianism domain concerns primarily equality between male and female, young and old, and between different social statuses, while open-mindedness measures attitudes toward sex. Social Isolation domain items examine attitudes and willingness toward interpersonal interaction, while those in the Self-Reliance domain assess views toward children's independence from their parents. Participants were often concerned about the freedom of marriage, which stood out as one of the important factors in the adapted MS-CIME. This may be explained by the fact that traditional Chinese marriages tend to be arranged marriages rather than liberal ones. Contrary to regulations stipulated in the New Marriage Law, many older participants entered a marriage that was not based on their own choice (X. H. Xu & Whyte, 1990).

Tests on the reliability of the MS-CIME indicated an acceptable level of internal consistency and test-retest reliability. Convergent validity was demonstrated by its correlation with socio-economic status, daily activities, self-image, and life satisfaction in expected directions. Such associations were consistent with previous research evidence (Kunzmann et al., 2000). In addition, the reliability level for the behavioral modernity scale was also satisfactory, and it was positively correlated with all the aforementioned criteria.

A relevant but surprising finding was that attitudinal modernity and behavioral modernity were significantly correlated ($r = .245, p < .01$) only among suburban/rural

participants. Urban participants had significantly higher behavioral modernity than their suburban/rural counterparts (urban mean = 30.061, suburban/rural mean = 25.514, $F = 45.074$, $p < .001$), but suburban/rural participants had a higher attitudinal modernity score (102.76) than their urban counterparts (99.60; $F = 6.314$, $p < .05$).

The finding that urban participants reported a significantly higher behavioral modernity than their suburban/rural counterparts is not difficult to understand. In the qualitative interviews, urban participants reported better access to digital products, as they were usually better educated, had higher incomes, and were better protected by the welfare system. It is thus natural to expect that they were more modern in their behaviors than their suburban/rural counterparts (Bai, 2016; Chow & Bai, 2011; Zhang, Zheng, & Wang, 2003). As for why a higher behavioral modernity score for urban participants did not lead to a higher attitudinal modernity level, one possible interpretation concerns the prevalence of mass media and more frequent information exchanges between urban and suburban/rural areas. People living in suburban/rural areas are also affected by the process of societal modernization and gradually adapt to some modern values.

An alternative explanation is that suburban/rural older people are more likely than urban older people to passively accept the facts that are put before them (Bai, 2016; Piron, 2006). Suburban/rural participants may have tended to agree with modern attitudinal modernity items, while more urban participants reflected on the appropriateness of certain modern values after achieving a certain level of attitudinal modernity. As was mentioned earlier, some participants in pilot interviews criticized the use of the item “When a wife has different opinions from her husband, she should insist on her own” to examine a person’s social independence level. They felt that on one hand, agreeing with this item was indicative of a person’s high self-reliance level (e.g., an indicator of modernity level). On the other hand, it might also indicate that one did not understand the importance of mutual respect, which is valued in modern society.

Suburban/rural older participants were more likely than their urban counterparts to agree that (a) one should not spend too much time on family members as family life is only part of life ($F = 19.316$, $p < .001$), (b) there is no need to stop the couple in quarrel next door ($F = 4.113$, $p < .05$), (c) others should not disparage a cohabitating couple without legal marriage ($F = 7.078$, $p < .01$), and (d) people should be more open on the issue of sex ($F = 27.187$, $p < .001$). People living in a relatively traditional society might feel that they had spent too much time dealing with family issues, been tired of having many unnecessary social interactions, and believed that people were too conservative about sex, and would therefore anticipate certain modern changes in relation to these aspects. On the contrary, after witnessing the weakening of a traditional culture that emphasized the importance of family life (Gillies & Edward, 2005), and after suffering the negative effects of being too open about sex,

people in a more modern society might have started to critically reflect on whether the loosening of family ties, the disconnection from neighbors or friends, and increasing tolerance of appropriate and inappropriate sex behaviors were all they wanted from the process of societal modernization. In fact, the role of older people in guiding the evolution of modern culture and in resisting the potential negative impacts of modernization has started to be acknowledged by a number of scholars in recent years (Bai, 2016; Coe & Palmer, 2009).

Hence, the disagreement of urban older people with certain modern attitudes may not necessarily mean that they are less modern in attitude. Rather, compared with their rural counterparts, they may have more reasons to claim themselves to be “postmodern” in attitude owing to their reflections and critical views on certain modern values.

Implications

Although individual modernity to some extent reflects a personal choice of lifestyle, resisting to the changes or withdrawal from the modernization process is commonly perceived as a potential barrier for positive participation in the information society as suggested by the social exclusion theory (Steyn & Johanson, 2011). Consistent with the hypothesis of the social exclusion theory, in evaluating the convergent validity of the MS-CIME, we found that levels of individual modernity were positively associated with self-image and life satisfaction in older people.

Therefore, much is to be gained if older people can be encouraged and supported to better adapt to societal modernization, rather than being stereotyped and marginalized in this process (Bai, 2016). When working with older clients who have low self-esteem or depression, service providers may encourage older clients, when their physical and cognitive conditions permit it, to have more access to products that reflect societal modernization and to keep themselves informed about important updates of current issues. At the same time, it is important to encourage family members to give support (both emotional and financial) and guidance so as to help the older client better adapt to or cope with the changes in both values and behavioral patterns brought forth by modernization. The validated MS-CIME, together with other outcome measurements, can be used in evaluating the effectiveness of such programs and to monitor the psychological and behavioral changes among older Chinese people in the process of modernization in Chinese communities.

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Author Contributions

Xue Bai planned this study, collected data, performed statistical analysis, and drafted the article. Daniel W. L. Lai and Nelson W. S. Chow contributed ideas for revising the article.

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