Acculturation and Mental Health among Rural-Urban Migrants in Urbanizing China

ZhongshanYue
Ph. D.
Department of Sociology
and
Institute for Empirical Social Science Research,
School of Humanities and Social Science,
Xi'an Jiaotong University, Xi'an, Shaanxi Province, 710049, China
Email: yuezhsh@gmail.com, zhshyue@xjtu.edu.cn
Tel & Fax: +86-29-8266-8384

Shuzhuo Li
Ph. D.
Institute for Population and Development Studies
School of Public Policy and Administration
Xi'an Jiaotong University, Xi'an, Shaanxi, 710049, China

Eric Fong
Ph. D.
Department of Sociology & Centre on Migration and Mobility
The Chinese University of Hong Kong, Hong Kong, China
and
Institute for Population and Development Studies
School of Public Policy and Administration
Xi'an Jiaotong University, Xi'an, Shaanxi, 710049, China

Marcus W. Feldman
Ph. D.
Morrison Institute for Population and Resource Studies
Stanford University, Stanford, CA 94305

Abstract:

In China, moving of massive internal migrants to cities from rural areas in pursuit of their urban dream has posed a number challenges for mental health. A few most recent studies have considered acculturation as a multidimensional and bicultural concept and shown that it is related to mental health of international immigrants. Rural-urban migrants experience a special process of rural-urban acculturation. Using data from a survey of rural-urban migrants in 2015-2016 in Guangdong, China, this paper is one of the few that empirically investigates the link between acculturation and mental health among rural-urban migrants by considering acculturation as a multidimensional (in terms of component of acculturation such as practices, values, and identifications) and bicultural (in terms of the independence of rural culture and urban culture orientations) process. We use latent class analysis (LCA) and identify four acculturation categories: rural-oriented integration, urban-oriented integration, integration-potential separation, and marginalization-risk separation. Mental health is assessed in terms of depression and life satisfaction. Rural-urban migrants in the category of rural-oriented integration have significantly lower level of depression and higher level of life satisfaction. This suggests that migrants should be encouraged to both maintain the rural culture and acculturate to the urban culture at the same time. Pushing migrants to assimilate to the urban culture and to discard rural culture does harm to their mental health. The findings demonstrate that the effects of acculturation on mental health of rural-urban migrants are partially mediated by social support and socioeconomic status but not by perceived stress. When migrants has been acculturating to the urban culture, they get higher socioeconomic status but at the expense of social support loss

from fellow villagers or fellow migrants. Thus, finding ways to maintain or even strengthen and develop social support of migrants while improving migrant integration will be beneficial to their mental health.

Introduction

Over the past decades, China has experienced rapid urbanization and accelerating rural-urban migration. By 2017, 58.52% of China's population lived in urban areas, of whom about 224.8 million were rural-urban migrants (China, 2018-02-28). Rapid urbanization has had important consequences for public health and posed a number of challenges of mental health for all developing countries (Harpham, 1994). In China, urbanization provides not only opportunities for improvements in migrant health such as higher income and access to improved health care but also substantial health risks such as occupational and traffic hazards, a set of different stressors from non-migrants including high mobility, high risk, lower social status compared with local urbanites, and separation from family and familiar social environment (Gong et al., 2012a; Hu et al., 2008).

Many studies have posited that acculturation is related to mental health of international immigrants (e.g., (Hunt et al., 2004; Koneru et al., 2007)), but fewer studies have addressed this link for internal migrants. Within many developing countries including China, internal migration from rural areas to cities has become extremely prevalent. Like their international counterparts, rural-urban migrants, who have transitioned from agricultural work in rural areas to jobs in factories and modern service industries in cities, also experience a special process of rural-urban acculturation (Beals, 1951; Gui et al., 2012; Yue et al., 2018b).

In previous international immigrant studies, acculturation was originally conceptualized as

a unidimensional and unidirectional process but now are considered multidimensional and bicultural[1] one. Therefore, research on acculturation and mental health is shifting the paradigm from unidimensional and unidirectional models to models that are multidimensional and bicultural. However, little comparable research using multidimensional and bicultural models has been conducted on the link between acculturation and mental health for rural-urban migrants. Understanding the relationship between acculturation and mental health of internal migrants can help the government and society to make policies and guide practices that aim to improve their mental health status.

Mental health of rural-urban migrants in China

Like their international counterparts, rural-urban migrants are generally healthier than the urban population in terms of physical health outcomes (Hu et al., 2008), although many studies have shown that rural-urban migrants in China are more likely to have infectious and communicable diseases, have an elevated level of substance abuse, and have a high risk of occupational disease and injuries (J. Chen, 2011; X. Chen et al., 2008b; Hu et al., 2008; Mou et al., 2013).

However, the healthy migrant phenomenon does not necessarily apply to mental health. Research on mental health of internal migrants has found major depression, depressive symptoms, and insomnia to be most common (Lu, 2010; Mou et al., 2013). Findings about

---

[1] In previous literature dimension refers to both component of acculturation (such as practices, values, and identifications) and orientation towards the culture of origin and the culture of the host society. To differentiate them, we define the former one as dimension and the latter one as direction. Therefore, in this study, wordings like "dimension", "unidimensional", "multidimensional" are related to the component of acculturation, wordings like "direction", "unidirectional", and "bidirectional/bicultural" refer to culture orientation towards origin culture and host culture.

mental health status of rural-urban migrants are mixed. For example, some researchers have found that rural-urban migrants have poorer mental health than non-migrants in rural areas and urban residents (X. Li et al., 2009). A study by Li et al (L. Li et al., 2007) showed that the mental health status of rural-urban migrants was worse than their rural counterparts, but was similar to urbanites. Factors that might affect rural-urban migrants' mental health include working/living conditions (Y. Lin et al., 2016; Lu, 2010), stigmatization (X. Li et al., 2006; Wang et al., 2010), migration experience (J. Chen, 2011), social support (Jin et al., 2012; Lu, 2010), socioeconomic status (J. Chen, 2011), physical health (J. Chen, 2011; L. Li et al., 2007), personality (Shen et al., 1998), stress that comes from work load and family separation (L. Li et al., 2007), discrimination (D. Lin et al., 2011; Wang et al., 2010), acculturation (Gui et al., 2012), and expectation-reality discrepancy (Wang et al., 2010).

Rural-urban acculturation of rural-urban migrants in China

Acculturation refers to a process of cultural change that arises following contact between individuals and groups of different cultural backgrounds (Redfield et al., 1936). Although the acculturation of rural-urban migrants in China is very different from that of international immigrants, one recent study (Yue et al., 2018b) shows that it conceptually meets Hunt et al 's (Hunt et al., 2004) four basic requirements in terms of cultural difference, identifiable groups, cultural contact, and cultural change. Drawing upon research on acculturation of international immigrants (e.g. (Berry, 2005; Schwartz et al., 2010)), they (Yue et al., 2018b) also constructed a multidimensional and bicultural framework including three dimensions (practices, values, and identifications) in both cultures (rural culture and

urban culture). Their (Yue et al., 2018a) conceptualization of acculturation among rural migrants in China is a first step in developing a framework for understanding the relationship between acculturation and mental health of rural-urban migrants in cities in many developing countries.

The traditional bicultural method proposed by Berry (Berry, 2005) to identify his four acculturation strategies is splitting scores of both origin and host societies at some cut points (median, mean, or scalar midpoint), then people who are high or low (or yes or no) on the two directions are categorized into one of the four acculturation strategies. This method assume that these four categories exist and are equally valid (Rudmin, 2003). Using such a priori cut points increases the likelihood that four types of strategies are well represented in the sample. However, more and more studies show that acculturation differs across migrant groups and interactional context in which it occurs. This means that not all of Berry's four categories may exist in any sample of migrants and some categories especially the marginalization category may not exist at all (Fox et al., 2013; Schwartz & Zamboanga, 2008). The validity of Berry's method has been criticized. To address these criticisms, over the past few years, Latent Class Analysis (LCA) that do not assume any priori theoretical model have been recommended and used by researchers (Fox et al., 2013; Rudmin, 2003; Schwartz et al., 2010). The major advantage is that LCA allows for formal statistical procedures for determining the number of clusters and thus is less subjective (Distefano & Kamphaus, 2006).

Using the same data as the present study and LCA models, Yue et al (Yue et al., 2018b)

identified four categories including two subtypes of integration (rural-oriented integration and urban-oriented integration) and two subtypes of separation (integration-potential separation and marginalization-risk separation), which provides partial support for Berry's (Berry, 2005) four-category acculturation model. Their preliminary findings (Yue et al., 2018b) have demonstrated that the integration acculturation strategy of rural-urban migrants also have beneficial effects on mental health like the link among international immigrants, with bicultural migrants having better mental health than others. However, the mechanisms behind the link have not been yet addressed in this previous study. We will investigate three possible mechanisms behind the link in the present study.

Acculturation and Mental Health

Many studies on international immigrants have examined the link between acculturation and mental health. The process of acculturation with numerous challenges and changes can benefit or adversely affect the health of immigrants (e.g., (Abraído-Lanza et al., 2006; Koneru et al., 2007)). However, despite both recent theories and clear empirical evidence favoring bicultural approaches to acculturation over unidirectional approaches, many of the studies relating acculturation to health outcomes continue to use unidirectional models. The major reason is that large epidemiological surveys based on which most research was conducted only covered acculturation variables of the host culture rather than ones of the origin culture. Most of these studies (e.g., (Alegría et al., 2008; J. Chen, 2011; D. Lin et al., 2011)) reported that higher level of acculturation were related to problematic health outcomes, poor physical health, and poor mental health (e.g., higher depression and

psychological distress), the so-called "immigrant paradox" phenomenon.

The limitation of using unidirectional models is obvious. It is not clear whether immigrant paradox phenomenon is due to immigrants' acquisition of host culture, loss of origin culture, or both. Policy and practice implications of these findings are also confusing. We do not know that whether immigrants should be encouraged to maintain the origin culture or be discouraged from acculturating to the host culture. Therefore, multidimensional and bicultural methods have been highly recommended (Schwartz et al., 2010; Schwartz & Zamboanga, 2008). Some recent research using smaller, convenience-based samples with bicultural measures of acculturation generally suggests that biculturalism (Berry's integration category) is associated with the most favorable psychosocial outcomes such as higher self-esteem and lower depression (Berry et al., 2006; Coatsworth et al., 2005; David et al., 2009; Fox et al., 2013; Phinney et al., 2001; Schachter et al., 2012)). Among rural-urban migrants, the link has not been investigated to date. An exception is Gui et al's (Gui et al., 2012) study, using a bivariate analysis, they show that the integrated identity is associated with the best wellbeing, which accords with much of the existing research on acculturation among international immigrants. However, they did not incorporate practices and values into their acculturation construct, and multivariate analyses is needed to confirm this link further after controlling for possible confounders that may influence psychological wellbeing.

The relationship between acculturation and health can be mediated through awareness of health systems and resources (Koneru et al., 2007; Schachter et al., 2012). However,

without local *hukou*, rural-urban migrants are institutionally excluded from access to health services in city society, on one hand; on the other hand, in China awareness of mental health issues is very low, the stigma associated with mental problems is really serious, and the mental health services are not adequate (Phillips, 1998). People and their family usually do not think mental disorders as health problems and would not go to hospital seeking for professional help. Thus, there are at least three more important explanatory mechanisms behind the link between acculturation and mental health among rural-urban migrants in China.

The first mechanism is related to social support. Cultural practices, values, and identifications may shape how migrants maintain the old social connections and construct new ones, which are the source of social support that is positively associated with mental health (Wong & Leung, 2008; Zhang & Ta, 2009). Bicultural migrants may be better equipped both to retain social connections either in hometown or with fellow migrants living in the same host society and construct new ones with local residents of the receiving society, which has been used to explain the positive association between bilingualism and self-rated health (e.g., (Mulvaneyday et al., 2007)). Previous studies show the abundance or shortage of social support for both left-behind family members in sending areas and migrants in receiving areas matters for people's psychological wellbeing (Cheung, 2013; Koneru et al., 2007; Lu, 2012).

The First second is about acculturative stress. In the process of long-term acculturation, acculturative stress may arise when the practices, values, and identifications of migrants'

original culture conflict with host culture (Berry, 2005; S. X. Chen et al., 2008a; Schwartz et al., 2010). However, those bicultural migrants, who endorse or integrate both cultures, may be experience lower level of stress in their working places and neighbourhoods. Because the availability of both origin and host cultures can activate the correct cultural schema to avoid or reduce stress in any given situation (S. X. Chen et al., 2008a; Schwartz et al., 2010). Take the practices of language speaking for example, limited or non-local language speakers may have higher stress levels (Gee & Ponce, 2010). Accordingly, bicultural immigrants with lower levels of acculturative stress may be have the most favorable psychological outcomes.

The third pathway through which acculturation affect migrant health may be socioeconomic status (SES), a widely acknowledged major predictor of health status (Gong et al., 2012b; Schachter et al., 2012). First, language proficiency is often a decisive factor in employment opportunities. Migrants who are incompetent in local language face difficulty in finding jobs, especially well-paid jobs. Second, as mentioned earlier, acculturation can shape migrants' social networks. Migrant networks contribute to economic outcomes such as access to the labour market and income. Especially in the initial stage of migration, kin-based and ethnicity-based connections in the destinations can facilitate migrants' job seeking in labor market (Zhao, 2003). So keeping the old social connections with fellow migrants play an important role in their status attainment. Beyond kin and ethnic ties, social ties gradually constructed by both internal migrants and international immigrants with the local residents in destination areas, are a valuable host-

area-specific social resource that can facilitate socioeconomic integration into the receiving societies (Lancee, 2010; Yue et al., 2013). Third, for the case of rural-urban migration, late socialization experiences such as factory work and later life in the city can help migrants become modern (A. Inkeles et al., 1997; Alex Inkeles & Smith, 1974) and vice versa. Rural migrants' higher level of individual modernity, such as planning their affairs in advance, completing jobs on time, and valuing diversity, openness, and novelty, can make them to be more competent to their job, earn more money, and get promoted more quickly. All the Language proficiency, social connections, and values are part of rural-urban migrants' acculturation. Accordingly, we expect that SES mediates acculturation-health link.

The literature has paid much more attention to international immigrants and examination of the link between acculturation and mental health among rural-urban migrants may add more insights into understanding the link.

Methods

Sample

Data for this study come from a survey of rural-urban migrants conducted by Xi`an Jiaotong University, Shaanxi Normal University, and Sun Yat-Sen University from late December 2015 to March 2016 in Guangzhou, the capital of Guangdong Province. As "the South Gate of China," Guangzhou is currently one of the most populous cities in mainland China, one of China's National Central Cities, and one of the key receiving cities for rural-urban migrants in China. By the end of 2015, Guangzhou had a population of 13.50 million,

of which 36.73% were migrants (including other kinds of migrants besides rural-urban migrants) (Guangzhou Statistics Bureau and Guangzhou Survey Team of Bureau of Statistics of the People's Republic of China, 2016). Since there was no sampling frame available for the migrant survey, a quota sampling method was adopted. This method was used to cover major migrant-receiving districts and all the typical industries in which rural-urban migrants are engaged, in order to increase our sample's representativeness and diversity. The Survey was conducted in the five districts of Guangzhou in which the most migrants lived: Baiyun, Tianhe, Panyu, Haizhu, and Huangpu. According to data released in 2016 by Guangzhou Statistics Bureau, 79.4% of migrants in Guangzhou lived in these five districts at the end of 2015 (Guangzhou Statistics Bureau, 2016). The smallest sampling unit of the survey is street/town, and about 100 respondents were interviewed from each street/town. Guangzhou had about 136 streets/towns in 2015. Based on the distribution of rural migrants in each of the five districts, 15 streets/towns were randomly selected in total. In each street/town, we also selected cases according to the industries in which migrants were employed, as reported in the 2014 Guangzhou Migrant Population Dynamic Monitoring Survey, conducted by the National Health and Family Planning Commission of PRC. In the process of the survey, we kept an even gender distribution and a 2/3 proportion of married migrants in each street/town to reflect the distribution in 2014 Guangzhou Migrant Population Dynamic Monitoring Survey.

We interviewed rural-urban migrants over 15 years old who had non-Guangzhou *hukou*. All respondents were interviewed face-to-face by trained interviewers. Since there was

great response in some districts, the total number of migrant respondents was 1,621 after ineligible ones had been excluded. Our non-probability sampling method produces bias in our data, which may restrict our ability to generalize our findings. However, given the relatively large size and diversity of our sample, our data are still useful for detection of acculturation pattern and association analyses although at the cost of detailed accuracy. The study was approved by Xi'an Jiaotong University in China.

Measures

Dependent variables: depression and life satisfaction

This study focuses on two mental health outcomes: depression and life satisfaction. Depression was assessed by CESD-10, a ten-item self-reported scale designed to identify depressive symptoms (experienced in the last week) in the general population. The measurement properties of CESD-10 have been assessed in previous studies (e.g.,(Andresen et al., 1994)), with satisfactory test–retest correlations and good predictive accuracy when compared with the original full-length 20-item version of the CES-D developed by Radloff (Radloff, 1977). A sample item is "I was bothered by things that usually don't bother me". All items were scored on a four-point Likert scale ranging from rarely (scored 0) to most of the time (scored 3), and summed across the ten items to provide a total CESD-10 score. This scale was found to have adequate reliability for the current study (Cronbach's alpha = **0.806**).

We use the Satisfaction with Life Scale (SWLS) developed by Diener and colleagues (Diener et al., 1985) to measure life satisfaction. The 5-item SWLS is responded to on a

five-point Likert scale (1=strongly disagree to 5=strongly agree). An example item is "I am satisfied with my life." Cronbach's alpha for SWLS in this research is **0.784**. The scores on the five items were summed.

Independent variable: acculturation

Under the multidimensional and bicultural framework, acculturation of rural-urban migrants is assessed by cultural practices, cultural values, and cultural identities in relation to both rural culture and urban culture.

Migrants' cultural practices are measured by using of native dialect / Mandarin Chinese when talking with urbanites in Guangzhou (1=speak Cantonese, the local dialect in Guangzhou, 2=bilingual, 3=speak native dialect or Mandarin Chinese), dialect proficiency (1=cannot understand Cantonese, 2=can understand some Cantonese but cannot speak, 3=can both understand and speak some Cantonese, 4=proficient in Cantonese) and social ties with non-urbanites and urbanites. In the survey, each migrant respondent was asked to report "over the past few months, concerning private matters rather than work issues, how many family members or relatives, and friends have you contacted frequently with face-to-face meetings, phone or text messages, or email/snail mail". They were also asked to report the specific number of local urban residents among family members or relatives, and friends. We use the number of a respondent's social ties with local urban residents and non-urbanites to measure social ties with urbanites and non-urbanites, which are operationalized as continuous variables. It is a regret that we did not collect information on migrants' food preference, which is a possible measure of cultural practices.

We use "attitude towards culture maintenance" and "individual modernity" to operationalize rural values and urban values, respectively. Attitude towards culture maintenance of the original culture is measured with four observed variables adapted from Zagefka and Brown's (Zagefka & Brown, 2002) scale. One sample item is "I think it is important that we migrants in this city maintain our own way of living." All items were measured on a five-point Likert scale (1=strongly disagree to 5=strongly agree). Cronbach's alpha for this scale is **0.785.** Culture maintenance is measured by the sum score of these four items. Following Yue et al (Yue et al., 2013), we use individual modernity to measure the extent to which migrants have acculturated to urban values. We attempted to assess migrants' modernity using the following four qualities: keeping informed about the world, manifesting a sense of personal efficacy and a general abandonment of passivity and fatalism, seeing the virtues of planning and showing an interest in carefully planning their affairs in advance, and liking people to be on time. We selected only one item to reflect each quality from Inkeles and Smith's (Alex Inkeles & Smith, 1974) scale of modernity, with minor modifications made to fit the Chinese context. The final index of modernity includes four qualitative aspects. A sample is "what do you think one's success depends on?"(1=mainly luck, 2=half luck and half personal efforts, 3=mainly personal efforts). Our index of modernity is calculated as the sum of the scores for the above four qualities.

We use "urban identity" and "rural identity" to operationalize bicultural identifications. Sense of belonging to cities can reflect the extent to which migrants identified themselves as members of urban society. Following Yue et al (Yue et al., 2013), sense of belonging is

measured with four items adapted from Bollen and Hoyle's (Bollen & Hoyle, 1990) scale: I feel a sense of belonging to cities, I feel that I am a member of cities, I feel at home in cities, and I see myself as part of cities. All four items were scored on a five-point Likert scale (1=strongly disagree to 5=strongly agree). Cronbach's alpha is **0.862**. We use the sum score as a measure of the culture identity towards city society. Based on the above "urban identity" scale, we got the "rural identity" scale by only changing the word "cities" into "hometown". Cronbach's alpha is **0.832**. We use the sum score as a measure of the culture identity with rural society.

Mediators: social support, perceived stress, and SES

We adapted the 12-item Multidimensional Scale of Perceived Social Support developed by Zimet et al (Zimet et al., 1988) to measure migrants' social support. These 12 items are divided into factor groups relating to three different sources of the social support, namely family or relatives, friends or fellow villagers, or colleagues or fellow workers. All items were scored on a five-point scale (1=strongly disagree to 5=strongly agree). The scores on the 12 items were summed. A sample item is "my friends or fellow villagers really try to help me". Cronbach's alpha is **0.829**.

We chose 4 items from Chinese Perceived Stress Scale (CPSS) (Yang & Huang, 2003), which was translated from Cohen et al's (Cohen et al., 1983) Perceived Stress Scale (PSS), to measure perceived stress. All the four items were scored on a five-point scale (1=never to 5=very often). The scores on the four items were summed. A sample item is "in the last month, how often have you felt confident about your ability to handle your personal

problems?" Cronbach's alpha is **0.617**.

Measures of SES included occupational status (1=non-manual labor including administrators, managers, professional or technical employees, clerk or owner of a private enterprise, 2=semi-manual labor including technical workers and self-employed entrepreneurs, 3=manual labor including all other occupations), perceived social status (how do you rate your own social status with the range from 1-10), income, and housing conditions. Income is operationalized as the common logarithm of monthly income plus one. Adapted from Wu's (Wu, 2004) study, we use a single scale with five aspects to measure housing conditions: (1) piped gas or propane (0=no, 1=yes), (2) kitchen(0=no, 1=shared, 2= private), (3) toilet (0=public only, 1=shared, 2=private), (4) shower room (0=no, 1=shared, 2= private), and (5) purpose of dwelling (0=residential and working or other purpose, 1=solely residential). The index is calculated as the sum of the five responses. Both objective (occupational status, income, and housing conditions) and subjective measures (perceived SES) are used in our study, which is very necessary. Previous studies shows both objective and subjective SES play a role in psychological well-being of rural-urban migrants (Yue et al., 2018a).

Covariates

Drawing upon previous studies, we group possible factors into three categories, i.e., demographic and personal characteristics, migration characteristics, and working and living status.

Variables of demographic and personal characteristics include gender (1=male; 0=female),

age in years, marital status (1=married, 0=other), education (1=primary school or below, the reference group, 2=junior high school, 3=senior high school, vocational school, or technical secondary school, 4=college or university), minority ethnicity (0=Han Chinese, 1=other), extroverted personality, and general health.

We chose 5 items from the 8-item extraversion subscale in the Neuroticism Extraversion Openness Five-Factor Inventory (NEO-FFI) developed by Paul and McCarae (Paul T. Costa & McCrae, 1992). All five items were scored on a five-point Likert scale (1=strongly disagree to 5=strongly agree). Cronbach's alpha is **0.748**. A sample item is "I enjoy talking with people very much." The scoring of the only negative item was reversed. We use the sum score as a measure of personal characteristics, with higher scores indicating more extroverted.

We used the 5-item subscale of general health from the Chinese 36-Item Short Form Health Survey (SF-36) (李. Li et al., 2002) translated from English version(Ware et al., 1993). The scores on the 5 items were summed and then directly transformed into a 0-100 scale, with higher scores indicating higher perceived general health. Cronbach's alpha of the scale is **0.801.**

Migration characteristics include migration distance (0=intraprovincial migration, 1=interprovincial migration), the common logarithm of duration of stay in the present city in years plus one, spouse migration (1=having spouse who migrated with respondent to Guangzhou, 0=having no spouse or having spouse but who did not migrated with respondent), and left-behind children (1=respondents reported they had children aged 16

or less at hometown, 0=no).

Variables of working and living status include common logarithm of number of working hours per week plus one, employment status (1=employer, the reference group, 2=self-employed, 3=employee), discrimination (1=ever-discriminated against, 0=never), and medical insurance (1= having medical insurance in Guangzhou, 0= not having).

Analyses

Following Yue et al (Yue et al., 2018b), LCA is used to evaluate Berry's model of acculturation and to identify groups of rural-urban migrants with similar patterns of scores on their multidimensional and bicultural acculturation in the software Mplus 7.4 (Muthén & Muthén, 1998-2015).

Second, analysis of variance (ANOVA) and Post hoc comparisons were conducted on the clustering variables. This allows us both to ensure that the acculturation variables sufficiently discriminated between clusters and to identify which acculturation category of Berry's are best represented by each latent class.

Third, using ANOVA, Post hoc comparisons, or cross-tabulation analysis depending on the focal variable is continuous/ordinal or categorical; we describe and compare mental health and mediators by latent class. We also provide descriptive statistics for all covariates by latent class.

Finally, to examine the link between acculturation and mental health, we conducted exploratory mediation analyses using OLS regressions in IBM SPSS Statistics 21.0. Then, final confirmatory analyses were done by multicategorical mediation test in multiple

mediator models with the PROCESS Version 3.0 developed by Hayes (Hayes, 2018) in the IBM SPSS Statistics 21.0.

206 cases with missing data in any of all the 31 variables we used were excluded, leaving a sample of 1,415 for our analyses. On average, 12.19 cases were excluded by each variable, with a minimum of 0 case excluded by 9 variables (e.g., age) and a maximum of 64 cases (3.95% of all the 1,621 cases) excluded by the variable of employment status. No explicit evidence show that data missing leads to systematic bias.

Results

As Yue et al (Yue et al., 2018b) have shown, by comprehensively considering all the fit statistics including AIC, BIC, ABIC, Entropy, LMR LRT value, and ALMR LRT value, the 4-class model was considered as the best fit of the data. Table 1 displays the ANOVA and Post hoc comparison results of acculturation variables by latent class. We calculated not only the mean and standard deviation for each latent class, but also a "range score" (RS). For each latent class, this score represents the proportion of the range of possible scores captured by the cluster mean. For example, the RS would be -1.00 for a cluster scoring at the bottom of the possible range, 1.00 for cluster scoring at the top of the possible range, and 0.00 for cluster scoring at the scale midpoint (for scale) or the indicator mean of the total sample (for indicator variables). We also calculated composite rural RS and composite urban RS for each class. ANOVAs show acculturation variables are significantly discriminated between clusters.

Based on the patterns and composite RSs appearing in Table 2, we can see that Cluster 2 (C2) is oriented to the urban culture with higher composite urban RS and lower composite rural RS; Cluster 1 (C1) is oriented to the rural culture, with higher composite rural RS and lower composite urban RS; Cluster 3 (C3), with the highest composite rural RS and a slightly negative composite urban RS of -0.02, is very close to the integration category, which means migrants in C3 is very potential to climb up into the integration category; Migrants in Cluster 4, with the lowest negative composite urban RS and the second lowest but still positive composite rural RS, possibly risk falling down into the marginalization category. Thus, we labeled C1 as Rural-Oriented Integration, C2 as Urban-Oriented Integration, C3 as Integration-Potential Separation, and C4 as Marginalization-Risk Separation.

We then cross-tabulated the clusters against mental health and mediators in Table 2. ANOVAs show that mental health is significantly associated with acculturation cluster. Migrants in C1 had the best status of mental health, with the lowest level of depression and the highest level of life satisfaction. Post hoc comparisons show that the level of depression of migrants in C1 is significantly lower than that of migrants in C3 and C4，and C3, with the highest score of depression, was significantly higher than C1 and C2. Speaking of life satisfaction, migrants in C1 with the highest level of life satisfaction were more satisfied with life than those in C2, C3, and C4. Migrants in C4 with the poorest life satisfaction were less satisfied with life than those in C1, C2, and C3.

Among the mediators, ANOVAs show that there is no significant relationship between perceived stress and cluster membership (p=0.138). Other mediators are significantly associated with acculturation cluster. Migrants in C1 had the highest level of social support and migrants in C4 had the lowest. The level of social support of C1 is significantly higher than that of C2, C3, and C4. In terms of SES, migrants in the urban-oriented integration cluster enjoyed highest SES among all the four clusters with the highest proportion of non-manual labor, highest score of self-perceived SES, and highest level of income and housing conditions. The status of housing conditions of migrants in C1 were as same as that of migrants in C2. Both C3 and C4 have significantly lower perceived SES and poorer housing conditions in comparison to C1 and C2. We can summarize that, by and large, bicultural migrants had better mental health status, social support, and SES.

Table 3 presents descriptive statistics of covariates for total sample and each acculturation cluster. A clear pattern we can find is that, social status of migrants in C2 was obviously better than that of migrants in C4. Migrants in C2 with lowest proportion of interprovincial migration had the highest level of education, shortest weekly hours of work, and highest coverage of local medical insurance. In contract, migrants in C4 with the highest proportion of interprovincial migration had lowest level of self-rated health, shortest duration of stay, most frequent experiences of discrimination, and lowest coverage of local medical insurance.

Table 4 and Table 5 provide results of Ordinary Least Squares (OLS) regression models on life satisfaction and depression, respectively. We show a series of six models in order to assess the direct effects of acculturation on meatal health and the mediating roles of the social support, perceived stress, and SES. For both life satisfaction and depression models, we see occupational status, as a measure of SES, is not significantly associated with mental health. Therefore, we did not incorporate occupational status in the mediation tests in multiple mediator models with the PROCESS Version 3.0. We just incorporated it in the models as a covariate.

Table 4 about here

Table 5 about here

We summarized the results of mediation tests in Figure 1. As Figure 1 illustrates, the regression coefficients between acculturation and social support, perceived SES, and income, except perceived stress, were statistically significant, as were the regression coefficients between all the mediators and mental health, an exception was the coefficient (-0.141) between income and depression.

Figure 1 about here

We tested the significance of these indirect effects using bootstrapping procedures with the PROCESS Version 3.0. Indirect effects were computed for each of 5,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The results of total effects, direct effects, and indirect effects were listed in Table 7. None of indirect effects through perceived stress was

statistically significant suggesting the mediating role of perceived stress was not confirmed. For social support and SES, at least one coefficient of C2, C3, or C4 and at least one indicator of SES have significant indirect effects on meatal health. Thus, acculturation cluster has significant effects on mental health, with social support and SES partially explaining these effects. In terms of the link between acculturation and life satisfaction, the direct effects of C2, C3, and C4 account for about 72%-90% of the total effects, mediation ratios (i.e., indirect effects as a percentage of total effects) of all the mediators accounted for about only 10%-28% of the total effects. Significant direct effects show that migrants in C1 had highest level of life satisfaction, following by migrants in C3, C2, and C4 from top to bottom. Among all the mediators, social support plays the most important mediating role in the link between acculturation and life satisfaction. Similar pattern holds for depression. The level of depression for migrants in C1 was significantly lower than that for migrants in C3. Taking all the indirect effects of acculturation clusters together, social support partially explaining acculturation-health link. Thus, our expectation of social support and SES's mediating role has been confirmed.

Table 6 about here

Specifically, taking the indirect effect of C2 for example, in comparison to C1, migrants in C2 had lower level of social support, through which they had significant lower lever of life satisfaction and higher level of depression, accounting for 24.45% and 529.97% of the total effect of C2 on life satisfaction and depression, respectively. The direct effect of C2 on life satisfaction is significant suggesting that, compared with C1, lower level of social support

of migrants in C2 directly led them to be at significantly lower level of life satisfaction, accounting for 90.02% of the total effect. However, the direct effect of C2 on depression is not significant suggesting that, in comparison to C1, the link between C2 and depression was fully mediated by social support.

Discussion

Socioeconomic transformation in developing countries has led to rapid urbanization and accelerating rural-urban migration. Rural-urban migrants in China experience a particular process of rural-urban acculturation (Beals, 1951; Gui et al., 2012; Yue et al., 2018b). According to previous studies on international immigrants, acculturation might be an important predictor of mental health of rural-urban migrants. Surprisingly, few empirical studies have focused on the acculturation of rural-urban migrants and research examining the link between acculturation and health is even rarer. Base on a multidimensional and bicultural framework, this paper is one of the few that empirically investigates the relationship between acculturation and mental health among rural-urban migrants. Our study has generalized the current acculturation theories and methods from international immigrants to internal migrants. Consistent with previous studies on their international counterparts, our findings show that bicultural rural-urban migrants also had the most favorable psychosocial outcomes.

After controlling for all the mediators and covariates, we found that the acculturation was significantly and directly associated with mental health. Migrants in acculturation category

of rural-oriented integration had the most favorable level of mental health. This might mean that maintaining higher level of rural culture and acquiring urban culture to some extent could be a more comfortable zone for mental health of rural-urban migrants (Yue et al., 2018b). The status of either urban-oriented integration or the other two subtypes of separation will be deleterious to their mental health. This finding strongly support that bicultural approaches are superior to unidirectional approaches. Policy and practice implications of these findings have become clear. Rural-urban migrants should be encouraged to both maintain the rural culture and acculturate to the urban culture at the same time. Pushing migrants to assimilate to the urban culture and to discard rural culture will do harm to their mental health. Both the government and civil society should provide friendlier environment facilitating migrants' integration and must be careful to deal with the relationship between rural culture and urban culture especially when they conflict with each other. Once such thing happens, scientific analysis and evaluation before and after a migrant policy initiated is very necessary.

Like many studies on international immigrants, we found bicultural groups (C1 and C2) enjoyed more favorable mental health than the separated ones (C3 and C4). It is interesting when we comparing mental health status of migrants in different acculturation cluster in terms of indirect effects through social support and socioeconomic status. Unsurprisingly, in comparison to C1 and C2, migrants in C3 and C4 who experienced double disadvantages in terms of social support and SES had the poorer status of mental health. At the same time, we can see migrants in rural-oriented integration group (C1) had higher level of social

support and lower level of SES than ones did in urban-oriented integration group (C2). The especially interesting finding is that, compared with C1, social support of migrants in C2 played a relatively larger negative mediating role in the link between acculturation and life satisfaction, but perceived SES and income, two measures of SES, played a smaller positive mediating role in the link because of lower level of SES for migrants in C2. For the link between acculturation and depression, compared with C1, a very large indirect effect (5.3 times of total effect) of C2 through social support has been found, but the mediating role of SES is not significant. Based on our findings, a bold but reasonable inference is that, if a migrant move from C1 to C2, he could get higher SES at the expense of loss of social support from fellow villagers or fellow migrants. It is might be possible for the government and society to find ways to maintain or even strengthen social support of migrants while improving migrant integration by replacing the lost personal support with institutional support from other sources, which carries far-reaching implications in policy making and practices related to mental health of rural-urban migrants.

Our expectation of mediating role of perceived stress in the link between acculturation and mental health has not been confirmed, which might suggest that acculturation itself is not the source of acculturative stress or leads to invariant stress for rural-urban migrants. After all, the culture shock of internal migrants is less than that of their international counterparts. For example, Mandarin Chinese can be used everywhere to communicate, although it is not that convenient if migrant do not speak local dialect. According to our mediation models, other factors such as job, general health, and discrimination experience might be

major sources of migrants' stress.

Our study has several limitations. First, it is important to note that our data are cross-sectional, both selection processes for migration at the very beginning and return migration during the stay in urban society caused sample bias in all the current studies on rural-urban migrants. We need to be cautious in interpreting the relationship we have modeled between acculturation and mental health. More robust conclusions would require longitudinal study. Second, we only use depression and life satisfaction to assess mental health. It would be very useful to examine the relationship of acculturation to other important health outcomes, which would allow more precise examination of health in its relation to acculturation. Third, we found that the link between acculturation and mental health is partially mediated by social support and SES. Future research is needed to identify other possible mediating mechanisms such as coping style (Koneru et al., 2007) and expectation-reality discrepancy (Wang et al., 2010) behind the link we could not address in this study. Despite these methodological limitations, this study with a multidimensional and bicultural framework is, to the best of our knowledge, one of the first to examine the link between acculturation and mental health among rural-urban migrants. Our preliminary findings concerning this relationship may be helpful in exploring the role of acculturation in mental health among other groups of internal migrants.

Acknowledgements

References

Abraído-Lanza, A.F., Armbrister, A.N., Flórez, K.R., & Aguirre, A.N. (2006). Toward a theory-driven model of acculturation in public health research. *American Journal of Public Health,* 96, 1342-1346.

Alegría, M., Canino, G., Shrout, P.E., Woo, M., Duan, N., Vila, D., et al. (2008). Prevalence of mental illness in immigrant and non-immigrant U.S. Latino groups. *American Journal of Psychiatry,* 165, 359-369.

Andresen, E.M., Malmgren, J.A., Carter, W.B., & Patrick, D.L. (1994). Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine,* 10, 77-84.

Beals, R.L. (1951). Urbanism, Urbanization and Acculturation. *American Anthropologist,* 53, 1-10.

Berry, J. (2005). Acculturation: Living successfully in two cultures. *International Journal of Intercultural Relations,* 29, 697-712.

Berry, J., Phinney, J., Sam, D., & Vedder, P. (2006). Immigrant youth: Acculturation, identity, and adaptation. *Applied Psychology,* 55, 303-332.

Bollen, K.A., & Hoyle, R.H. (1990). Perceived cohesion: A conceptual and empirical examination. *Social Forces,* 69, 479-504.

Chen, J. (2011). Internal migration and health: Re-examining the healthy migrant phenomenon in China. *Social Science & Medicine,* 72, 1294-1301.

Chen, S.X., Benet-Martínez, V., & Bond, M.H. (2008a). Bicultural Identity, Bilingualism, and Psychological Adjustment in Multicultural Societies: Immigration-Based and Globalization-Based Acculturation. *Journal of Personality,* 76, 803–838.

Chen, X., Stanton, B., Li, X., Fang, X., & Lin, D. (2008b). Substance use among rural-to-urban migrants in China: a moderation effect model analysis. *Substance Use & Misuse,* 43, 105-124.

Cheung, N.W. (2013). Rural-to-urban migrant adolescents in Guangzhou, China: Psychological health, victimization, and local and trans-local ties. *Social Science & Medicine,* 93, 121-129.

China, 国.N.B.o.S.o.t.P.s.R.o. (2018-02-28). Statistical Bulletin of PRC's National Economy and Social Development in 2017 中华人民共和国 2017 年国民经济和社会发展统计公报 http://www.stats.gov.cn/tjsj/zxfb/201802/t20180228_1585631.html (in Chinese).

Coatsworth, J.D., Maldonadomolina, M., Pantin, H., & Szapocznik, J. (2005). A person-centered and ecological investigation of acculturation strategies in hispanic immigrant youth. *Journal of Community Psychology,* 33, 157-174.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health & Social Behavior,* 24, 385-396.

David, E.J.R., Okazaki, S., & Saw, A. (2009). Bicultural self-efficacy among college students: Initial scale development and mental health correlates. *Journal of counseling psychology,* 56, 211-226.

Diener, E., Emmons, R., Larsen, R., & Griffin, S. (1985). The satisfaction with life scale.

Journal of Personality Assessment, 49, 71-75.

Distefano, C., & Kamphaus, R.W. (2006). Investigating Subtypes of Child Development: A Comparison of Cluster Analysis and Latent Class Cluster Analysis in Typology Creation. *Educational & Psychological Measurement,* 66, 778-794.

Fox, R.S., Merz, E.L., Solórzano, M.T., & Roesch, S.C. (2013). Further Examining Berry's Model: The Applicability of Latent Profile Analysis to Acculturation. *Measurement and Evaluation in Counseling and Development,* 46, 270-288.

Gee, G.C., & Ponce, N. (2010). Associations between racial discrimination, limited English proficiency, and health-related quality of life among 6 Asian ethnic groups in California. *American Journal of Public Health,* 100, 888-895.

Gong, P., Liang, S., Carlton, E.J., Jiang, Q., Wu, J., Wang, L., et al. (2012a). Urbanisation and health in China. *The Lancet,* 379, 843-852.

Gong, P., Liang, S., Carlton, E.J., Jiang, Q., Wu, J., Wang, L., et al. (2012b). Urbanisation and health in China. *Lancet,* 379, 843-852.

Guangzhou Statistics Bureau. (2016). Guangzhou Population Size and Distribution in 2015.

Guangzhou Statistics Bureau and Guangzhou Survey Team of Bureau of Statistics of the People's Republic of China. (2016). National Economy and Social Development Statistical Bulletin of Guangzhou, 2016.

Gui, Y., Berry, J.W., & Zheng, Y. (2012). Migrant worker acculturation in China. *International Journal of Intercultural Relations,* 36, 598-610.

Harpham, T. (1994). Urbanization and mental health in developing countries: a research

role for social scientists, public health professionals and social psychiatrists. *Social Science & Medicine,* 39, 233-245.

Hayes, A.F. (2018). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach (2nd Ed)*. New York: The Guilford Press.

Hu, X., Cook, S., & Salazar, M.A. (2008). Internal migration and health in China. *The Lancet,* 372, 1717-1719.

Hunt, L.M., Schneider, S., & Comer, B. (2004). Should "acculturation" be a variable in health research? A critical review of research on US Hispanics. *Social Science & Medicine,* 59, 973-986.

Inkeles, A., Broaded, C.M., & Cao, Z.D. (1997). Causes and consequences of individual modernity in China. *China Journal,* 37, 31-59.

Inkeles, A., & Smith, D.H. (1974). *Becoming Modern: Individual Change in Six Developing Countries*. Cambridge: Harvard University Press

Jin, L., Wen, M., Fan, J., & Wang, G. (2012). Trans-local ties, perceived social status and mental health among Rural-to-urban migrants in Shanghai. *Social Science & Medicine,* 75, 288-296.

Koneru, V.K., Weisman de Mamani, A.G., Flynn, P.M., & Betancourt, H. (2007). Acculturation and mental health: Current findings and recommendations for future research. *Applied and Preventive Psychology,* 12, 76-96.

Lancee, B. (2010). The Economic Returns of Immigrants' Bonding and Bridging Social Capital: The Case of the Netherlands1. *International Migration Review,* 44, 202–226.

Li, L., Wang, H., Ye, X., Jiang, M., Lou, Q., & Hesketh, T. (2007). The mental health

status of Chinese rural–urban migrant workers. *Social Psychiatry and Psychiatric Epidemiology,* 42, 716-722.

Li, X., Stanton, B., Fang, X., & Lin, D. (2006). Social stigma and mental health among rural-to-urban migrants in China: A conceptual framework and future research needs. *World Health & Population,* 8, 14-31.

Li, X., Stanton, B., Fang, X., Xiong, Q., Yu, S., Lin, D., et al. (2009). Mental health symptoms among rural-to-urban migrants in China: A comparison with their urban and rural counterparts. *World Health & Population,* 11, 24-38.

Li, 李., Wang, 王., & Shen, 沈. (2002). SF-36 健康调查量表中文版的研制及其性能测试 Development and psychometric tests of a Chinese version of the SF-36 Health Survey Scales. *中华预防医学杂志 Chinese Journal of Preventive Medicine,* 36, 109-113.

Lin, D., Li, X., Wang, B., Hong, Y., Fang, X., Qin, X., et al. (2011). Discrimination, perceived social inequity, and mental health among rural-to-urban migrants in China. *Community mental health journal,* 47, 171-180.

Lin, Y., Zhang, Q., Chen, W., Shi, J., Han, S., Song, X., et al. (2016). Association between Social Integration and Health among Internal Migrants in ZhongShan, China. *PLOS ONE,* 11, e0148397.

Lu, Y. (2010). Rural-urban migration and health: Evidence from longitudinal data in Indonesia. *Social Science & Medicine,* 70, 412-419.

Lu, Y. (2012). Household Migration, Social Support, and Psychosocial Health: The Perspective from Migrant-Sending Areas. *Social Science & Medicine,* 74, 135.

Mou, J., Griffiths, S.M., Fong, H., & Dawes, M.G. (2013). Health of Chinas rural-urban migrants and their families: a review of literature from 2000 to 2012. *British Medical Bulletin,* 106, 19-43.

Mulvaneyday, N.E., Alegría, M., & Sribney, W. (2007). Social cohesion, social support, and health among Latinos in the United States. *Social Science & Medicine,* 64, 477-495.

Muthén, B., & Muthén, L.K. (1998-2015). *Mplus User's Guide*. Los Angeles, CA: Muthén & Muthén

Paul T. Costa, J., & McCrae, R.R. (1992). *NEO -PI -R professional manual: Revised NEO Personality Inventory (NEO-PIR) and NEO Five Factor Inventory (NEO-FFI)*. Odessa, FL: Psychological Assessment Resources.

Phillips, M.R. (1998). The Transformation of China's Mental Health Services. *China Journal,* 39, 1-36.

Phinney, J., Horenczyk, G., Liebkind, K., & Vedder, P. (2001). Ethnic identity, immigration, and well-being: An interactional perspective. *Journal of Social Issues,* 57, 493-510.

Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement,* 1, 385-401.

Redfield, R., Linton, R., & Herskovits, M. (1936). Memorandum for the study of acculturation. *American Anthropologist,* 38, 149-152.

Rudmin, F.W. (2003). Critical history of the acculturation psychology of assimilation, separation, integration, and marginalization. *Review of general psychology,* 7, 3.

Schachter, A., Kimbro, R.T., & Gorman, B.K. (2012). Language Proficiency and Health Status Are Bilingual Immigrants Healthier? *Journal of Health and Social Behavior,* 53, 124-145.

Schwartz, S.J., Unger, J.B., Zamboanga, B.L., & Szapocznik, J. (2010). Rethinking the concept of acculturation: implications for theory and research. *American Psychologist,* 65, 237.

Schwartz, S.J., & Zamboanga, B.L. (2008). Testing Berry's model of acculturation: A confirmatory latent class approach. *Cultural Diversity and Ethnic Minority Psychology,* 14, 275.

Shen, Q., Lu, Y.W., Hu, C.Y., Deng, X.M., Gao, H., Huang, X.Q., et al. (1998). A preliminary study of the mental health of young migrant workers in Shenzhen. *Psychiatry & Clinical Neurosciences,* 52, S370-S373.

Wang, B., Li, X., Stanton, B., & Fang, X. (2010). The influence of social stigma and discriminatory experience on psychological distress and quality of life among rural-to-urban migrants in China. *Social Science & Medicine,* 71, 84-92.

Ware, J.E., Snow, K.K., Kosinski, M., & Gandek, B. (1993). *SF-36 Health Survey : Manual and Interpretation Guide*. Boston, Massachusetts: The Health Institute, New England Medical Center.

Wong, D.F.K., & Leung, G. (2008). The Functions of Social Support in the Mental Health of Male and Female Migrant Workers in China. *Health & Social Work,* 33, 275-285.

Wu, W. (2004). Sources of migrant housing disadvantage in urban China. *Environment*

and Planning A, 36, 1285-1304.

Yang, 杨., & Huang, 黄. (2003). 社会转型中城市居民心理压力的流行病学研究 An epidemiological study on stress among urban residents in social transition period. 中华流行病学杂志 *Chinese Journal of Epidemioloy,* 24, 760-764.

Yue, Z., Fong, E., Yuan, Y., & Li, S. (2018a). Life Satisfaction and Internal Migration Experience: Migrant Workers in Guangzhou, China. Population Association of America 2018 Annual Meeting. Dever, Colorado.

Yue, Z., Li, S., Fong, E., & Feldman, M.W. (2018b). Acculturation of Rural-Urban Migrants in Urbaning China: a Multidimensional and Bicultural Framework （Manuscript).

Yue, Z., Li, S., Jin, X., & Feldman, M.W. (2013). The Role of Social Networks in the Integration of Chinese Rural-Urban Migrants: A Migrant-Resident Tie Perspective *Urban Studies,* 50, 1704-1723.

Zagefka, H., & Brown, R. (2002). The relationship between acculturation strategies, relative fit and intergroup relations: Immigrant-majority relations in Germany. *European Journal of Social Psychology,* 32, 171-188.

Zhang, W., & Ta, V.M. (2009). Social connections, immigration-related factors, and self-rated physical and mental health among Asian Americans ☆. *Social Science & Medicine,* 68, 2104-2112.

Zhao, Y. (2003). The Role of Migrant Networks in Labor Migration: The Case of China. *Contemporary Economic Policy,* 21, 500-511.

Zimet, G.D., Dahlem, N.W., Zimet, S.G., & Farley, G.K. (1988). The Multidimensional

Scale of Perceived Social Support. *Journal of Personality Assessment,* 52, 30-41.

Table 1

Acculturaiton variables by latent cluster

Direction	Dimension scale (range of possible score) or indicator (range)	Total sample (N=1415, 100%)		C1: Rural-oriented integration (N=343, 24.24%)			C2: Urban-oriented integration (N=410, 28.98%)			C3: Integration-potential separation (N=320, 22.61%)			C4: Marginalization-risk separation (N=342, 24.17%)			ANOVA		
		M	SD	M	SD	RS [1]	M	SD	RS [1]	M	SD	RS [1]	M	SD	RS [1]	df	F	$p\eta2$
Rural Society	①Using of native dialect (1-3)	2.36	0.88	2.51[a]	0.81	0.51	2.06[b]	0.92	0.06	2.40[a]	0.86	0.40	2.51[a]	0.82	0.51	3, 1411	23.76***	0.05
	②Non-urbanite ties (0-248)	16.28	15.69	17.63[a]	20.87	0.01	16.27[ac]	14.68	0.00	16.89[ad]	15.21	0.00	14.38[bcd]	10.15	-0.12	3, 1411	2.70*	0.01
	③Cultural maintenance (1-5)	3.69	0.67	3.98[a]	0.29	0.49	3.16[b]	0.51	0.08	4.17[c]	0.72	0.58	3.60[d]	0.59	0.30	3, 1411	245.25***	0.34
	④Rural identity (1-5)	4.04	0.61	4.03[a]	0.19	0.52	3.52[b]	0.59	0.26	4.73[c]	0.46	0.87	4.00[a]	0.37	0.50	3, 1411	464.80***	0.50
	Composite rural RS [2]	/	/	/	/	0.42	/	/	0.12	/	/	0.55	/	/	0.33			
Urban Society	⑤Dialect Proficiency (1-4)	2.64	1.13	2.53[acd]	1.09	0.02	3.05[b]	1.03	0.37	2.55[c]	1.14	0.04	2.33[d]	1.15	-0.12	3, 1411	30.10***	0.06
	⑥Urbanite ties (0-30)	1.46	3.15	1.27[a]	2.95	-0.13	2.31[b]	3.85	0.03	1.43[a]	3.15	-0.02	0.66[c]	1.95	-0.55	3, 1411	18.28***	0.04
	⑦Individual modernity (1-3)	2.34	0.37	2.35[a]	0.38	0.02	2.39[a]	0.34	0.08	2.35[a]	0.38	0.02	2.25[b]	0.38	-0.04	3, 1411	9.54***	0.02
	⑧Urban identity (1-5)	3.02	0.80	3.46[a]	0.44	0.23	3.49[a]	0.53	0.25	2.84[b]	0.92	-0.08	2.18[c]	0.33	-0.41	3, 1411	401.01***	0.46
	Composite urban RS [3]	/	/	/	/	0.07	/	/	0.18	/	/	-0.02	/	/	-0.26			

Note.

/ denotes not applicable. Within each row, means with the same superscript are not significantly different from one another. Post hoc comparisons were conducted using Tukey's Honestly Significant Difference test. $p\eta2$ = partial eta-squared from omnibus analysis of variance.

* $p < 0.05$, *** $p < 0.001$.

[1] RS denotes range score. Since individual modernity, non-urbanite ties, and urbanite ties are acculturation indicators rather than scales, we use mean, minimum, and maximum of total sample to caculate RS. We use scale midpoint, minimum, and maximum to caculate RS for acculturation scales. If class mean<scale midpoint or mean of total sample, RS =(class mean-midpoint or sample mean)/(midpoint or sample mean - minimum), ranging from -1.00 to 0.00; If class mean>=scale midpoint or mean of total sample, RS =(class mean - midpoint or sample mean) / (maximum - midpoint or sample mean), with a range from 0.00 to 1.00.

[2] Composite rural RS= ((①+②)/2+③+④)/3;

[3] Composite urban RS= ((⑤+⑥)/2+⑦+⑧)/3;

Table 2

Mental health, social support, perceived stress, and SES by acculturation cluster

	M (SD)				ANOVA or Cross-Tabulation Analysis [1]		
	C1: Rural-oriented integration (N=343)	C2: Urbal-oriented integration (N=410)	C3: Integration-potential separation (N=320)	C4: Marginalization-risk separation (N=342)	df	F or Likelihood-Ratio chi2	$p\eta_2$
Depression	**6.42^a** (3.99)	6.76^{ab} (4.13)	**7.31^{bc}** (4.41)	7.15^{abc} (4.48)	3, 1411	3.01*	0.006
Life satisfaction	**15.56^a** (3.24)	14.45^b (3.27)	14.42^b (3.72)	**13.07^c** (3.27)	3, 1411	31.26***	0.062
Social support	**45.28**(4.75)	43.31^{bc} (5.09)	43.93^b (6.88)	**42.65^c** (6.17)	3, 1411	13.22***	0.027
Perceived stress	**5.66^a** (2.35)	5.94^{ab} (2.58)	5.78^{abc} (2.73)	**6.09^{abc}** (2.63)	3, 1411	1.84	0.004
SES							
Occupational Status							
Nonmanual	**0.02**	**0.09**	0.04	**0.02**	/	29.00***	/
Semimanual	0.18	0.19	**0.17**	**0.21**			
Manual	0.80	0.73	**0.79**	**0.77**			
Perceived SES	4.42^a (1.37)	**4.72^b** (1.48)	4.08^c (1.70)	**3.50^d** (1.65)	3, 1411	42.03***	0.082
Income	4186.29^{ab} (2584.64)	**4523.51^b** (3327.86)	4406.76^{ab} (3762.35)	**3890.59^a** (2044.80)	3, 1411	3.09*	0.007
Housing conditions	**6.95^a** (1.56)	**6.95^a** (1.54)	**6.49^b** (1.78)	6.53^b (1.77)	3, 1411	8.22***	0.017

Note: / denotes non-applicable; Within each row, means with the same superscript are not significantly different from one another. Post hoc comparisons were conducted using Tukey's Honestly Significant Difference test. $p\eta_2$ = partial eta-squared from omnibus analysis of variance.

[1] For ANOVA, F value and *p* value were reported; for cross-tabulation analysis, we reported Likelihood-Ratio chi2 and *p* value. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3

Descriptive statistics of covariates of total sample and acculturaiton cluster

covariate	Total sample (N=1415)				C1: Rural-oriented integration (N=343)		C2: Urban-oriented integration (N=410)		C3: Integration-potential separation (N=320)		C4: Marginalization-risk separation (N=342)	
	Mean	SD	Min	Max	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Demographic and personal characteristics												
Male	0.52	0.50	0	1	**0.49**	0.50	0.47	0.50	**0.60**	0.49	0.52	0.50
Age	34.04	10.98	16	73	**35.60**	10.53	**31.14**	10.15	35.37	11.87	34.70	10.89
Married	0.65	0.48	0	1	**0.74**	0.44	**0.55**	0.50	0.63	0.48	0.68	0.47
Education												
Junior high school	0.42	0.49	0	1	0.45	0.50	0.34	0.47	0.44	0.50	**0.49**	0.50
Senior high school	0.29	0.46	0	1	0.28	0.45	**0.38**	0.49	0.28	0.45	**0.23**	0.42
College or university	0.13	0.34	0	1	0.11	0.31	**0.22**	0.41	**0.08**	0.28	0.10	0.30
Minority ethnicity	0.03	0.18	0	1	0.03	0.18	0.02	0.15	0.04	0.20	0.04	0.18
Extroverted personality	18.35	3.09	6	25	18.51	2.61	18.29	2.85	**18.99**	3.65	**17.67**	3.11
Self-rated health	67.11	16.72	0	100	66.01	14.38	67.09	17.37	**69.72**	17.66	**65.82**	16.98
Migration characteristics												
Interprovincial migration	0.59	0.49	0	1	0.64	0.48	**0.45**	0.50	0.63	0.48	**0.69**	0.46
Duration of stay (years)	7.64	6.80	0.08	37.75	7.33	6.16	7.63	6.72	**8.35**	7.39	**7.30**	6.89
Spouse migration	0.51	0.50	0	1	**0.63**	0.48	0.48	0.50	**0.44**	0.50	0.48	0.50
Left-behind children	0.19	0.40	0	1	**0.25**	0.43	**0.13**	0.34	0.19	0.39	0.22	0.41
Working and living status												
Number of jobs	2.38	2.69	1	30	2.42	2.41	2.44	2.82	**2.63**	3.34	**2.04**	2.03
Weekly hours of work (hours)	59.43	21.74	0	147	61.20	19.77	**55.25**	19.85	**62.54**	24.07	59.78	22.81
Self-employed	0.16	0.37	0	1	0.15	0.36	**0.13**	0.34	**0.21**	0.41	0.15	0.35
Employee	0.69	0.46	0	1	0.67	0.47	**0.73**	0.44	**0.64**	0.48	**0.73**	0.45

Discrimination	0.39	0.49	0	1	0.37	0.48	**0.30**	0.46	0.42	0.49	**0.47**	0.50
Medical insurance	0.21	0.41	0	1	0.20	0.40	**0.33**	0.47	0.15	0.36	**0.12**	0.33

Table 4

Results of Ordinary Least Squares (OLS) regression models on life satisfaction

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Demographic and personal characteristics												
Male	-0.560**	(0.188)	-0.532**	(0.184)	-0.466**	(0.179)	-0.565**	(0.183)	-0.648***	(0.184)	-0.610***	(0.180)
Age	0.020	(0.012)	0.017	(0.012)	0.017	(0.011)	0.011	(0.012)	0.021	(0.011)	0.017	(0.011)
Married	1.021**	(0.359)	1.242***	(0.350)	1.174***	(0.341)	1.226***	(0.348)	1.090**	(0.342)	1.032**	(0.333)
Education												
Junior high school	0.290	(0.285)	0.229	(0.278)	0.235	(0.271)	0.228	(0.276)	0.102	(0.271)	0.119	(0.264)
Senior high school	0.071	(0.311)	-0.096	(0.306)	-0.062	(0.298)	-0.135	(0.304)	-0.327	(0.299)	-0.296	(0.291)
College or university	0.034	(0.382)	-0.086	(0.375)	-0.050	(0.365)	-0.125	(0.372)	-0.479	(0.377)	-0.418	(0.367)
Minority ethnicity	0.569	(0.511)	0.514	(0.498)	0.325	(0.485)	0.440	(0.495)	0.216	(0.487)	0.038	(0.475)
Extroverted personality	0.151***	(0.030)	0.128***	(0.029)	0.079**	(0.029)	0.115***	(0.029)	0.104***	(0.029)	0.056*	(0.028)
Self-rated health	0.017**	(0.006)	0.018**	(0.006)	0.013*	(0.005)	0.012*	(0.006)	0.014**	(0.005)	0.007	(0.005)
Migration characteristics												
Interprovincial migration	0.103	(0.194)	0.165	(0.190)	0.084	(0.185)	0.157	(0.188)	0.163	(0.185)	0.081	(0.181)
Duration of stay (logged)	-0.008	(0.122)	-0.013	(0.119)	0.016	(0.116)	-0.027	(0.118)	-0.070	(0.117)	-0.041	(0.114)
Spouse migration	-0.131	(0.289)	-0.410	(0.283)	-0.395	(0.276)	-0.470	(0.282)	-0.469	(0.279)	-0.467	(0.273)
Left-behind children	-0.574*	(0.253)	-0.644**	(0.246)	-0.732**	(0.240)	-0.653**	(0.245)	-0.586*	(0.242)	-0.684**	(0.236)
Working and living status												
Number of jobs	-0.039	(0.034)	-0.056	(0.034)	-0.046	(0.033)	-0.040	(0.034)	-0.053	(0.033)	-0.034	(0.032)
Weekly hours of work (logged)	0.291*	(0.119)	0.225	(0.116)	0.224*	(0.113)	0.210	(0.115)	-0.608**	(0.216)	-0.516*	(0.211)
Self-employed	-0.362	(0.349)	-0.251	(0.340)	-0.364	(0.332)	-0.245	(0.338)	-0.210	(0.332)	-0.316	(0.324)
Employee	-0.683*	(0.287)	-0.541	(0.280)	-0.775**	(0.274)	-0.538	(0.278)	-0.616*	(0.284)	-0.832**	(0.278)
Discrimination	-0.368	(0.193)	-0.216	(0.189)	-0.127	(0.184)	-0.151	(0.188)	-0.020	(0.186)	0.078	(0.182)

	(1)		(2)		(3)		(4)		(5)		(6)	
Medical insurance	0.705**	(0.234)	0.511*	(0.231)	0.422	(0.225)	0.543*	(0.229)	0.330	(0.227)	0.291	(0.221)
Acculturation												
C2: Urban-oriented integration			-0.881***	(0.249)	-0.630*	(0.244)	-0.870***	(0.248)	-1.051***	(0.244)	-0.808***	(0.240)
C3: Integration-potential separation			-1.131***	(0.261)	-0.936***	(0.255)	-1.100***	(0.259)	-0.956***	(0.255)	-0.788**	(0.249)
C4: Marginalization-risk separation			-2.288***	(0.257)	-1.969***	(0.253)	-2.247***	(0.255)	-1.906***	(0.254)	-1.643***	(0.250)
Social support					0.136***	(0.015)					0.118***	(0.015)
Perceived stress							-0.163***	(0.036)			-0.102**	(0.035)
SES												
Occupational status												
Non-manual labor									0.050	(0.451)	0.021	(0.440)
Semi-manual albor									0.117	(0.239)	0.180	(0.233)
Perceived SES									0.402***	(0.056)	0.368***	(0.055)
Monthly income (logged)									1.267***	(0.266)	1.115***	(0.260)
Housing conditions									0.106	(0.055)	0.074	(0.053)
Constant	8.856***	(0.893)	10.632***	(0.902)	5.806***	(1.036)	12.489***	(0.984)	8.029***	(0.969)	5.373***	(1.179)
Observations	1415		1415		1415		1415		1415		1415	
R^2	0.076		0.126		0.172		0.139		0.175		0.218	
Adjusted R^2	0.063		0.112		0.158		0.125		0.159		0.201	

Note. $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$.

Table 5

Results of Ordinary Least Squares (OLS) regression models on depression

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Demographic and personal characteristics												
Male	0.210	(0.227)	0.157	(0.227)	0.093	(0.224)	0.299	(0.206)	0.202	(0.233)	0.281	(0.211)
Age	-0.054***	(0.014)	-0.055***	(0.014)	-0.056***	(0.014)	-0.030*	(0.013)	-0.058***	(0.014)	-0.033*	(0.013)
Married	0.626	(0.433)	0.584	(0.433)	0.651	(0.426)	0.653	(0.393)	0.647	(0.433)	0.730	(0.391)
Education												
Junior high school	-0.430	(0.344)	-0.350	(0.343)	-0.355	(0.338)	-0.343	(0.312)	-0.288	(0.343)	-0.319	(0.310)
Senior high school	-0.178	(0.376)	-0.045	(0.378)	-0.079	(0.372)	0.121	(0.343)	0.062	(0.378)	0.138	(0.342)
College or university	-0.069	(0.461)	0.117	(0.463)	0.082	(0.456)	0.284	(0.421)	0.263	(0.477)	0.227	(0.431)
Minority ethnicity	-0.546	(0.617)	-0.544	(0.615)	-0.357	(0.606)	-0.227	(0.559)	-0.396	(0.617)	-0.082	(0.557)
Extroverted personality	-0.118**	(0.036)	-0.126***	(0.036)	-0.078*	(0.036)	-0.069*	(0.033)	-0.115**	(0.036)	-0.034	(0.033)
Self-rated health	-0.058***	(0.007)	-0.060***	(0.007)	-0.055***	(0.007)	-0.035***	(0.006)	-0.058***	(0.007)	-0.033***	(0.006)
Migration characteristics												
Interprovincial migration	-0.038	(0.234)	-0.073	(0.235)	0.007	(0.231)	-0.039	(0.213)	-0.082	(0.234)	0.022	(0.212)
Duration of stay (logged)	0.000	(0.147)	-0.005	(0.147)	-0.034	(0.145)	0.053	(0.134)	0.033	(0.148)	0.038	(0.133)
Spouse migration	-1.084**	(0.348)	-0.947**	(0.350)	-0.962**	(0.345)	-0.691*	(0.318)	-0.885*	(0.354)	-0.702*	(0.319)
Left-behind children	0.130	(0.305)	0.144	(0.305)	0.231	(0.300)	0.183	(0.277)	0.105	(0.306)	0.244	(0.276)
Working and living status												
Number of jobs	0.115**	(0.042)	0.114**	(0.042)	0.105*	(0.041)	0.047	(0.038)	0.115**	(0.042)	0.045	(0.038)
Weekly hours of work (logged)	-0.067	(0.143)	-0.064	(0.143)	-0.062	(0.141)	0.001	(0.130)	0.400	(0.274)	0.079	(0.248)
Self-employed	-0.216	(0.421)	-0.264	(0.421)	-0.152	(0.414)	-0.289	(0.382)	-0.290	(0.420)	-0.210	(0.379)
Employee	0.007	(0.347)	0.019	(0.347)	0.249	(0.342)	0.007	(0.315)	0.013	(0.359)	0.163	(0.326)
Discrimination	1.018***	(0.233)	0.967***	(0.233)	0.879***	(0.230)	0.688**	(0.212)	0.872***	(0.235)	0.576**	(0.213)

Medical insurance	0.373	(0.282)	0.459	(0.285)	0.546	(0.281)	0.319	(0.259)	0.530	(0.287)	0.416	(0.259)
Acculturation												
C2: Urban-oriented integration			**0.037**	**(0.308)**	**-0.211**	**(0.305)**	**-0.013**	**(0.280)**	**0.108**	**(0.309)**	**-0.150**	**(0.281)**
C3: Integration-potential separation			**0.999****	**(0.322)**	**0.807***	**(0.318)**	**0.867****	**(0.293)**	**0.901****	**(0.323)**	**0.681***	**(0.292)**
C4: Marginalization-risk separation			**0.433**	**(0.318)**	**0.119**	**(0.316)**	**0.258**	**(0.288)**	**0.242**	**(0.322)**	**-0.059**	**(0.293)**
Social support					-0.134***	(0.019)					-0.088***	(0.018)
Perceived stress							0.698***	(0.040)			0.666***	(0.041)
SES												
Occupational status												
Non-manual labor									0.342	(0.571)	0.514	(0.515)
Semi-manual albor									0.085	(0.302)	-0.158	(0.273)
Perceived SES									-0.190**	(0.071)	-0.144*	(0.065)
Monthly income (logged)									-0.698*	(0.337)	-0.141	(0.305)
Housing conditions									-0.080	(0.069)	-0.013	(0.062)
Constant	14.629***	(1.078)	14.511***	(1.114)	19.268***	(1.293)	6.552***	(1.112)	15.988***	(1.227)	10.714***	(1.382)
Observations	1415		1415		1415		1415		1415		1415	
R^2	0.101		0.109		0.138		0.266		0.117		0.282	
Adjusted R^2	0.088		0.094		0.124		0.253		0.100		0.267	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1

Regression coefficients for the relationship between acculturation and mental health
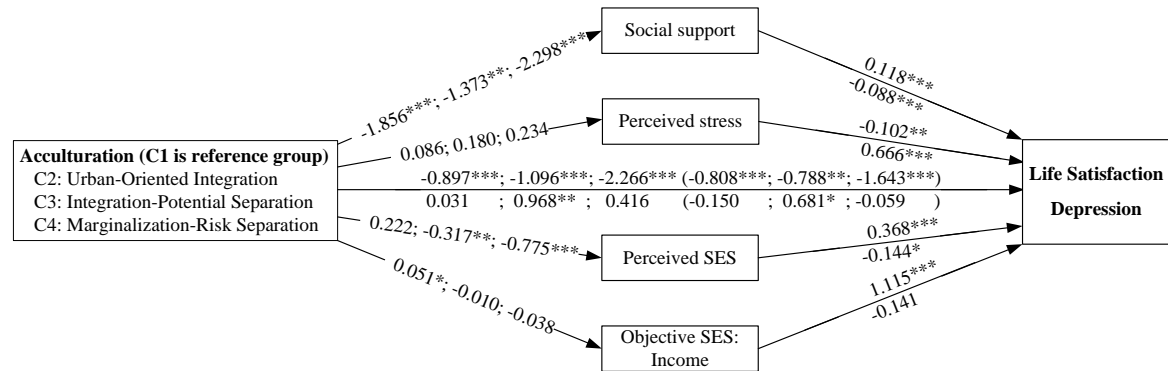
Note. Coefficients of C2, C3, and C4 in each path are shown in sequence. The regression coefficients between acculturation and mental health, controlling for all the mediators, are in parentheses. The regression coefficients at the top of respective path are from regressions on life satisfaction, and coefficients at the bottom of respective path are from regressions on depression. $^{*}p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$.

Table 6

Effects of acculturation on mental health and percentage of the total effects

	Life Satisfaction		Depression	
	Effects [CI or 95% bootstrapped CI] [1]	Percentage of total effect	Effects [CI or 95% bootstrapped CI] [1]	Percentage of total effect
Relative total effects				
C2	-0.897 [-1.387, -0.408]	100.00	0.031 [-0.576, 0.637]	100.00
C3	-1.096 [-1.609, -0.584]	100.00	0.968 [0.334, 1.603]	**100.00**
C4	-2.266 [-2.770, -1.762]	100.00	0.416 [-0.208, 1.040]	100.00
Relative direct effects				
C2	**-0.808 [-1.278, -0.338]**	**90.02**	-0.150 [-0.701, 0.401]	**-489.25**
C3	**-0.788 [-1.277, -0.298]**	71.84	**0.681 [0.107, 1.255]**	70.31
C4	**-1.643 [-2.133, -1.153]**	72.49	-0.059 [-0.633, 0.516]	-14.11
Relative indirect effects through social support				
C2	**-0.219 [-0.332, -0.121]**	**24.45**	**0.163 [0.074, 0.271]**	**529.97**
C3	**-0.162 [-0.275, -0.062]**	**14.81**	**0.120 [0.035, 0.231]**	**12.43**
C4	**-0.272 [-0.402, -0.161]**	**11.99**	**0.201 [0.092, 0.327]**	**48.40**
Relative indirect effects through perceived stress				
C2	-0.009 [-0.052, 0.027]	0.97	0.057 [-0.169 , 0.286]	186.97
C3	-0.018 [-0.067, 0.022]	1.67	0.120 [-0.140 , 0.372]	12.38
C4	-0.024 [-0.073, 0.012]	1.05	0.156 [-0.085 , 0.398]	37.54
Relative indirect effects through perceived SES				
C2	**0.082 [0.005, 0.176]**	**-9.09**	-0.032 [-0.087, 0.002]	-104.23
C3	**-0.117 [-0.222, -0.029]**	**10.65**	**0.046 [0.001 , 0.116]**	**4.72**
C4	**-0.285 [-0.422, -0.167]**	**12.59**	**0.112 [0.009, 0.231]**	**26.84**
Relative indirect effects through income				
C2	**0.057 [0.009, 0.121]**	**-6.34**	-0.007 [-0.044, 0.028]	-23.45
C3	-0.011 [-0.073, 0.045]	1.04	0.001 [-0.016 , 0.025]	0.14
C4	-0.043 [-0.101, 0.004]	1.88	0.005 [-0.022, 0.037]	1.30

Note. [1] Confidence intervals (CI) of regression results were reportd for total effects and direct effects, 95% bootstrapped CI reported in bootstrapping procedures for indirect effects. If CI or 95% bootstrapped CI does not include 0, the respective effect is statistically significant at least at the level of $p < 0.05$. The more detailed significance level of total effects and direct effects can be found in Figure 3.