The subjective wellbeing of migrants in Guangzhou, China: The impacts of the social and physical environment

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ABSTRACT

China has witnessed a surge of rural-urban migrants over the past three decades. Although a plethora of literature has shed light on the low quality of migrants' lives, little research has been done to understand how migrants evaluate their own lives in host cities, and no study has been undertaken to link migrants' subjective wellbeing with their residential environments. Using the data collected from a questionnaire survey in Guangzhou and multilevel linear models, this paper examines the determinants of migrants' subjective wellbeing in host cities. It particularly focuses on the extent to which and the ways in which migrants' social ties and residential environment influence their subjective wellbeing. The results indicate that, in general, migrants have a lower level of subjective wellbeing than local residents, and the cognitive and emotional components of migrants' subjective wellbeing are influenced by different factors. The sense of relative deprivation, social support, and neighbourhood social environment matter in determining the cognitive component of migrants' wellbeing (life satisfaction) but have no impact on the emotional component of their wellbeing (positive and negative affect). No evidence shows that neighbourhood cleanliness and neighbourhood amenities influence the level of migrants' subjective wellbeing.

1. Introduction

Subjective wellbeing (SWB) refers to how people experience the quality of their life and is composed of life satisfaction and affect (comprising positive and negative affect) (Diener, 1984; Diener, Sapyta, & Suh, 1998). Life satisfaction represents the cognitive evaluation of one's life circumstances in the long run, while affect reveals one's emotional responses to ongoing events in the short term (Diener, 1984; Diener et al., 1998). Over the past decades, social scientists have devoted a considerable amount of effort to unravel the mystery of SWB (for example, Ballas & Tranmer, 2012; Diener, Suh, Lucas, & Smith, 1999; Easterlin, 2001; Florida, Mellander, & Rentfrow, 2013; Glaeser, Gottlieb, & Ziv, 2014; Helliwell & Putnam, 2004; Veenhoven, 2008). One of the fastest-growing sub-fields of SWB research is the understanding of the impact of one's residential environment on his or her SWB (Helliwell & Putnam, 2004; Brereton, Clinch, & Ferreira, 2008; Berry & Okulicz-Kozaryn, 2011; Morrison, 2011; Florida et al., 2013; Glaeser et al., 2014; Cao, 2016). For one thing, environmental

psychologists and urban geographers have paid increasing attention to the effects of environmental stressors and residential amenities on mental wellbeing (Ambrey & Fleming, 2013; Berry & Okulicz-Kozaryn, 2011; Ellaway, Macintyre, & Kearns, 2001; Macintyre, Ellaway, & Cummins, 2002; Morrison, 2011; Van Den Berg, Maas, Verheij, & Groenewegen, 2010). For another, a growing body of psychological and epidemiological literature has examined the association between neighbourhood cohesion and residents' SWB (Fone et al., 2007; O'campo, Salmon, & Burke, 2009). The continued interest in enhancing residents' SWB through community development and environmental improvement in Western countries reflects the importance of this issue to public policy (Elliott, Gale, Parsons, & Kuh, 2014; Pfeiffer & Cloutier, 2016).

Recent years have seen a surge of interest in what makes a good life for Chinese people (Appleton & Song, 2008; Bian, Zhang, Yang, Guo, & Lei, 2015; Brockmann, Delhey, Welzel, & Yuan, 2009; Easterlin, 2014; Steele & Lynch, 2013). The majority of relevant studies have focused on the association between one's SWB and his or her socioeconomic status (Li & Zhu, 2006; Appleton & Song, 2008; Brockmann et al., 2009). So far, only a handful of studies have attempted to investigate the effects of some dimensions of residential environment, in particular physical environment, on SWB in the Chinese context (Liu, Dijst, & Geertman, 2016a; Liu, Liu, Feng, & Li, 2016b; Wang & Wang, 2016; Wen & Wang,

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2009). The dearth of in-depth research on the effect of neighbourhood social environment requires more attention to this issue. In this study, we take into account not only the physical aspect but also the social aspect of residential surroundings when understanding the determinants of SWB.

Most previous studies on the SWB of Chinese people have focused on either urban residents or rural residents only, neglecting migrants who have left their place of origin and currently live in a new place (Knight, Song, & Gunatilaka, 2009; Yip, Leung, & Huang, 2013). A plethora of literature has indicated that most migrants, especially rural migrant workers, have a low standard of living in host cities (Fan, 2008; Gui, Berry, & Zheng, 2012; Li & Wu, 2013a; Liu & Xu, 2015; Wang & Fan, 2012). It is only recently that migrants' evaluation of the quality of their lives has received academic attention (Cheng, Wang, & Smyth, 2014; Jin, Wen, Fan, & Wang, 2012; Knight & Gunatilaka, 2010). However, what is missing in the literature is the link between migrants' SWB and their residential surroundings. Is migrants' SWB associated with the physical and social environment of neighbourhoods where they live? What kinds of environmental factors make them feel happy/unhappy? The present study manages to answer these questions by incorporating the analysis of migrants' SWB within a multilevel framework.

To fill in these knowledge gaps, this paper investigates the factors that influence migrants' SWB in a Chinese city, Guangzhou, through a multilevel perspective. It particularly focuses on the extent to which, and the ways in which migrants' social ties and residential environment influence their SWB. Empirically, we treat SWB as a multidimensional concept that comprises life satisfaction, positive affect, and negative affect. We use multilevel linear models to identify the factors significantly influencing each component of migrants' SWB based on questionnaire data collected in 23 neighbourhoods in Guangzhou. This study goes beyond earlier studies on SWB in China by focusing particularly on migrants temporarily living in host cities and examining the effect of migrants' residential environment on their SWB.

The rest of this paper is organised as follows. Section 2 provides a brief overview of literature on the SWB and its association with migrants in Chinese cities and, based on this, proposes several working hypotheses. In Section 3, we introduce data, measurements, and models used in this study. Section 4 presents the results of both a descriptive analysis and multilevel models on migrants' SWB. Section 5 summarises the main findings of this paper and discusses their policy implications.

2. Literature review

2.1. Research on subjective wellbeing

The effects of personal factors on SWB have been investigated extensively in a range of academic disciplines. Some research has shown that demographic characteristics, socioeconomic status, and social supports have a significant impact on one's SWB (Diener et al., 1999; Easterlin, 2001; Helliwell & Putnam, 2004). A large body of research has focused on the relationship between one's income and SWB. It is commonly believed that people with higher incomes are more likely to report being happy (Clark, Frijters, & Shields, 2008; Kahneman & Deaton, 2010). Some other scholars pointed out that a sense of relative deprivation may result in a decrease in happiness (Bellani & D'ambrosio, 2011; McBride, 2001; Runciman, 1972; Wilkinson & Pickett, 2007). For instance, Wilkinson and Pickett (2007) found that people who considered themselves as the underclass based on their comparison with the rest of society tended to suffer from chronic stress and mental problems.

Another strand of literature has indicated that social ties and social support contribute substantially to one's SWB (Cohen & Wills, 1985; Helliwell & Putnam, 2004; Mair, Diez Roux, & Morenoff, 2010; Schwanen & Wang, 2014). Cohen and Wills (1985) argued that social support was positively related to SWB, as one's social support not only protected himself or herself from the adverse influences of stressful events but also offered positive experiences and a sense of stability

('buffer effect' hypothesis). Helliwell and Putnam (2004) found that interactions with neighbours and friends have a positive impact on individuals' SWB, and especially on their life satisfaction. Schwanen and Wang (2014) in particular shed light on factors influencing positive affect and negative affect, finding that one's participation in non-employment activities with relatives, friends, and neighbours helps increase his or her immediate positive affect.

Scholarship on the impact of residential environments on residents' SWB has been growing over the past decade. Research has shown that an individual's SWB is influenced by his/her physical surroundings and social milieus. On the impacts from physical surroundings, Berry and Okulicz-Kozaryn (2011) and Florida et al. (2013) found that the SWB of residents in the populated metropolitan area was lower than that of residents in rural or suburban areas in the United States. In a study of six cities in New Zealand, Morrison (2011) emphasized that residents' accessibility to shops, education, and public transportation was positively associated with their SWB. With the research of Twin City in United States, Cao (2016) emphasized the significance of neighbourhood design and further indicated that high population density and poor street connectivity of neighbourhoods were detrimental to residents' SWB. Vemuri, Grove, Wilson, and Burch (2009)'s research on Metropolitan Baltimore suggested that a clean and uncontaminated neighbourhood built environment had a significant positive impact on residents' SWB. Concerning social milieus, Ballas and Tranmer (2012) studied the happiness and wellbeing of people in the United Kingdom. Their findings indicated that the variation in happiness scores was partly attributable to income inequality within neighbourhoods. Ettema and Schekkerman (2016)'s research of neighbourhoods in Netherlands indicated that neighbourly mutual support and neighbourhood safety were positively associated with residents' SWB. Overall, one's residential environment exerts a significant influence on his or her life satisfaction, positive affect, and negative affect.

International literature on migrants' SWB has suggested that migrants tend to have a lower level of happiness than ever before after migration (Ek, Koiranen, Raatikka, Järvelin, & Taanila, 2008; Nowok, Van Ham, Findlay, & Gayle, 2013). Migrants generally have a lower level of SWB than local residents (Hendriks, Ludwigs, & Veenhoven, 2016). Nowok et al. (2013) found that migrants had a low level of SWB due to their difficulty in adapting to the host city. Hendriks et al. (2016) pointed out that migrants in Germany suffered from considerable pressure, as they had to adapt to new social circumstance and build up new social ties after their arrivals. Korinek, Entwisle, and Jampaklay (2005) 's research on migrants in Thailand led to the same conclusion that migrants released the pressure and developed a sense of security when interacting with their neighbours.

Another stream of literature has argued that migrants would experience an increase in SWB after their arrivals in the host city (Mitra, 2010; Switek, 2016). Based on research in Indian slums, Mitra (2010) pointed out that migrants who had achieved upward social mobility in the host city had a feeling of achievement and thus a higher level of SWB than their peers. Switek (2016)'s research on Swedish internal migration indicated that migrant's realisation of their personal goals, especially goals of career development, led to a lasting increase in their SWB. In most cases, migration is associated with an increase in social status, which results in the rise in migrants' SWB.

2.2. The subjective wellbeing of migrants in urban China

There is an extensive literature on the understanding of migrants' objective wellbeing such as housing and social welfare in Chinese cities (Fan, 2008; Huang, Dijst, Van Weesep, Jiao, & Sun, 2016; Li, 2006; Li & Wu, 2013b; Shen, 2016). However, only a handful of studies have examined how migrants evaluate the quality of their life. Existing studies have compared migrants with urban residents, indicating that migrants are in general less happy than urban residents (Knight & Gunatilaka, 2010). Another strand of literature has shown that migrants who are

female, married, healthy, educated, and well-paid tend to be happier than migrants who are male, unmarried, unhealthy, low-educated, and low-paid (Cheng et al., 2014; Gui et al., 2012; Knight & Gunatilaka, 2010; Wen & Wang, 2009). The impact of migrants' individual attributes on their SWB has been widely studied, but how migrants' residential environments influence their SWB remains poorly understood. We put forward four working hypotheses based on the literature.

Hypothesis 1. *Migrants who have a lower self-perceived social status in the host city are likely to have a lower level of SWB than other migrants.*

Some researchers have argued that a sense of relative deprivation has an adverse effect on migrants' SWB (Cheng et al., 2014; Knight & Gunatilaka, 2010). As compared with local residents, migrants earn a lower salary and have lower-status jobs (Fan, 2008; Wang & Fan, 2012). Knight and Gunatilaka (2010) argued that the discrepancy between migrants' expected and actual life in the host city led to a strong sense of relative deprivation and made migrants unhappy with their life. Cheng et al. (2014) pointed out that migrants tended to feel unhappy with their lives when they compared their pay with that of local residents. Their findings echoed previous studies on the association between relative deprivation and SWB in the cities of developed countries (Bellani & D'ambrosio, 2011; McBride, 2001).

Hypothesis 2. *Migrants who have more social support within the host city are likely to have a higher level of SWB relative to migrants who have less social support.*

As migrants are not entitled to most welfare benefits in the host city, they often seek social support from their relatives, native-place fellows, and friends in the face of financial difficulties and stressful life events (Jin et al., 2012; Liu, Li, & Breitung, 2012; Yue, Li, Jin, & Feldman, 2013). For one thing, social ties are the most important channels for migrants to acquire job information, rental information, and money loans in the host city (Fan, 2002; Liu, Li, Liu, & Chen, 2015; Liu et al., 2012). For another, social support alleviates migrants' homesickness, forestalls the occurrence of stressful events, and reduces the adverse effects of stress and anxiety (Jin et al., 2012; Liu et al., 2012). Therefore, migrants receiving more social support are supposed to be more resilient to life difficulties and stressors. Although many migrants still have a strong connection with those left behind in the home place, in most cases they seek help from their relatives, native-place fellows, and friends living in the same city (Liu et al., 2012; Wang, Zhang, & Wu, 2015; Wu & Logan, 2015). Some studies on migrants' social support have found that the neighbourhood where a migrant resides is an important source of his or her social support, as migrants tend to live near their relatives, friends, and native-place fellows in the host city for better access to intra-group social resources (Liu et al., 2015; Ma & Xiang, 1998).

Hypothesis 3. *Migrants living in an impoverished neighbourhood are likely to have a lower level of SWB than migrants living in other neighbourhoods.*

Individuals' residential environments may influence their SWB. Some studies on neighbourhoods in developed countries have shown a negative association between the level of neighbourhood poverty and their residents' mental wellbeing, as deprived neighbourhoods are deficient in neighbourhood social capital and optimistic culture (Aminzadeh et al., 2013; Fone et al., 2007). Another body of literature has indicated that both the fear of crime and the perception of *anti-social behaviours* have an adverse effect on the sense of wellbeing (Ellaway et al., 2001; Stafford, Chandola, & Marmot, 2007). Therefore, migrants may have a low level of SWB when they live in impoverished neighbourhoods because these neighbourhoods tend to have a high rate of crime, a high incidence of anti-social behaviour, and a low-quality living environment (Yuan, Wu, & Xu, 2011). These environmental stressors may lead to the occurrence of negative emotion and dissatisfaction with life.

Hypothesis 4. *Migrants living in a neighbourhood with poor neighbourhood amenities are likely to have a lower level of SWB compared to migrants living in other neighbourhoods.*

Not only neighbourhood socioeconomic profiles but also neighbourhood amenities exert an influence on migrants' SWB. Studies on the residents of urban neighbourhoods in China have shown that the quality of dwellings, cleanliness, safety, amenities, and community services are influential in residents' satisfaction with their living conditions (Li & Liu, 2007; Shen & Lin, 2016; Tao, Wong, & Hui, 2014; Wang & Wang, 2016; Xiao, Li, & Webster, 2016). Although migrants tend to consider the host city as a place to work and thus choose to live in cheap rental housing, they have a willingness to access proper living conditions as others do. For instance, studies carried out in China's large cities have shown that migrants' residential satisfaction is affected by the facilities of their residence and neighbourhoods (Li & Wu, 2013b; Tao et al., 2014). The study of Wen and Wang (2009) on migrants in Shanghai showed that good neighbourhood leisure facilities significantly improved migrants' life satisfaction and reduced their feeling of loneliness.

3. Data and methods

3.1. Data

This research is based on a questionnaire survey conducted in Guangzhou, China, from June to August 2015. We chose Guangzhou as the study area for two reasons. First, Guangzhou is one of the most attractive destinations for migrants in China. Second, Guangzhou's migrant population is heterogeneous regarding demographic characteristics, socioeconomic status, and place of origin. We adopted a multi-stage stratified probability proportionate to size (PPS) sampling method to select respondents for the Guangzhou survey. In the first stage of the survey, 23 residential communities (*she qu*)[1] were selected randomly from 7 districts, with the method of the probability of selection proportionate to the total population of each community (Fig. 1). The districts included *Liwan*, *Yuexiu*, *Haizhu*, *Tianhe*, *Baiyun*, *Panyu*, and *Huangpu*, located in Guangzhou's inner city areas and inner suburbs. In the second stage, one neighbourhood was randomly selected in each community (*she qu*) to guarantee that all types of neighbourhoods had the same probability of being chosen.[2] Within each sample neighbourhood, we randomly selected around 50 households and then chose one respondent in each household. The survey yielded a total of 1150 valid respondents, among which 467 respondents were migrants and 683 respondents were locals. In this study, migrants refer to people who leave their place of origin and live in Guangzhou on the time of survey without a Guangzhou *hukou*. The proportion of migrants among the survey respondents is approximately equal to that among Guangzhou's population in 2015.[3] Given that migrants' neighbourhoods may have little influence on their SWB if they stay in the neighbourhood for a short period, we only retained 444 migrants who had lived in the sampled neighbourhood for one year or more in the analysis.

Questions in our questionnaires related to migrant's demographic characteristics, socioeconomic status, work experiences, migration experiences, and subjective wellbeing. We also carried out a survey aimed at the officers of neighbourhood committees (*ju wei hui*) of the 23 sampled neighbourhoods. Questions on community questionnaires include the *hukou* composition of residents, amenities and facilities, interactions between residents, and community activities.

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[1] A community in a Chinese city is an administrative and social collective. It always consists of one or more neighbourhoods that adjoin each other. Residents living in the community are served and governed by the same neighbourhood committee (*ju wei hui*).

[2] In our questionnaire survey, we directly and randomly selected 50 households when a community only consisted of one neighbourhood.

[3] Data from the Guangzhou Statistical Bureau (http://www.gzstats.gov.cn/tjgb/qtgb/201504/t20150430_37572.htm).
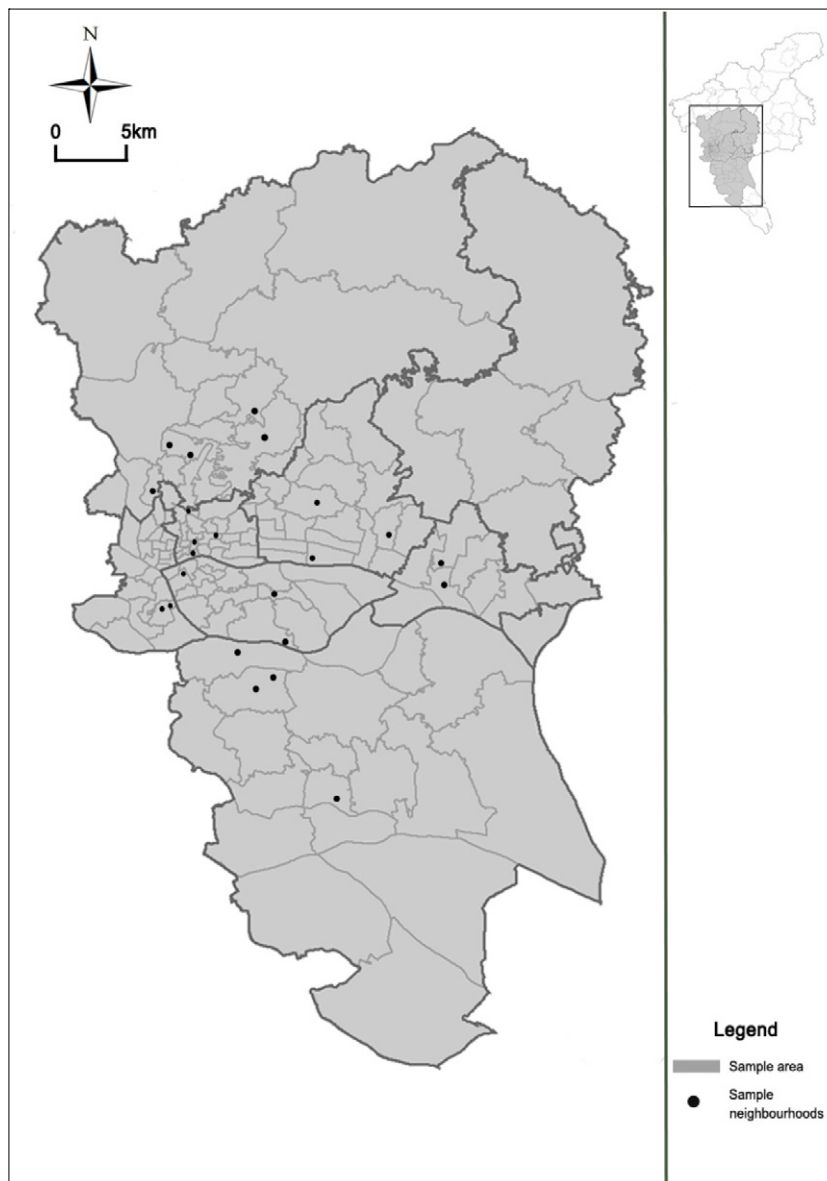
Fig. 1. Location of 23 sampled neighbourhoods in Guangzhou, China.

3.2. The measure of subjective wellbeing

The term 'subjective wellbeing' here is defined as one's perception of his or her quality of life; it includes two elements, the cognitive component (i.e. life satisfaction) and the affective component (i.e. positive and negative affect) (Diener, 1984; Diener, Scollon, & Lucas, 2009). We applied *The Satisfaction with Life Scale* (*SWLS*) (Diener, 1984) and *The Positive and Negative Affect Schedule* (*PANAS*) (Watson, Clark, & Tellegen, 1988) to measure the extent of life satisfaction, positive affect, and negative affect separately. *SWLS* includes five questions, which are '*In most ways, my life is close to my ideal*', '*The conditions of my life are excellent*', '*I am satisfied with my life*', '*So far I have gotten the important things I want in life*', and '*If I could live my life over again, I would change almost nothing*', (Diener, 1984). Respondents were asked to indicate the extent to which they agree or disagree with each of the above statements. A seven-point Likert-type scale ranging from 1 ('strongly disagree') to 7 ('strongly agree') was utilised. In order to gain insights into individual positive affect and negative affect, we asked respondents to rate *The Positive and Negative Affect Schedule* (*PANAS*), which covers 20 items describing

emotions and feelings,[4] on a five-point Likert scale ranging from 1 ('very slightly or not at all') to 5 ('extremely') (Watson et al., 1988).

3.3. Multilevel linear models

This research treated migrants' SWB as a function of their individual attributes and their residential environment (Table 1). Given that all three response variables of SWB (i.e. life satisfaction, positive affect, and negative affect) are continuous variables, we employed multilevel linear models to quantify the effects of individual attributes and the residential environment. The multilevel model is superior to the single-level model, not only because the former has a more accurate inference than the latter, but also because the former can separate out effects due to observed and unobserved group characteristics. In the model, 444

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[4] *The Positive and Negative Affect Schedule* (*PANAS*) includes 20 items of emotions: interested, distressed, excited, upset, strong, guilty, scared, hostile, enthusiastic, proud, irritable, alert, ashamed, inspired, nervous, determined, attentive, jittery, active, and afraid.

Table 1
Summary statistics of migrants' characteristics and residential environment.

Variables		
Demographic characteristics		
Age	Mean	37.3
	S.D.	9.6
Sex (%)		
Male		53.4
Female		46.6
Marital status and family organisation (%)		
Living with spouse		79.1
Single, divorced, widowed		16.8
Migrating alone, and leaving family behind		4.1
Health status		
Physcial health (1–5 Likert scale, 1 unhealthy, 5 very healthy)	Mean	4.3
	S.D.	0.7
Psychological health (GHQ-12, the range of score 12–48)	Mean	22.8
	S.D.	5.2
Socioeconomic status		
Personal hourly income (yuan)	Mean	21.5
	S.D.	39.1
Time spent on work each month (hour)	Mean	218.3
	S.D.	85.9
Housing tenure (%)		
Homeowner		18.47
Renter		81.53
Relative deprivation		
Social status (1–10 Likert scale)	Mean	5.9
	S.D.	1.6
Social support		
Social ties (number of friends in Guangzhou)	Mean	16.0
	S.D.	32.0
Mutual help among neighbours	Mean	3.6
(1–5 Likert scale, 1 never, 5 very frequent)	S.D.	0.7
Neighbourhood social environment		
Area poverty (%)	Mean	0.004
	S.D.	0.027
Ratio of migrants in neighbourhood (%)	Mean	0.498
	S.D.	0.337
Neighbourhood physical environment		
Facilities provision (The range of score is 1–13.)	Mean	9.9
	S.D.	1.6
Cleanliness (The range of score is 1–5. 1 very dirty,	Mean	3.4
5 very clean and tidy.)	S.D.	0.8
Number of cases		444

migrants at level 1 were nested within 23 neighbourhoods at level 2. Random intercepts models are specified as follows:

$$Y_{1ij} = \alpha_1 + \beta_1 X_{1ij} + \gamma_1 Z_{1j} + \mu_{1j} + \varepsilon_{1ij} \tag{1}$$

$$Y_{2ij} = \alpha_2 + \beta_2 X_{2ij} + \gamma_2 Z_{2ij} + \mu_{2j} + \varepsilon_{2ij} \tag{2}$$

$$Y_{3ij} = \alpha_3 + \beta_3 X_{3ij} + \gamma_3 Z_{3ij} + \mu_{3j} + \varepsilon_{3ij} \tag{3}$$

where Y_{1ij}, Y_{2ij}, and Y_{3ij} are life satisfaction score, positive affect score, and negative affect score respectively for person i in neighbourhood j. X_{1ij}, X_{2ij}, and X_{3ij} denote a set of individual-level variables concerning personal characteristics, relative deprivation, and social support. Z_{1j}, Z_{2j}, and Z_{3j} represent a set of neighbourhood-level variables concerning social environment and neighbourhood amenities. u_{1j}, u_{2j}, and u_{3j} denote the differences between neighbourhood *j*'s mean and the overall mean, and ε_{1ij}, ε_{2ij}, and ε_{3ij} represent individual residuals.

In this study, we estimated the above three equations separately. It is noteworthy that the error terms may be correlated across the equations, as unobserved factors influencing one's life satisfaction, positive affect, and negative affect are the same in most cases. If this is the case, seemingly unrelated regressions (SUR) will produce more efficient estimates than equation-by-equation regressions (Zellner, 1962). Nevertheless, we did not use a SUR method to estimate the equations jointly in the analysis, although a Breusch-Pagan test of independence suggested a correlation between the error terms. The main reason is that SUR

estimates turn out to be equivalent to equation-by-equation estimates in this case, because Eqs. (1)–(3) contain exactly the same set of repressors on the right-hand-side (Wooldridge, 2010). In addition, we could not find a way to apply multilevel models in a SUR setting. Here is the description of independent variables and controlled variables:

3.3.1. Relative deprivation

A variable of self-perceived social status was used to capture the effect of relative deprivation. We asked respondents to rate their social status relative to the average in Guangzhou (ranging from 1 to 10). The lower the self-perceived social status, the stronger is the sense of relative deprivation from which the respondent may suffer.

3.3.2. Social support

We included two variables: the number of social ties within Guangzhou, and the possibility of mutual help among neighbours in the model. We used the total number of friends who live in Guangzhou as a proxy for the respondent's number of social ties. For mutual help among neighbours, we asked respondents to rate the extent to which they agreed with the statement that '*Both myself and my neighbours are willing to help other residents when it is needed*' (from 1 'strongly disagree' to 5 'strongly agree'). Admittedly, the second indicator was generated based on respondents' subjective perceptions rather than objective evaluations. However, it is an individual's perception of social support (rather than the actual level of social support) that has a direct influence on his or her subjective assessment of quality of life. In this case, the self-reported indicator should be valid for this study.

3.3.3. Neighbourhood social environment

Two neighbourhood-level variables – area poverty and ratio of migrants in neighbourhood – were used as proxies for neighbourhood social environment. Following Wu, He, and Webster (2010), we used the proportion of recipients with minimum living standard support (*di bao hu*) in the neighbourhood as a measure of area poverty. The reason why we measured area poverty is that living in an impoverished neighbourhood will render migrants frustrated and stressed. Migrants tend to feel a sense of hopelessness as their expectations of enjoying urban life and having upward social mobility seem difficult to fulfil. It is noteworthy that migrants have no access to minimum living standard support (*di bao*) in Chinese cities, and therefore neighbourhoods with a large share of poor migrants may show a low proportion of *di bao* recipients. Such a measurement error may bias upward the coefficient related to area poverty in regressions. We then used the proportion of migrants to total residents as a proxy for the residential segregation in a neighbourhood. For migrants, living in a migrant 'enclave' may lead to a sense of isolation and exclusion. The variable of area poverty was generated based on data compiled from our interviews with the officers of neighbourhood committees. The variable of ratio of migrants in neighbourhood was derived based on Guangzhou's population census in 2010.

3.3.4. Neighbourhood amenities

Two variables were used to capture the impacts of neighbourhood amenities on migrants' SWB: community facilities and cleanliness. The variable of community facilities is a continuous variable ranging from 1 to 13. It measures the degree of provision of 13 kinds of facilities (including supermarkets, parks, health care centres, kindergartens, etc.) within the neighbourhood. The degree of cleanliness was evaluated by the research team. The research team made an evaluation from five aspects: avenues and alleys in the neighbourhood, open space of the neighbourhood, amenities and facilities, corridors inside residential buildings, and garbage recycling. The score ranges from 1 (very dirty) to 5 (very clean and tidy).

3.3.5. Personal characteristic variables

A series of controlled variables were included in the model: demographic characteristics, self-reported health conditions, and socioeconomic status. We measured the two aspects of respondents' health status: psychological health and physical health. For the measurement of psychological health, we used the *12-item General Health Questionnaire* (*GHQ-12*),[5] which assesses the severity of one's mental problems in the past few weeks (Goldberg & Hillier, 1979). The respondents were asked to respond to 12 items, and rate on a four-point Likert-type scale. The positive items were corrected from 1 ('always') to 4 ('never'), while the negative ones from 4 ('always') to 1 ('never'). The range of score is 12 ~ 48. Higher scores suggest worse psychological health. For the measurement of physical health, the interviewees were requested to give an evaluation of their physical health, which ranged from 1 ('very unhealthy') to 5 ('very healthy').

4. Results

4.1. Descriptive statistics

We made a comparison between migrants and locals in Guangzhou regarding their level of SWB. The average score of migrants' life satisfaction is 19.98, lower than that of their local counterparts in the survey (score = 21.42, $t = -4.475$, $p = 0.001$) and the national average in China (score = 20.32) (Bai, Wu, Zheng, & Ren, 2011). According to the benchmark of *SWLS*[6] (Diener, Emmons, Larsen, & Griffin, 1985; Pavot & Diener, 1993), the average level of migrants' life satisfaction falls into the category of those who are slightly dissatisfied with their life. As for the mean score of positive affect, there is no statistically significant difference between migrants and locals (33.67 versus 33.43, $t = 0.623$, $p = 0.541$). However, the average score of migrants' negative affect is significantly higher than that of their local counterparts (19.49 versus 18.54, $t = 2.883$, $p = 0.004$). This finding implies that migrants, on average, are less satisfied with their life and have more negative emotions relative to locals.

We then analysed the characteristics of migrants with different levels of SWB (Table 2). Concerning the cognitive component of SWB, migrants with a higher level of life satisfaction tend to be those who have a high level of income (19.2 versus 20.7, $t = -3.263$, $p = 0.001$), live in their own property (22.9 versus 19.3, $t = -6.061$, $p = 0.000$), and have a high self-perceived social status (18.2 versus 20.2, $t = -2.791$, $p = 0.003$). As compared to dissatisfied migrants, satisfied migrants are more likely to have a broader social network (19.6 versus 20.6, $t = -2.881$, $p = 0.002$) and live in a mutually supportive neighbourhood (19.1 versus 20.6, $t = -3.073$, p = 0.001). In addition, migrants who live in a deprived neighbourhood (area poverty: 20.4 versus 19.4, $t = 2.272$, $p = 0.011$; ratio of migrants in neighbourhood: 20.3 versus 19.6, $t = 1.992$, $p = 0.038$) are less satisfied with their lives than other migrants. These findings indicate that migrants' life satisfaction is associated with their social and economic status, experience of social support, and neighbourhood deprivation.

Regarding migrants' emotional component of SWB (i.e. positive and negative affect), those who have good psychological health (35.0 versus 31.8, $t = 5.646$, $p = 0.000$) and physical health (31.5 versus 33.9, $t = -2.565$, $p = 0.005$) tend to have a higher level of positive affect than those who have poor psychological and physical health. Perceived social status (30.9 versus 34.0, $t = -3.318$, p = 0.001) is positively associated with the scores of migrants' positive affect but have no association

with the scores of their negative affect. Overall, life satisfaction appears to be dependent on individual attributes and neighbourhood characteristics, and positive affect and negative affect responses seem to be determined by individual attributes only.

4.2. Modelling migrants' subjective wellbeing

We further examined factors influencing migrant's life satisfaction, positive affect, and negative affect via a series of multilevel linear models. We conducted a likelihood ratio (LR) test to justify the application of multilevel modelling instead of the conventional single-level

Table 2
The average scores of migrant's life satisfaction, positive affect, and negative affect.

	Life satisfaction	Positive affect	Negative affect
Demographic characteristics			
Age			
18–30	19.8	34.1	20.1
31–40	19.8	33.9	19.0
41–50	20.4	33.8	19.2
51 and above	19.9	31.4	20.3
Sex			
Female	20.0	32.7	19.7
Male	19.9	34.5	19.3
Marital status and family organisation			
Living with spouse	19.9	33.5	19.3
Single, divorced, widowed	19.9	34.0	20.1
Migrating alone, and leaving family behind	19.8	35.6	19.7
Health status			
Psychological health (GHQ-12)			
12–24 (High)	20.0	35.0	17.6
25–37 (Low)	19.9	31.8	22.4
Physical health			
1–3 (Unhealthy)	19.5	31.5	20.7
4–5 (Healthy)	20.0	33.9	19.4
Socioeconomic status			
Personal hourly income (yuan)			
0–15	19.2	33.7	19.4
16 and above	20.7	34.1	19.4
Time spent on work each month (hour)			
1–100	20.6	33.2	20.1
101–200	21.3	34.2	19.3
201–300	19.2	33.5	19.8
301 and above	18.9	33.3	18.5
Housing tenure			
Homeowner	22.9	34.0	19.6
Renter	19.3	33.6	19.5
Relative deprivation			
Social status			
1–4 (Low)	18.2	30.9	20.3
5 and above (Medium and high)	20.2	34.0	19.4
Social support			
Social ties (the number of friends in Guangzhou)			
0–10	19.6	33.5	19.5
11 and above	20.6	33.8	19.4
Mutual help among neighbours			
1–3 (Weak mutual help)	19.1	33.2	20.2
4–5 (Strong mutual help)	20.6	34.0	19.0
Neighbourhood social environment			
Area poverty (ratio of residents receiving minimum living standard support)			
0–0.5%	20.4	33.9	19.5
0.5–1.0%	19.4	31.8	18.9
Ratio of migrants in neighbourhood			
0–50%	20.3	33.3	19.3
51–100%	19.6	34.1	19.7
Neighbourhood physical environment			
Facilities provision			
1–9 (Poor facilities provision)	19.7	33.9	19.2
10–13 (Good facilities provision)	21.0	33.6	19.6
Cleanliness			
1–3 (Dirty, noisy and disorder)	19.5	34.0	19.8
4–5 (Clean and tidy)	20.5	33.3	19.2

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[5] The *12-item General Health Questionnaire* (*GHQ-12*) includes 12 items of mental problems: 'able to concentrate', 'loss of sleep over worry', 'playing a useful part', 'capable of making decisions', 'felt constantly under strain', 'couldn't overcome difficulties', 'able to enjoy day-to-day activities', 'able to face problems', 'feeling unhappy and depressed', 'losing confidence', 'thinking of self as worthless', and 'feeling reasonably happy'.

[6] The benchmark of *The Satisfaction with Life Scale* (SWLS) is: 5–9 'extremely dissatisfied', 10–14 'dissatisfied', 15–19 'slightly dissatisfied', 20 'neutral', 21–25 'slightly satisfied', 26–30 'satisfied', and 31–35 'extremely satisfied'.

modelling. The result from the LR test ($p < 0.001$) shows that multilevel regressions have stronger explanatory power than single-level regressions. We then tested the multicollinearity of independent variables. The measure of variance inflation factors (VIF < 5) suggests that correlations among independent variables have not excessively biased the parameter estimates of the models. We conducted multilevel linear models separately for three outcome variables: life satisfaction, positive affect, and negative affect. Regression results are shown in Table 3.

4.2.1. The model of life satisfaction

The coefficient of self-perceived social status is significantly positive (0.443). A one-point increase in the score of self-perceived social status increases the score of life satisfaction by 0.443 units. This finding confirms our hypothesis 1 that migrants who suffer from relative deprivation tend to have a lower level of SWB. With respect to the social support, both the number of social ties in Guangzhou and mutual help among neighbours are positively associated with migrants' life satisfaction. Having one more friend in Guangzhou increases a migrant's life satisfaction by 0.022 points, and a one-point increase in a migrant's evaluation of neighbourly help leads to an increase in his or her life satisfaction by 0.820 points. The results confirm our hypothesis 2 that the more social support a migrant receive in the host city, the higher the score of his or her life satisfaction is. As for variables related to neighbourhood environment, only area poverty is significantly associated with migrants' life satisfaction. A one-percentage-point increase in the proportion of recipients with minimum living standard support (*di bao hu*) in the neighbourhood reduces the score of the migrant's life satisfaction by 0.018 points. In this sense, our model results partially support our hypothesis 3 (concerning neighbourhood social environment) and reject our hypothesis 4 (concerning neighbourhood physical environment).

The effects of controlled variables on life satisfaction confirm what is known from the existing literature: first, mental health problems have a negative impact on life satisfaction; second, the higher a migrant's

earnings, the higher his or her life satisfaction is. More specifically, home ownership can significantly improve the level of migrants' life satisfaction (with 1.533 points). This finding implies that migrants who live in their own home are more able to settle down in Guangzhou and are thereby more satisfied with their lives, as compared to migrants who rent a place to live in Guangzhou.

4.2.2. The model of positive affect

Contrary to our expectation, none of seven independent variables has a statistically significant effect on migrants' positive affect. As for controlled variables, only sex, psychological health, and personal income have significant impacts on migrants' positive affect. To be specific, an average female migrant has a lower level of positive affect (with −1.163 points) than an average male migrant. A one-point increase in migrants' psychological health increases their score of positive affect by 0.417 points. A one-percent increase in personal income increases the score of positive affect by 0.015 points.

4.2.3. The model of negative affect

No evidence has shown that independent variables are significantly related to migrants' negative affect scores. As for controlled variables, only two variables, marital status and family organisation and psychological health, have a significant effect on migrant's negative affect. Single migrants have higher scores of negative affect than those who are married and live with their spouse by 1.377 points. A one-point increase in a psychological health score is accompanied by a decrease in the score of negative affect by 0.521 points.

Contrary to our expectations, there is no evidence from our positive and negative affect models in support of our four hypotheses. Our findings are consistent with existing arguments that the level of life satisfaction (i.e. the cognition component of SWB) and the level of positive affect and negative affect (i.e. the emotion component of SWB) tend to be influenced by different factors (Diener, 1984; Diener, 2009; Huppert & Whittington, 2003; Schwanen & Wang, 2014). Cognition

Table 3
Multilevel modelling on migrants' life satisfaction, positive affect and negative affect in Guangzhou.

	Life satisfaction		Positive affect		Negative affect	
	Estimates	S.E.	Estimates	S.E.	Estimates	S.E.
Independent variables						
Self-perceived social status	0.443***	0.159	0.307	0.188	0.090	0.156
Social ties in Guangzhou	0.022***	0.007	0.006	0.008	0.001	0.007
Mutual help among neighbours	0.820***	0.314	0.126	0.372	−0.338	0.309
Area poverty	−0.018*	0.009	−0.005	0.011	−0.007	0.009
Ratio of migrants in neighbourhood	−0.865	1.345	0.615	1.360	−0.914	1.095
Facilities provision	0.073	0.280	−0.227	0.289	0.118	0.234
Cleanliness	0.505	0.504	−0.76	0.517	−0.195	0.418
Controlled variables						
Demographic characteristics						
Age	0.013	0.026	−0.040	0.031	−0.013	0.026
Sex (reference group: Male)	−0.336	0.451	−1.163**	0.537	0.298	0.446
Marital status and family organisation (reference group: Married and living with spouse)						
Single	0.781	0.676	−0.086	0.804	1.377**	0.668
Migrating alone, and leaving family behind	−0.504	1.154	0.626	1.372	1.497	1.14
Health status						
Psychological health (continuous)	−0.090*	0.043	−0.417***	0.052	0.521***	0.043
Physical health (reference group: Unhealthy)	0.048	0.796	0.731	0.946	−1.132	0.787
Socioeconomic status						
Personal hourly income (natural log)	0.013*	0.006	0.015**	0.007	0.001	0.006
Time spent on work monthly (continuous)	−0.002	0.003	−0.001	0.004	−0.002	0.003
Housing tenure (reference group: Renter)	1.533**	0.675	0.462	0.788	−0.302	0.652
Constant	12.691***	4.470	46.334***	4.851	9.667**	3.966
Variance component						
Within area variance	20.149***	1.395	28.701***	1.981	19.856***	1.367
Between area variance	2.363*	1.201	2.005	1.232	1.239	0.763
Sample N	444		444		444	
Log likelihood	−1308.792		−1384.037		−1301.615	

* p < 0.10.
** p < 0.05.
*** p < 0.01.

(in this case, life satisfaction) is more stable than emotion (in this case, affect). An individual's cognition is subject to his or her long-lasting environments such as relative social status, social resources, and neighbourhood environment, and his or her emotion usually fluctuates along with momentary circumstances and events (Diener, 1984). Therefore, our regression results indicate that migrants' social support and residential environment are merely associated with their life satisfaction rather than their positive and negative affects.

5. Conclusion and discussion

Using data from a questionnaire survey and multilevel models, this paper examines the determinants of migrants' SWB in Guangzhou, China. It particularly focuses on the extent to which and the ways in which social support and residential environments influence migrants' SWB. Results from descriptive analysis have indicated that migrants are less satisfied with their life and have more negative emotions as compared to local residents. Results from multilevel models have shown that social support, neighbourhood cleanliness, and neighbourhood amenities are associated with the cognition component of migrants' SWB (i.e. life satisfaction) but have no association with the emotion component of migrants' SWB (i.e. positive affect and negative affect). Specifically, migrants who have a feeling of relative deprivation, who receive less social support from people living in Guangzhou, and who live in an impoverished neighbourhood tend to be less satisfied with their lives. Migrants' positive affect and negative affect are significantly influenced by their psychological health status. However, there is no evidence in support of the assumption that social support, neighbourhood social environment, and neighbourhood physical environment play an important role in shaping migrants' positive and negative affects.

This study makes conceptual and empirical contributions to the understanding of migrants' SWB in Chinese cities, which enhances our knowledge in the determinants of SWB. Conceptually, it has incorporated both social environment and physical environment at the neighbourhood level into the analytical framework of migrants' SWB. This study empirically examines migrants' SWB in China by taking into account both the cognition component and the emotion component of SWB for the first time. The empirical results of this research support the view that migrants tend to feel deprived and unhappy when recognising the socioeconomic disparities between local residents and migrants themselves (Cheng et al., 2014; Knight & Gunatilaka, 2010). This study also verifies the 'buffer effect' theory that accounts for the positive implications of social support for SWB (Cohen & Wills, 1985). Moreover, it implies that the neighbourhood where migrants live have an important implication on their SWB. On one hand, a cohesive and supportive neighbourhood offers migrants neighbourly support and alleviates their life stress. On the other hand, a deprived and impoverished neighbourhood strengthens migrants' feeling of relative deprivation and dampens their aspiration to pursue a better life.

It is noteworthy that this exploratory study has some limitations. First, the estimation of our multilevel models might be biased by the presence of unobserved individual heterogeneity. For example, our regressions have not included variables related to personality traits, which have been found to influence SWB in previous studies. However, personality traits are not the main concern of this study and are therefore not included in our regression specification. Readers must be cautious about possible bias in parameter estimation due to omitted variables. Second, our study does not consider city-level factors such as population density and climatic amenities. Therefore, our future research on migrants' SWB will use the nationally representative dataset to explore the determinants of migrants' SWB in a wider geographical context. Third, this study has not made fully use of Guangzhou 2010 census data, which provide rich and reliable information on the demographic and socioeconomic profiles of sampled neighbourhoods. It will be worthwhile to incorporate census-derived neighbourhood-level

variables such as area deprivation into regression specifications of our next study.

Finally, this study focuses on migrants only rather than both migrants and local residents, therefore failing to quantify the effect of obtaining a local *hukou* status on migrants' subjective wellbeing. Migrants who are recently granted a Guangzhou *hukou* status ('permanent migrants') are assumed to have a higher level of SWB compared with migrants who are always denied a Guangzhou *hukou* status ('temporary migrants'), as permanent migrants have a higher socioeconomic status and a weaker sense of relative deprivation than temporary migrants (Fan, 2002; Liu & Xu, 2015). The next stage of our research will further investigate the role of migrants' *hukou* status in shaping their sense of relative deprivation and wellbeing.

There are some policy implications drawn from the findings of this research. Our research suggests that neighbourhood social environment and social support are strongly associated with migrants' SWB. Previous studies have shown that migrants turn to their relatives, friends, native-place fellows (*laoxiang*), and neighbours (most of whom are native-place fellows) for help, because they are excluded from social support provided by government and local residents (Liu et al., 2012; Wang et al., 2015). Our findings confirm this point and further suggest that migrants' restricted access to social support is detrimental to their feeling of well-being. Therefore, policy reforms should prioritize the elimination of discriminatory practices against migrants in terms of social support provision. Another practical approach to increase migrants' SWB is to build a cohesive and supportive community and to help migrants to integrate into the community. First, migrants should be taken into account in the planning of public services, and these services should be allocated spatially based on the number of de facto population (including migrants and local residents) rather than the number of de jure population (local residents only). Second, it is advisable to assign more well-trained social workers to areas with a huge number of migrants. These social workers are responsible for addressing life challenges and enhancing well-being of the disadvantaged including migrant workers. Third, a more inclusive community planning is needed, and migrants' wellbeing should be a critical component of community planning. Fourth, some physical planning approaches (e.g. community centres and public space) are needed to facilitate the interaction and mutual help between migrants and local residents.

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