Cities 45 (2015) 81–90

Contents lists available at ScienceDirect

Cities

journal homepage: www.elsevier.com/locate/cities

Social and spatial differentiation of high and low income groups' out-of-home activities in Guangzhou, China

Suhong Zhou [a,b,*], Lifang Deng [c], Mei-Po Kwan [d], Ruogu Yan [e]

[a] School of Geography and Planning, Sun Yat-sen University, Guangzhou, China
[b] Guangdong Key Laboratory for Urbanization and Geo-simulation, Guangzhou, China
[c] The Urban Planning Institute of Foshan Chancheng, Foshan, China
[d] The University of Illinois at Urbana-Champaign, Urbana, IL, USA
[e] Guangdong Academy of Social Sciences, Guangzhou, China

ARTICLE INFO

Article history:
Received 16 June 2014
Received in revised form 1 March 2015
Accepted 1 March 2015
Available online 4 April 2015

Keywords:
Spatiotemporal behaviour
Social diversity
China

ABSTRACT

With China's rapid urbanisation driving its growing economy, the enlarging socio-spatial inequalities in the cities have received wide attention. Rather than following the largely studied residential spaces, this paper focuses on socio-spatial differentiation based on the spaces of one's out-of-home activities. Using data of 1006 individuals collected by door to door questionnaires, this paper sets up the spatial and temporal autocorrelation GT coefficient to examine the spatial heterogeneity characteristics of high- and low income groups' out-of-home activities in a continuous spatiotemporal framework. The factors and different mechanisms influencing the clustering of the activities are discussed to better understand social diversity in post-reform urban China. The results suggest that there is obvious spatial and temporal variation in high- and low income groups' out-of-home activities, indicating that differing social spaces are not just limited to the macro-static residence-based living space, but also exist in the individual's daily-activities space. Both high- and low income people have drastically different activity spaces and they may not interact much with each other. This is socially very significant because it means that there is considerable social isolation or segregation for both groups. The results also show that within the same income group there exists a divisive cluster with different formation mechanisms, including the job–housing relationship, the correlation of activity opportunities with those surrounding residential areas and the individual's ability to access activities (that is, space–time accessibility). Structural transition can also impact on activities choices of various social groups.

Introduction

China's urbanisation level rose from 17.9% in 1978 to 49.68% in 2010 with a 3.24% annual growth rate (National Bureau of Statistics of China, 2008, 2011). This represents an unprecedented speed and scale of urbanisation. Based on GDP data in 2010, China has become the world's second largest economy with an important role in the world economic system. Whist rapid economic growth has considerable potential to improve people's living standards, income inequality in China is becoming increasingly serious. Various statistical sources indicate that China's Gini coefficient was 41.5 in 2011, which exceeded the internationally acceptable warning level of 40. The quintile income ratio is now 8.4, which means that the average income of the richest 20% of the population is 8.4 times higher than the average income of the poorest 20% of the population (United Nations Development Programme, 2013). China has become one of the world's countries with serious income inequality, which indicates that the benefits of China's rapid economic growth have not been equally shared by different levels of society. As social difference in China becomes increasingly serious (Gu & Christian, 1997; Yang, 2005), concern for social justice has attracted much attention and discussion.

It is widely recognised that post-fordist cities are often characterised by socio-spatial polarisation (Li, Wu, & Lu, 2004; Marcuse & Kempen, 2000). However, many post-socialist cities are also facing increasing socio-spatial divisions (Ruoppila, 2005). As China has transformed to a socialist market system in the last three decades or so, some new socio-spatial phenomena have emerged in the country (Ma, 2002). These include new gated communities (Wu, 2005), peasant enclaves, and *chengzhongcun* (villages in the city) for migrants (Ma & Xiang, 1998; Zhang, Zhao, & Tian, 2003).

* Corresponding author at: 135 Xingang Xi Road, School of Geography and Planning, Sun Yat-sen University, Guangzhou 510275, China. Tel.: +86 13825044799.
E-mail address: eeszsh@mail.sysu.edu.cn (S. Zhou).

http://dx.doi.org/10.1016/j.cities.2015.03.002
0264-2751/

Many studies have examined the socio-spatial differentiation of post-reform Chinese cities and observed that post-reform urban China is characterised by residential segregation (Feng & Zhou, 2008; Gu & Liu, 2001; Li & Wu, 2008; Wu, 2002). Whilst it is important to examine social differentiation in residential spaces, it is also necessary to investigate whether social segregation happens in other places where people perform their out-of-home activities such as work, shop, and play (Kwan, 2013). This broadened focus will help us better understand socio-spatial differentiation and the complex relationships between social justice and spatial structure.

Individual behaviour has spatiotemporal characteristics. Examining individual spatial behaviour at the micro-level provides an important perspective and method for urban research. It analyzes the interaction between individual behaviour and urban space by considering how individual characteristics and demands impact on the activities system of a whole city (Chai, Liu, & Li, 2002; Zhou & Deng, 2010). Current research focuses on a series of particular behaviours, such as commuter and consumer behaviour (Giuliano & Small, 1993; Kwan, 1999; Vandersmissen, Villeneuve, & Thériault, 2003; Wachs et al., 1993; Shen, Kwan, & Chai, 2013); time allocation among different activities (Huff & Hanson, 1986; Pas & Sundar, 1995); the time allocation and changes between family members (Bhat, 1996; Golob & McNally, 1997; Mannering, Murakami, & Kim, 1994; Niemeier & Morita, 1996); multi-purpose travelling (Krizek, 2003; Nishii & Kondo, 1992); decision-making simulation (Kitamura, 1984); and the realisation of 3D geographic visualisation (Forer, 1998; Huisman & Forer, 1998; Kwan, 2000, 2004; Yu, 2006). However, much research to date has used panel data for analysis, and studies that take into account individual behaviours spatiotemporally in a continuous space–time framework are still very limited.

Spatial behaviour and the associated activity spaces that unfold in a continuous space–time framework are important perspectives that reveal the quality-of-life and social equity issues in urban areas. Individual activity spaces are determined by three important determinants, such as home, regular activities, and travel between and around the pegs (Golledge & Stimson, 1997: 279). Thus, it consists of the visited locations, and the routes and areas one has travelled through (Schönfelder & Axhausen, 2003). The location and status of residential areas, and the frequently visited activity locations such as work or shopping would be important "anchors" of daily activity spaces. In urban China, the location and status of these "anchors" are deeply impacted by historical path dependence and urban social and economic transformation.

The widening social and income inequality in China mentioned above also manifests itself in the spatiotemporal behaviour of people (Shen et al., 2013). Recent research has found that poor people may work longer hours (thus facing more space–time constraints) and have lower mobility (because of a lack of access to private vehicles). Thus they are less free to move around and access various urban opportunities, such as shops and social and recreational facilities (Zhou & Deng, 2010). However, how would social inequality affect people's spatiotemporal activities? What are the characteristics of the out-of-home activities clusters of different social groups? Why has the cluster formed? This paper will use case studies to examine these issues.

Income inequality intensified social differentiation during the post-reform era in China. Income is an important index for social stratification, where groups with different incomes can be used for social classification. Studies of how the daily activities of different income groups form different space–time clusters will help to reveal their social spatiotemporal segregation from a space–time perspective. This study uses spatial and temporal autocorrelation to examine the sociospatial differentiation between the activity clusters of high- and low-income groups in a contiguous spatiotemporal framework. It presents a case study of Guangzhou based on a survey of a sample of residents' behaviour to construct a spatiotemporal autocorrelation GT coefficient. It seeks to reveal the underlying mechanisms and factors contributing to such differentiation. Results of this research will be useful for addressing sociospatial equity issues and also optimising the allocation of urban resources.

Historical path dependence and socio-spatial differentiation of daily activities in urban China

As mentioned above, the location and status of activity "anchors", mostly residential areas and workplaces, are deeply impacted by historical path dependence in urban China. The built environment formed in the socialist period such as *danwei* and in the post socialist era such as commercial and social housing and new industrial area, have some impact on current socio-spatial differentiation and thus impact on personal daily activities.

For decades, *danwei* was not only the basic unit of economic and social organisation, but also the spatial organiser in urban China (Bjorklund, 1986; Bray, 2005). According to Bjorklund (1986), *danwei* is a spatial framework in which social life, economic activity, and political control are integrated. Apart from offering a job, *danwei* provides its employees with a comprehensive package of welfare services for daily life, which deeply impact on not only residential but also people's out-of-home activity choices.

After the revolution in China in 1949, especially after the socialist reform of the publicly-owned system, almost all properties and production were organised by *danwei*, with *danwei* responsible for setting up economic and social units. *Danwei* made decisions about the daily needs of individual households and became an 'invisible hand' which organised people's daily activities. However, the historic path of the *danwei* system still plays its role in the current urban structure and thus on people's out-of-home activities, especially for the employees of *danwei*.

In the socialist era, the *danwei* compound, a mix of housing, workplaces, and daily services was one of the main working and living units. People living in a compound mostly commuted by walking, resulting in mixed land use in 'walking' neighbourhoods. At the same time, with the development of the cities, and the lack of large pieces of land for compound construction, more and more *danwei* constructed their residential housing out of the compounds in areas called Danwei Residential Areas (单位生活区). Although it resulted in some geographical separation of jobs, housing and other services, the optimal strategy of the jobs-housing connection mostly came from the *danwei*, which tried to make this separation as small as possible. After the reform of the late 1990s, both labour and housing became more and more mobile and individual households had more decision-making autonomy. However, the *danwei* system still plays its role in the current urban structure and daily activities.

Instead of the much more socially diverse market system, social status in the *danwei* system is much less differentiated. Through the *danwei* compound providing jobs, housing and daily services, the development of mixed land use in the city is stimulated. The Danwei Residential Areas, however, encouraged some workplaces to relocate near to the large residential areas, which in turn may stimulate the mix of land use development around the living places. With the reform of the *danwei* system, some government-financed institutions and government offices, whose employees are mostly professionals and highly educated, left and the compounds of these *danwei* became one of the high-income groups' daily activity clustering zones. At the same time, some