



Research Paper

Exploring the link between neighborhood environment and mental wellbeing: A case study in Beijing, China

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ABSTRACT

Existing studies of the health effects of urban form have focused overwhelmingly on physical health. The potential role of neighborhood environment in promoting people's positive mental wellbeing is understudied. The purpose of this study is to partially fill this gap. Based on a survey of 712 residents in 16 typical neighborhoods in Beijing, China, we develop hierarchical multilevel models to analyze the association between observed and perceived neighborhood environment (physical and social) and residents' mental wellbeing, controlling for their general health status, personal characteristics, and housing conditions. We find that among the five observed neighborhood characteristics (floor area ratio, building coverage ratio, mixed land use, neighborhood size, and proximity to an urban park), proximity to an urban park is the only one that shows a significant and positive effect on subjective wellbeing. General neighborhood satisfaction has a significant and positive association with residents' mental wellbeing. Such a positive association, however, turns marginally significant when observed neighborhood environment is controlled for in the model. We find a significant and positive association between perceived neighborhood social environment (particularly harmonious interpersonal relationship between neighbors) and mental wellbeing. The association between neighborhood social environment and mental wellbeing is weaker in newer neighborhoods that were built after 2000. Moreover, the strength of social capital tends to decline from older to newer residential neighborhoods. In general, neighborhood environment plays a significant but minor role in explaining people's subjective wellbeing. Personal health status and demographic characteristics are more powerful in explaining the variation among people's subjective wellbeing.

1. Introduction

The past few decades have seen a renaissance of interest amongst planning scholars and practitioners in promoting public health through urban planning and design (Boarnet, 2006; Corhurn, 2009; Frank et al., 2006; Handy, Boarnet, Ewing, & Killingsworth, 2002). Existing studies, however, have focused overwhelmingly on physical health; the potential role of urban form in increasing people's positive mental wellbeing is understudied (Delbosc, 2012; Pfeiffer & Cloutier, 2016), even though facilitating life satisfaction has long been one of the most important goals of urban planners (Cao, 2016). Furthermore, almost all the extant studies have been conducted in more developed countries, and evidence from the less developed world is scant. This study partially fills these gaps by exploring the link between neighborhood environment (physical and social) and positive mental wellbeing in Beijing, China, a large metropolitan area in a developing country.

Mental wellbeing has been defined and measured in a range of

different ways in the literature. Some researchers use the phrase "mental wellbeing" as a synonym for "happiness" and "life satisfaction" (Easterlin, 2003; Pfeiffer & Cloutier, 2016). In this analysis, we define mental wellbeing broadly as a state of subjective wellbeing that includes both happiness and life satisfaction. Following Bond et al. (2012), we conceptualize positive mental wellbeing as a state of health, happiness and prosperity, comprising two dimensions, namely how we feel and how we function. Mental wellbeing is not the absence of mental illness. Only a small portion of the population is mentally ill, but mental wellbeing is something that everyone experiences, albeit to varying degrees (Bond et al., 2012). There were skeptics who questioned the measurability of mental wellbeing and its interpersonal comparability, as well as the correlation between subjective wellbeing and material goods. For example, the set-point theory posits that people can adapt to almost any life event and their happiness levels fluctuate around a biologically determined set point that rarely changes (Lucas, 2007). But more and more recent studies have confirmed the inter-

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personal ordinal comparability of satisfactions (Van Praag, Frijters, & Ferrer-i-Cardonell, 2003) and the correlation between subjective wellbeing and objective measures of quality of life (Oswald & Wu, 2010).

Empirical studies show that individual demographic factors play important roles in determining people's mental status. Dolan et al. (2008) reviewed relevant papers that have been published since 1990 to determine the drivers of subjective wellbeing. Their review suggests that the following individual drivers might influence people's subjective wellbeing: 1) income, 2) age, 3) gender, 4) education, 5) marital status, and 6) health.

Housing conditions and neighborhood environment can also influence residents' psychological wellbeing in both direct and indirect ways. "Housing and neighborhoods are not just defined by their physical aspects but can also be considered as a psychosocial environment" (Bond et al., 2012). Many features of the built environment, such as housing crowdedness and neighborhood unsafety, can directly impact people's mental health by exposing residents to environmental stressors, causing psychological stress and mental problems and greater likelihood of depression (Evans, 2003; Galea, Ahern, Rudenstine, Wallace, & Vlahov, 2005; Honold, Beyer, Lakes, & van der Meer, 2012; Lederbogen et al., 2011). A review by Evans (2003) shows that high-rise, multifamily, and high-floor homes are inimical to residents' psychological wellbeing. Research suggests that relative, as opposed to absolute, housing conditions may be most associated with happiness (Pfeiffer & Cloutier, 2016). A study of Scotland's Housing and Regeneration Project shows that moving from flats into houses increases respondents' sense of wellbeing (Bond et al., 2012). In addition to physical housing conditions, housing tenure might also influence people's subjective wellbeing. A study in urban China shows that homeownership has a strong and positive effect on both one's housing satisfaction and overall happiness (Hu, 2013). A study in Europe shows that renters who become homeowners not only experience a significant increase in housing satisfaction, but also after changing their tenure status, they obtain different benefits from the same housing context (Diaz-Serrano, 2009).

Providing residents with access to open, natural, and green space can directly increase their happiness (Pfeiffer & Cloutier, 2016). Kaplan and Kaplan (1989) laid the theoretical foundation for explaining landscape's potential influence on cognitive attention restoration. Many empirical studies have shown that greenspace and landscape is a health resource that promotes physical, mental, and social wellbeing (Abraham, Sommerhalder, & Abel, 2010; Bratman, Hamilton, & Daily, 2012; Carrus et al., 2015; Francis, Wood, Knuiiman, & Giles-Corti, 2012; Lachowycz & Jones, 2013; Scopelliti et al., 2016). These studies suggest that greenspace and landscape may improve one's mental status through three mechanisms: 1) attention restoration; 2) stress reduction; and 3) evoking positive emotions (Abraham et al., 2010; Bratman et al., 2012).

The connection between neighborhood design and residents' subjective wellbeing is still not fully clear. The New Urbanism Movement promotes traditional neighborhood design that features higher density, mixed land use, and walkability (Congress for the New Urbanism, 1999). There are numerous studies that compare the environmental outcomes of different types of neighborhood forms, but research on the impact of neighborhood design on mental wellbeing is limited. Lovejoy et al. (2010) review neighborhood characteristics that are related to neighborhood satisfaction. They find that neighborhoods of the following characteristics are consistently associated with neighborhood satisfaction in previous studies: safety, upkeep, and some form of neighboring or social ties, and to a lesser extent, quiet, housing quality, and greenery. Their empirical study in Northern California indicates that attractive appearance and perceived safety are two neighborhood characteristics that are associated with better neighborhood satisfaction in both traditional and suburban neighborhoods, among many other neighborhood design elements (Lovejoy, Handy, & Mokhtarian, 2010).

Cao's (2016) study in the Twin Cities (MN) finds that both high density and poor street connectivity are detrimental to life satisfaction, and street connectivity is more influential than density; mixed land use simultaneously imposes positive and negative impacts on life satisfaction and its total effects is not statistically significant. A survey of residents in New York City finds that living in neighborhoods characterized by a poor-quality built environment is associated with a greater likelihood of depression (Galea et al., 2005). A study in Greenwich, London confirms an association between the physical environment and mental well-being across a range of domains; the most important factors that operate independently are neighbor noise, sense of over-crowding, and fear of crime (Guite, Clark, & Ackrill, 2006). Wang and Wang (2016) examine the intra-city variations of life satisfaction in different districts in Beijing and find that district effects account for around 9% of the variance in individuals' life satisfaction, which are similar to the effects of individuals' socioeconomic variables.

Neighborhood social environment may also influence residents' mental wellbeing. Studies consistently show that living in a neighborhood of low socioeconomic status is associated with high incidents of depression (Galea et al., 2007; Mair, Diez Roux, & Galea, 2008; Matheson et al., 2006). A survey of older adults attending senior centers in New York City indicates that after adjusting for covariates, self-reported quality of life is significantly associated with neighborhood safety and social cohesion, but is not significantly associated with neighborhood walkability. Miller and Buys (2008) investigate the extent to which social capital and participation in community activities predict happiness in a Gold Coast suburb in Australia. They find that among the seven elements of social capital tested in their analysis, two of them—life satisfaction and health—predict happiness. Studies of neighborhood social capital in Chinese cities have shown that interactions between neighbors have been declining with the transformation of housing provision from work-based to a market economy (Wu, 2012). A case study of three Chinese cities (Beijing, Shanghai, and Guangzhou) reveals that social attachment within the community is the most important determinant of residential satisfaction in China's informal settlements (Li & Wu, 2013). A social survey of Guangzhou, China shows that the level of social interaction, local intimacy, and trust and mutual assistance tends to diminish from the older, more established neighborhoods to the work-unit-based and commodified areas (Forrest & Yip, 2007).

In summary, there seems to be a conceptual consensus that neighborhood environment (physical and social) plays an important role in determining residents' mental status. Empirical studies, however, have yielded mixed and inconsistent results. This is at least partially because the connection between residential environment and mental wellbeing is highly complex and context specific. Furthermore, residential environment and mental wellbeing have been defined and measured in a variety of ways, which may also contribute to the inconsistent findings from the literature. Another limitation of the literature is that the vast majority of previous studies have been conducted in the developed world. Empirical evidence from the developing world is scant.

This study provides some new evidence of the complex relationships between neighborhood environment and subjective wellbeing. We consider both the built and social environments and develop hierarchical multilevel models to analyze their associations with residents' positive mental wellbeing based on a survey of 712 residents in 16 typical neighborhoods in Beijing. We are particularly interested in testing the following three hypotheses:

- 1) Higher satisfaction with different domains of neighborhood environment is associated with better mental wellbeing;
- 2) Neighborhoods of new urbanist features—such as higher density, mixed use, and better walkability—promote better mental wellbeing; and
- 3) Better social environments within a neighborhood inspire better

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