

# How does neighborhood design affect life satisfaction? Evidence from Twin Cities



Xinyu (Jason) Cao\*

Humphrey School of Public Affairs, University of Minnesota, United States

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## ABSTRACT

Planning for quality of life is generally conceptual because empirical studies are limited. Most of them focus on environmental amenities and have yet to consider other dimensions of neighborhood design. More importantly, previous studies are not based on theoretical frameworks and hence have a limited capacity to reveal the mechanisms underlying neighborhood design and life satisfaction. This study adapts Campbell's model to connect neighborhood characteristics and life satisfaction through perceptions and residential satisfaction. It applies structural equations models to the data from the Minneapolis-St. Paul metropolitan area. Land use mix simultaneously imposes positive and negative impacts on life satisfaction although its total effect is insignificant. Both high density and poor street connectivity are detrimental to life satisfaction, but street connectivity is much more influential than density. To enhance life satisfaction, planners should limit poor-connectivity neighborhoods and implement strategies to promote positive responses of land use mix.

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## 1. Introduction

Why do we need empirical research into environmental correlates of life satisfaction? Life satisfaction is a cognitive measure of subjective well-being or quality of life (Diener et al., 1985; Kahn and Juster, 2002). It is the ultimate goal of urban planning (APA, undated). Urban planners usually believe that certain development pattern facilitates/inhibits life satisfaction. For example, urban sprawl has been criticized for its detrimental effect on life satisfaction (Frank, 2000; Sturm and Cohen, 2004). From a historic overview, however, development patterns that planners have advocated vary greatly over time (van Kamp et al., 2003). The variation results from the fact that the connections between built environment elements and life satisfaction are mostly conceptual in the minds of planners, architects, and policymakers. Planners often review a variety of planning documents and propose a set of livability/sustainability principles (see <http://www.epa.gov/smartgrowth/partnership/>) and define corresponding indicators (see <http://www.sustainablecommunities.gov/indicators/>) to guide planning efforts (van Kamp et al., 2003). Since principles and indicators are seldom based on empirically-supported theories, it is uncertain whether certain environmental element derived from the principles and indicators will improve residents' life satisfaction.

\* Tel.: +1 612 625 5671.

E-mail address: [cao@umn.edu](mailto:cao@umn.edu)

Smart Growth and Compact City have recently become masterpieces of planning initiatives. Do people prefer to live in such high-density and mixed-use neighborhoods? Previous studies suggest that there are a broad of interests and markets (Levine and Inam, 2004; Myers and Gearin, 2001; Song and Knaap, 2003). On the other hand, an apparently sizable share of households favor characteristics of sprawl development (Cao, 2008; Morrow-Jones et al., 2004). These illustrate heterogeneous tastes of residents. Different tastes tend to lead to different responses to built environment interventions. What are the effects of the interventions on life satisfaction? Few studies have offered solid answers. Although high density has been advocated for its benefits to the environment (Ewing et al., 2008), it is evident that density tends to negatively affect residential satisfaction (Rodgers, 1981). The controversy calls for a better understanding of the mechanisms between the built environment and life satisfaction through empirical research. The consequences of misguided planning practices can be long-lasting because once developed, the built environment may last for decades.

A limited number of empirical studies have shed light on the relationships between the built environment and life satisfaction. Ambrey and Fleming (2014) explore the effect of public greenspace on life satisfaction of individuals living in Australia's capital cities and conclude a positive relationship between them. They also find that the greenspace offers extra benefits to lone parents and less-educated people. Shafer et al. (2000) investigate the

relationships between users' perception of three urban greenway trails in Texas and quality of life, and find that fitness, natural areas, better land use and resident pride associated with the trails contribute the most to quality of life. A few studies have examined environmental correlates of life satisfaction of older people. Sugiyama et al. (2009) explore the associations between neighborhood open space characteristics and life satisfaction of seniors in the U.K. They conclude that proximity to open space is positively associated with life satisfaction and two perceived measures of open space (pleasantness and safety) positively affect life satisfaction. Friedman et al. (2012) examine the relationships between perceived neighborhood characteristics and life satisfaction of residents in senior centers in New York City. They conclude that perceived neighborhood safety and cohesion are positively associated with life satisfaction whereas walkability has no effect. Parra et al. (2010) study the impacts of both objective and perceived built environment elements on life satisfaction of the elderly in Bogota, Columbia. They find that perceived safety of parks, safety from traffic, and street noises are associated with mental dimensions of quality of life. However, objective neighborhood characteristics (including the presence of public park and bus rapid transit) do not show significant influences.

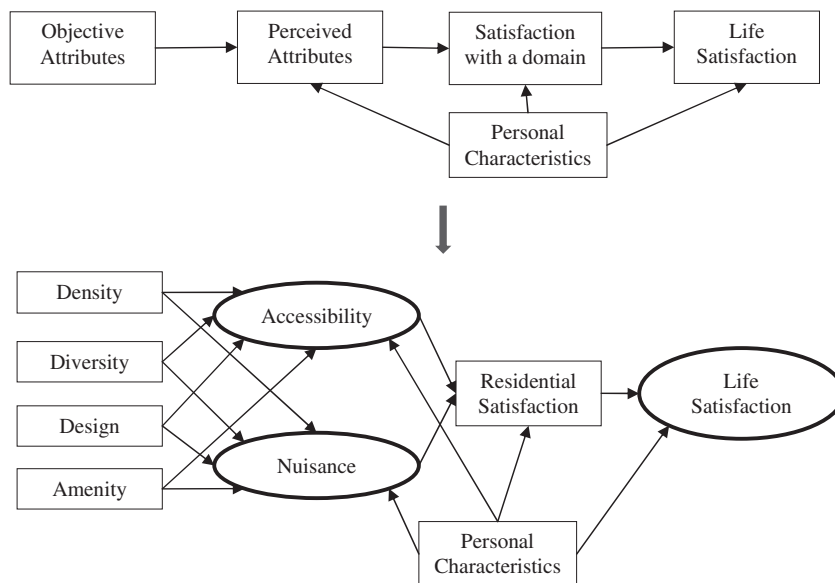
Although the studies offer important insights, there are significant gaps in the field. To begin with, scarce empirical studies limit planners' understanding on the connections between the built environment and life satisfaction. Moreover, most of existing studies focus on environmental amenities such as open spaces, parks, and greenways. Although they are an essential component of the built environment, they represent only one of its dimensions. More importantly, previous studies are ad hoc in nature, and not based on theoretical frameworks. As previous studies conclude environmental correlates of life satisfaction, new questions have emerged: Why do objective (or perceived) measures of the built environment influence life satisfaction? What are the relationships between objective measures and perceived measures? What are the mechanisms among these variables?

In the field of residential environment and life satisfaction, one of the most prevailing frameworks is Campbell's model (1976). According to the model, life satisfaction results from a process of objective stimuli, cognitive responses, and domain-specific

satisfactions. As shown in the upper diagram of Fig. 1, an individual experiences objective attributes (stimuli) in her residential environment, and perceives the stimuli through a cognitive process, and then evaluates whether she is satisfied with the residential environment, and life satisfaction is a global evaluation of residential satisfaction and satisfactions with other domains such as health, housing and family. Campbell et al. (1976) also believe that personal characteristics are important determinants of perceptions, satisfaction with domains, and life satisfaction. This model conceptually depicts the mechanisms underlying residential environment and life satisfaction: objective environmental attributes affect life satisfaction through two mediating processes: perceived environmental attributes and satisfaction with residential environment. Although several previous studies have measured both objective and perceived built environment elements (and sometimes residential satisfaction), few have applied a sound theoretical model into empirical research. In the area of residential satisfaction, Hur et al. (2010) explore the influences of building density and vegetation rate on neighborhood satisfaction through their influences on perceptions and evaluations although they do not explicitly tie their model to any theoretical framework.

Moreover, previous studies have yet to consider different cognitive responses to the same environmental stimulus. High density often means high accessibility to destinations, which facilitates activity participation. Because work and leisure are important dimensions of quality of life (Poortinga et al., 2004), high-density neighborhoods conducive to exercising these activities presumably enhance life satisfaction. On the other hand, for some people, high density also means crowding, which is detrimental to residential satisfaction (Rodgers, 1981). However, the impacts of the two responses on life satisfaction may be canceled out if researchers do not decompose the different effects of density on life satisfaction. This modeling practice will hinder our understanding of the mechanisms underlying residential environment and life satisfaction.

Using data from residents of five neighborhoods in the Minneapolis-St. Paul metropolitan area (Twin Cities), USA, this study adapts Campbell's model to investigate the influences of neighborhood characteristics on life satisfaction. As shown in the lower diagram of Fig. 1, this study focuses on the 3Ds (density,



Adapted from Campbell's Model (1976)

Fig. 1. Theoretical models.

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