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How do spatial characteristics influence well-being and mental health? Comparing the effect of objective and subjective characteristics at different spatial scales

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ABSTRACT

The impact of spatial characteristics on well-being has received increasing attention over the past decade. In most studies, however, the emphasis has been on either cognitive well-being (life satisfaction) or mental health. In addition, studies differ in terms of using objective or subjective characteristics, and in terms of the spatial scale of spatial variables (neighbourhood vs. the wider urban environment). This paper first discusses these differences from a theoretical point of view, and then compares model estimates based on different well-being conceptualisations and using objective and subjective spatial variables. To this end, a survey was held in the Utrecht province in the Netherlands that focused on this issue. We find that significant differences in cognitive and affective wellbeing and mental health are observed between neighbourhoods, which can be explained from both neighbourhood characteristics and personal characteristics of the inhabitants. We find that life satisfaction and affective well-being are more affected by subjective spatial variables, and mental health more by objective variables. In particular, life satisfaction and affective well-being are mostly affected by neighbourhood attractiveness and social safety, whereas mental health is positively associated with a newer housing stock. In general neighbourhood characteristics appear to have greater impact on different forms of well-being than accessibility variables on the urban level.

1. Introduction

The past decades have seen a steady increase in the number of studies addressing the underlying factors of individuals' well-being and how individuals' well-being can be increased by interventions of public authorities, employers and schools (e.g., Dolan et al., 2008; Frey and Stutzer, 2010). Factors that have been found to influence individuals' well-being include personality traits, working status, age, household composition, social interactions, physical health status, engagement in meaningful activities and religion. Increasingly, also the residential and urban environment is receiving attention as a potential influential factor of well-being. According to Leyden et al. (2011), the neighbourhood and the city one lives in will influence individuals' well-being as they form the stage where one interacts with other individuals' to participate in social activities that contribute to happiness. Others (See Wang and Wang, 2015 for a review) have found that issues such as safety and accessibility, quality of urban facilities and exposure to noise and air quality in urban areas may influence human flourishing and well-being.

Relevant studies (discussed in detail in Section 2) come from different domains, such as geography, land use and transportation studies, sociology and psychology. As a consequence, research approaches differ significantly in terms of spatial scale and measurement methods. The level of spatial resolution used in various studies ranges from whole cities (e.g., Leyden et al., 2011) to quality of the dwelling (Evans, 2003), with most studies focusing on the neighbourhood level. In addition, some studies (e.g., Morris, 2011) test the effect of objective neighbourhood characteristics and accessibility indicators on well-being, whereas others (e.g., Sirgy and Cornwell, 2002) investigate the impact of subjective evaluations of the urban environments on well-being. Finally, definitions of well-being and corresponding measurement scales differ between studies. Whereas many studies apply straightforward measures of self-reported well-being or happiness (e.g., Brereton et al., 2008), others have used more elaborate conceptualisations of subjective well-being (e.g., Delbosc and Currie, 2011) or focused also on mental health aspects (e.g., Van den Berg et al., 2010).

As a result, it is difficult to compare studies and draw conclusions about the impact of objective and subjective factors,

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the spatial scale of influential factors and the implications for different specifications of well-being. The current study aims to add to the state of the art in this area by investigating the relationship between environmental characteristics and well-being based on a single data set, but using different definitions of well-being, comparing models based on objective and subjective urban characteristics, and using variables relating to both the immediate neighbourhood as well as the wider urban surroundings. The emphasis is on physical characteristics of neighbourhoods and urban areas, rather than on the social networks embedded in them, which we will use as a control variable measured in a more abstracted way.

By comparing various specifications, conclusions can be drawn regarding the impact of variables on different spatial scales and to what extent subjective evaluations have a different impact on well-being than objective characteristics. Analyses are carried out on data collected in the Utrecht region in The Netherlands in 2013.

The paper is organised as follows. Section 2 discusses theoretical issues with respect to the operationalisation of well-being, spatial scale and objective and subjective spatial factors. Section 3 describes the measurement tools and the survey. Section 4 discusses the data collection effort and sampling procedure. Section 5 presents descriptive results as well as multivariate models of well-being as a function of (amongst others) spatial variables. Section 6 draws conclusions regarding the findings and addresses avenues for further research.

2. Theory and state-of-the-art

2.1. Subjective well-being

According to Frey and Stutzer (2010), subjective well-being is a meaningful indicator to assess life conditions and the outcome of policies. Diener and Suh (1997) proposed that subjective well-being consists of three components: a cognitive judgment of satisfaction with life as a whole, positive affect (PA), and negative affect (NA). Life-satisfaction judgments are often measured using the 5-item *Satisfaction With Life Scale* (SWLS) (Diener et al., 1985), where five self-report statements (e.g., "I am satisfied with my life") are rated on 7-point Likert scales ranging from "totally disagree" to "totally agree". Life satisfaction is also measured by a single-item judgment such as Cantril's *Self-Anchoring Scale* that asks participants to rate their current life on a "ladder" from 0 "the worst possible life for you" to 10 "the best possible life for you" (Kahneman and Deaton, 2010). Although life satisfaction items may refer to feelings (e.g., 'I am content with my life', 'I would not change a thing'), the items tap a cognitive assessment of agreement with these items, rather than a direct question of how one feels, and are therefore considered cognitive measures.

The affective components (PA and NA) are assessed by different methods including instantaneous self-reports of specific emotions and moods (*Experience Sampling Method* (ESM), Stone et al., 1999) or recalled past emotions or moods (*Day Reconstruction Method* (DRM), Kahneman et al. 2004). Scales to measure positive and negative affect include the *Positive Affect and Negative Affect Scale* (PANAS, Watson et al., 1988) and the *Swedish Core Affect Scale* (SCAS, Västfjäll et al., 2002; Västfjäll and Gärling, 2007).

Mental health is a concept that is related (and sometimes equated) to well-being, but usually used in a more medical sense as the presence/absence of specific symptoms of mental disorders, such as stress and fear. As pointed out by Keyes (2006), absence of mental illness can be regarded as a necessary but not sufficient condition for psychological well-being, since life circumstances and events happening to mentally healthy individuals may lead to lower levels of well-being. Thus, mental health scales may miss factors leading to deterioration of life circumstances for healthy people. On the other hand, mentally unhealthy individuals may be more sensitive to environmental factors such as age of buildings, presence of graffiti, amount of recreation area and unused buildings (Weich et al., 2002). Thus, the effects of neighbourhood characteristics on mental health may differ from the effects on cognitive or affective well-being. However, various mental health scales exist. Some scales, such as WEMWBS (Tennant et al., 2007), measure individuals' mental functioning in a way rather similar to cognitive well-being scales. Other scales, such as the K10 (Furukawa et al., 2003) or SCL (Strand et al., 2003) tap specific symptoms of mental illness such as anxiety and depression. In this paper we define mental health in term of the presence or absence of such symptoms.

2.2. Conceptualising well-being and urban environment

One approach in conceptualising the effect of the urban environment on well-being is to assume that overall life-satisfaction is affected by satisfaction with certain domains in life, such as one's family life or professional life (Sirgy and Wu, 2013). In a similar vein Sirgy and Cornwell (2002) found empirical support for the fact that life satisfaction is influenced by neighbourhood satisfaction and housing satisfaction, which are influenced by evaluations of specific characteristics such as upkeep of houses and yards, noise and crowding, perceived crime and experienced safety. McCrea et al. (2005) proposed a model in which life satisfaction is influenced by satisfaction with urban living, which in turn is influenced by community, neighbourhood and housing satisfaction. Cao (2015) empirically showed that life satisfaction is influenced by personal characteristics and residential satisfaction. Residential satisfaction is in turn influenced by accessibility and nuisance factors. Taken together, these studies suggest that the effect of urban environmental characteristics on well-being is channelled via the satisfaction with specific life domains. However, models confirming such hierarchical structures are based on the subjective assessment of overall life satisfaction and satisfaction with certain domains, making it difficult to disentangle the mutual causalities. For example, it is difficult to assess whether someone is more satisfied with her life because she is more satisfied with her neighbourhood, or whether she is more satisfied with her neighbourhood because she is happier with her life in general.

At the other end of the spectrum we find studies assuming that individual urban characteristics (e.g., distance to facilities, population density or upkeep of houses) bear a direct impact on life satisfaction. As discussed by Leyden et al. (2011) the urban environment may directly influence our daily functioning and our feelings about it, so that we can trade off the importance of the environmental factor (e.g., noise) against other factors influencing our well-being (Brereton et al., 2008), and even might be able to put a price tag on it. In the current paper we will adopt the latter approach to investigate the impact of neighbourhood and urban characteristics and assume that they can exert a direct effect on individuals' well-being.

2.3. Objective vs. subjective urban characteristics

An important distinction between studies of the impact of urban environments on well-being concerns the use of objective vs. subjective assessment of urban factors. Subjective evaluations involve assessments by respondents themselves of the quality of characteristics such as upkeep, safety, nearness of facilities and street lighting. Objective measurements are usually based on official statistics and land use data. Due to the different sources of these variables, their nature also differs. Subjective assessments are not respondents' estimate of a factual characteristic (e.g., population