



Public green spaces and positive mental health – investigating the relationship between access, quantity and types of parks and mental wellbeing



Lisa Wood^{a,*}, Paula Hooper^b, Sarah Foster^{b,c}, Fiona Bull^b

^a School of Population and Global Health and Centre for Social Impact, The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia

^b Centre for the Built Environment and Health, School of Agriculture & Environment and School of Human Science, The University of Western Australia (M707), 35 Stirling Highway, Crawley WA 6009, Australia

^c Centre for Urban Research, RMIT University, 124 La Trobe Street, Melbourne VIC 3000, Australia

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ABSTRACT

Associations between parks and mental health have typically been investigated in relation to the presence or absence of mental illness. This study uses a validated measure of positive mental health and data from RESIDENTIAL Environments (RESIDE) Project to investigate the association between the presence, amount and attributes of public green space in new greenfield neighbourhood developments and the mental health of local residents ($n = 492$). Both the overall number and total area of public green spaces were significantly associated with greater mental wellbeing, and findings support a dose-response relationship. Positive mental health was not only associated with parks with a nature focus, but also with green spaces characterised by recreational and sporting activity. The study demonstrates that adequate provision of public green space in local neighbourhoods and within walking distance is important for positive mental health.

1. Introduction

Mental health is a leading cause of disability globally, and there is increasing emphasis on the promotion of mental wellbeing as a more preventive and population based complement to the treatment of mental illness (United Nations General Assembly, 2011; WHO, 2013, 2014). Whilst mental illness or mental health conditions is most often the measure of focus in research to date, there is increasing international interest in the concept and measurement of positive mental health and its contribution to all aspects of human life. Indeed, the World Health Organisation (WHO) (2004) has emphasized that mental health is not merely the absence of mental illness, and describes positive mental health as the 'foundation for well-being and effective functioning for both the individual and the community', defining it as a state 'which allows individuals to realise their abilities, cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their community' (p.g. 13).

Getting outdoors and access to nature are intuitively associated with mental wellbeing and there is now a substantial body of evidence around the nexus between nature and mental health (Kaplan, 2001; Douglas, 2012; Sullivan et al., 2004; Maller et al., 2006; Bratman et al.,

2012). Whilst references to woodlands, forests, bushland, and gardens are the focus of some studies on nature and mental health, in modern urban cities and towns, parks and green open space are among the most widely available forms, and importantly for health equity, are usually provided and maintained for public benefit. However, there is relative paucity of published studies that have specifically focused on the role of parks and public green spaces in relation to mental health. Instead, research to date on parks and public green space has more often focused on physical activity as the health outcome, or, on the psychological benefits of access to green space for physical activity. For example, Astell-Burt et al. (2013) found that high levels of exposure to green space had a protective effect against psychological distress only among those who were more physically active in their study population.

Among the small cluster of studies that have looked at mental health as the primary outcome in relation to parks or green space, positive associations are generally reported, but there have been some divergent findings, and the effect is not necessarily the same for different genders or age groups. Illustratively, a Swedish study by Annerstedt et al. (2012) found an association between green space exposure, physical exercise and improved mental wellbeing in women, whilst in an Australian study, Astell-Burt et al. (2014) found that access

* Corresponding author.

E-mail address: lisa.wood@uwa.edu.au (L. Wood).

to green space was beneficial for the mental health of men only, and that the importance of greenspace varied by age. In a systematic review of longitudinal studies on green space and mental health, there was a positive association among adults for surrounding greenness and mental health, but insufficient evidence pertaining specifically to access to green spaces or to green space quality (Gascon et al., 2015).

Gascon et al.'s systematic review calls for more detailed information on the mechanisms and the characteristics of green spaces that may promote better mental health (Gascon et al., 2015, p. 4355), and this call resonates soundly with the focus of this paper. The literature suggests several pathways by which PGS and specifically parks may be linked to mental health; these include the restorative benefits of contact with nature (Maller et al., 2006), stress reduction (Ward Thompson et al., 2012) and the role of parks as a setting that facilitates social interaction and development of social ties (Bedimo-Rung et al., 2005; Kuo et al., 1998; Chiesura, 2004; Wolch et al., 2014). These pathways are important to understand, but more drilling down into the characteristics of parks and green spaces that afford mental health benefits is also imperative. For instance, we know from a large body of research around public green spaces (PGS) and physical activity that some park attributes are more important than others for specific health outcomes, but this mental health lens has not been applied to looking at PGS, or specifically parks and mental health other than in studies utilising measures of mental illness (Sugiyama et al., 2008; Francis et al., 2012).

The quality of parks and public green space is one of the attributes for which there is now compelling evidence. In a study by Francis et al. (2012) that investigated the relative influence of the quantity and quality of parks for mental health (as measured by the Kessler psychological distress scale), no significant association was found with the *quantity* of neighbourhood parks, but residents in neighbourhoods with higher *quality parks* were more likely to have lower levels of psychological distress. Notably, this association was not contingent on whether residents actually used parks, suggesting that the mere presence of parks and public open space within a neighbourhood may yield some mental health benefit. This is congruent with seminal findings from experimental studies which have shown that views of nature, or proximity to nature and greenspace is important for mental wellbeing, independent of whether it actually used or visited (Kaplan, 1985, 1992; Kaplan and Kaplan, 1989; Cordell et al., 1998).

Both perceived and objective measures of green space have emerged as predictive of mental health in population based surveys. Sugiyama et al. (2008) found that the 'greenness' of the neighbourhood was more strongly associated with mental health than physical health outcomes, with residents who perceived their neighbourhood as highly green having higher odds of better mental health, compared with residents who had lower perceptions of neighbourhood greenness. While Sugiyama's findings were based on respondent perceptions of greenness, Van Den Berg et al. (2003) computed an objective measure of the quantity of green space within a 3 km radius of residents homes, and found that respondents with a higher amount of green space had better mental health and were less affected by stressful life events than respondents with a low amount of green space. In a recent UK study, (controlling for individual and regional covariates) on average, individuals had both lower mental distress and higher well-being when living in urban areas with more green space (White et al., 2013).

That stress is a risk factor for cardiovascular disease may also explain Pereira et al.'s finding of a protective association between levels and variability of neighbourhood greenness and coronary heart disease or stroke (Pereira et al., 2012). Specifically, this study found that the odds of hospitalization was 37% lower among adults with highly variable greenness around their home, compared to those in neighbourhoods with low variability in greenness (Pereira et al., 2012). Relatedly, a New Zealand study that examined the relationship between green space and four different health outcomes, mental health and cardiovascular disease were the two outcomes that emerged as being of lower risk among participants with more green space within their

neighbourhood (Richardson et al., 2013).

While the preceding studies point to beneficial associations between parks and mental health, such research has typically relied on measures of mental illness or the absence thereof (Francis et al., 2012). Mounting evidence however substantiates that positive mental health is not merely the absence of mental illness (WHO, 2004) and this has spawned greater interest in the development and validation of measures of positive mental wellbeing. One such measure is the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) (Tennant et al., 2007). This is comprised of positively worded items relating to different aspects of positive mental health and covers the majority of concepts associated with positive mental health, including both hedonic ('pleasure') and eudemonic ('happiness') aspects, positive affect, satisfying interpersonal relationships and positive functioning (Tennant et al., 2007). WEMWBS has now been validated and used across a range of projects and population groups (Stewart-Brown et al., 2011).

The relationship between public green spaces and mental health is not merely of academic interest, but has strong public policy and planning implications. Urban and town planning policy often provides regulations and guidance on the provision of parks and public open space. Worldwide and within nations however there is enormous variability in the specificity of such guidelines and different types of standards and metrics to quantify how much or what type of green public open spaces should be provided to meet community's needs. This ranges from area-percentages (a fixed percentage of land to be reserved for parks or green open spaces), population ratios (a prescribed level of provision of open space related to the level of population typically, per 1000 population), and catchment areas (maximum distances which residents should have to travel to access a park) (Veal, 2013). The evidence and empirical basis for these policy recommendations is often weak however (Veal, 2013; Wilkinson, 1985) and more research is needed to better quantify and characterize the optimal provision of public open space for health, and specifically for improving the mental health and wellbeing of residents. This is of particular importance as the pressure increases on land use allocation within existing urban areas of metropolitan cities worldwide.

Given these policy priorities and gaps in empirical evidence, the aim of this study was to investigate the association between the presence, amount and attributes of parks within new greenfield neighbourhood developments and the mental health of local residents. The specific objectives were to investigate the relationship between positive mental wellbeing and the:

- 1) provision (number) and amount (area) of public parks and their size within the neighbourhood around home;
- 2) to test whether the minimum park provision as stipulated by Western Australian planning policy (8% of the sub-divisible land area) was sufficient to impact positively on residents' mental health;
- 3) proximity of (access) different sized parks within the neighbourhood around home;
- 4) attributes (amenity or functions) provided within parks within the neighbourhood around home;
- 5) provision of total area of public open space within the neighbourhood around home.

2. Methods

2.1. Study context

The RESidential Environments (RESIDE) Project is a longitudinal natural experiment designed to evaluate the impact of a new government planning policy (the Liveable Neighbourhoods) on residents health and wellbeing. Full details of the study design are published elsewhere (Giles-Corti et al., 2008) however in brief, study participants comprised of people building houses and relocating to 73 new housing developments across Perth, Western Australia. Participants completed

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