Do the psychological benefits of greenspace depend on one's personality?

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ABSTRACT

Greenspace is thought to yield psychological benefits in terms of reducing stress and restoring attentional fatigue. The efficacy of exposure to greenspace may depend greatly on an individual's personality. Certain personality traits may make an individual more susceptible to experiencing stress and attentional fatigue and hence these same individuals may derive greater psychological benefits from greenspace than others. Employing data from the Household, Income and Labour Dynamics in Australia (HILDA) survey and Geographic Information Systems (GIS), this study investigates the extent to which one's personality traits may moderate the psychological benefits of greenspace. The results provide some evidence to suggest that individuals who report higher levels of emotional stability (equivalently, lower levels of neuroticism) glean noticeably greater psychological benefits from greenspace. This result may reflect more emotionally stable individuals being more likely to venture out and take pleasure in green and more hospitable spaces. Conversely, and in line with a priori expectations, there is some, albeit weak evidence, to suggest that individuals who report higher levels of conscientiousness realise greater psychological benefits from greenspace than those who report comparatively lower levels of conscientiousness. These findings extend on existing knowledge in the area of environmental psychology on the benefits of nature.

1. Introduction

The significance of the built environment for health and wellbeing is widely acknowledged (Barton, 2009). Nature, a restorative environment, is one means through which individuals' health and wellbeing may be cultivated. According to attention restoration theory, nature yields restorative psychological benefits, reducing stress and restoring attentional fatigue. This is achieved, in part because restorative environments are intrinsically compelling. This 'fascination' inhibits or supresses competition for one's attention. Further, one attends a restorative environment in a manner that requires no effort and hence this process is itself resistant to fatigue. In this way, restorative benefits provide a pathway help to rest and restore individuals' directed attention (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995).

The degree of any such psychological benefit may depend greatly on an individual's personality which shapes the environments they experience and derive benefits from. This nature and personality link is expressed elsewhere: "[Personality] traits are important because they influence how individuals interact with particular environments… [personality] traits influence how individuals construe and interpret the personal meaning a particular environment or situation has for them … and to which aspects of the environment they attend." (John,

Naumann, & Soto, 2008, p. 141). There is some evidence to indicate that this may be the case.

One earlier study, among adolescents of Michigan's Upper Peninsula, revealed that different settings pose different challenges and require different skills central to achieving self-esteem. Following this line of reasoning, R. Kaplan (1977) found that some dimensions of self-esteem (e.g. having a positive view of one's self and relatedly one's feelings of inner resourcefulness) were linked to preferring natural settings (e.g., woodland areas, wilderness, campfires, lakes and waterfalls). Furthermore, this preference for nature seemed to stem from a desire to: learn about nature; find peace and tranquillity; and to be alone and away from other pressures.

Other studies of adolescent populations have also pointed to a link between one's environment and their personality. For instance, among high school students in Southern Germany; psychoticism was found to be positively linked to anthropocentric views of nature; and neuroticism, positively linked to bio-centric views of nature (Wiseman & Bogner, 2003). Further, among 96 introductory psychology students, openness to experience was found to be associated with time spent in restaurants, cafes, or bars; agreeableness with time spent in other public places; conscientiousness with time spent in class; and neuroticism with less time outdoors (Mehl, Gosling, & Pennebaker, 2006). Studies to use Goldberg's (1981) Big Five have reported that openness and agreeableness are positively and most strongly linked to preferences for nature (Hirsh, 2010; Hirsh & Dolderman, 2007; Milfont & Sibley,

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2012; Nisbet, Zelenski, & Murphy, 2009); and the potential for attention restoration (Felsten, 2014). The associations with extraversion and conscientiousness were less strongly positive. Further, the evidence on neuroticism and attitudes to nature is mixed.

Explicit hypotheses or conceivable a posteriori explanations for some of these reported links between nature and personality have been rare. It is conceivable for instance; that certain personality traits such as higher degrees of neuroticism may make an individual more vulnerable to experiencing stress and fatigue (cf. Abdel-Khalek, 2009), more likely to seek out solitude (Gramzow et al., 2004) and thus more likely to derive greater benefit in terms of attentional restoration (Stephen Kaplan & Berman, 2010), emotional regulation (Johnsen, 2013), or reduced rumination (Bratman, Hamilton, Hahn, Daily, & Gross, 2015). Stated simply, not only may an individual's personality shape the environment they experience, it may also affect their vulnerability to stress and fatigue and hence; more neurotic individuals may derive greater restorative psychological benefits from greenspace than others.

Conversely, a counter hypothesis is that individuals who are more emotional stable are less likely to fret and worry and hence are more likely to venture out and experience nature. In this regard, there is some evidence to indicate that for at least a select group of males, time spent in public spaces is linked to emotional stability (Mehl et al., 2006). Further, it may also be reasoned that climate, which can influence one's own thermal comfort and the activities that one can engage in, is more agreeable in greener areas (Byrne et al., 2016). In this way, the physical environmental climatic conditions may explain individual difference variables (e.g. aggression, depression and health) and hence, may cultivate certain personality traits (Rentfrow, Gosling, & Potter, 2008). Through the confluence of more emotionally stable individuals seeking out and experiencing greenspace; and the role of greenspace in the alleviation of thermal discomfort (e.g., Lafortezza, Carrus, Sanesi, & Davies, 2009); it could also be hypothesised that more emotionally stable individuals may receive greater psychological benefits from greenspace than others.

The purpose of this study is to expand on earlier research efforts which have focused on the links between personality traits and attitudes to nature by providing evidence on the potentially heterogeneous psychological benefits associated with exposure to nature. To achieve this end, this study employs data from the Household, Income and Labour Dynamics in Australia (HILDA) survey and Geographic Information Systems (GIS) to investigate whether if the psychological benefits of greenspace depend on extraversion, agreeableness, conscientiousness, emotional stability and openness to experience, other things held constant. In doing so, it is envisaged that the findings of this study will expand current knowledge in the area of environmental psychology. Furthermore, it is hoped that these findings may help to inform future research and practice among health practitioners by revealing the potential psychological benefits of greenspace, other things held constant. In what follows, Section 2 reports the method and data employed and Section 3 provides an account of the results. Finally, Section 4 discusses the findings and concludes.

2. Method

2.1. Participants

The socioeconomic and wellbeing data on the 6082 individuals is obtained from Wave 13 (2013) of the Household, Income and Labour Dynamics in Australia (HILDA) survey, subset to the major capital cities of Australia..[1] The sampling design of the survey involves the selection of households into the sample by a multi-stage process. In Wave 1 (2001) of the HILDA survey, a random sample of 488 Census Collection Districts (CDs) based on the 1996 census boundaries were selected from

across Australia, stratified by State, and within the five largest States in terms of population, by metropolitan and non-metropolitan regions. Each CD consisted of approximately 200 to 250 households. The CDs were sampled with probability proportional to their size, as measured by the number of dwellings (unoccupied and occupied) recorded in the 1996 Census, with some adjustments for population growth since the Census. Within each of these CDs, all dwellings were fully enumerated and 22 to 34 dwellings randomly sampled based on the expected response and occupancy rates within each area (Watson & Wooden, 2002).

2.2. Key variables

In terms of how the key variables are obtained, the life satisfaction dependent variable is obtained from individuals' responses to the question: 'All things considered, how satisfied are you with your life?' The life satisfaction variable is an ordinal variable, the individual choosing a number between 0 (totally dissatisfied with life) and 10 (totally satisfied with life).

The mental health dependent variable is obtained using data from the Short-Form General Health Survey (SF-36) instrument (collected within the HILDA survey), an internationally recognised tool for assessing functional health status and well-being.[2] The Mental Component Summary (MCS) used in this study is derived from 14 items on four scales; vitality, social functioning, role-emotional and mental health, transformed to a 0–100 index using 1995 Australian Bureau of Statistics population norms (Australian Bureau of Statistics, 1995; Ware et al., 2000). A higher mental health score indicates better mental health while a lower mental health score indicates the reverse.

The psychological distress dependent variable is measured by the Kessler Psychological Distress Scale (K10) also collected in the HILDA survey. The ten questions and their selection are described at length in Kessler et al. (2002), as explained by Wooden (2009) the K10 score was derived by scoring responses on each of the items using a simple linear scale running from 5 (all of the time) to 1 (none of the time), and summing across all items. The overall score thus ranges from 10 to 50, where a higher score indicates greater psychological distress and a lower score indicates lower psychological distress.

The sadness dependent variable is obtained from the question, 'How much of the time during the past 4 weeks: h) Have you been a happy person?' The individual chooses a number between 1 (all of the time) and 6 (none of the time). This score is then reverse coded so that a higher score indicates greater happiness and a lower score indicates lower happiness.

The sadness dependent variable is obtained from the question, 'In the last four weeks, about how often did you feel … i) so sad that nothing could cheer you up?' The individual chooses a number between 1 (all of the time) and 5 (none of the time). This score is then reverse coded so that a higher score indicates greater sadness and a lower score indicates lower sadness.

The personality variables: extraversion; agreeableness; conscientiousness; emotional stability; and openness to experience are all obtained from the well-validated short version of the Big Five developed by Saucier (1994), using just 30 of Saucier's 40 items and 6 from other sources. Individuals were asked in a self-completion questionnaire to indicate how accurately each adjective describes them on a 7-point scale, from: 1 (does not describe me at all) to 7 (describes me very well).

2.2.1. Geographic Information Systems data

Data from the HILDA survey are linked to Geographic Information Systems (GIS) data on greenspace through the individual's Census Collection District (CD). Specifically, using GIS CDs are overlayed with greenspace measured from the PSMA Australia Limited Transport and

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[1] Major capital cities in Australia include: Adelaide, Brisbane, Canberra, Darwin, Melbourne, Perth and Sydney.

[2] See Ware, Snow, and Kosinski (2000) for further information on the SF-36.