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Testing the dimensionality of place attachment and its relationships with place satisfaction and pro-environmental behaviours: A structural equation modelling approach

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HIGHLIGHTS

- Demonstrates place attachment as a second-order construct.
- Place attachment positively influences low and high effort environmental intentions.
- Place attachment has a positive influence on place satisfaction.
- Place satisfaction positively influences low effort pro-environmental intentions.
- Place satisfaction negatively influences high effort pro-environmental intentions.

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ABSTRACT

Drawing on literature from environmental psychology, the present study examined place attachment as a second-order factor and investigated its relationships with place satisfaction and visitors' low and high effort pro-environmental behavioural intentions. Confirmatory factor analysis and structural equation modelling were used to test a model using a sample of 452 visitors at the Dandenong Ranges National Park, in Australia. Results supported the four-dimensional second-order factor of place attachment and indicated (a) positive and significant effects of place attachment on both low and high effort pro-environmental behavioural intentions of park visitors, (b) a significant and positive influence of place attachment on place satisfaction, (c) a significant and positive effect of place satisfaction on low effort pro-environmental behavioural intentions, and (d) a negative and significant influence of place satisfaction on high effort pro-environmental behavioural intentions. The main theoretical contribution relates to the inclusion of the four dimensions of place attachment in a single model. Findings are discussed with respect to their applied and theoretical relevance.

1. Introduction

Natural areas serve as important venues for spending time, and seeking out new experiences interacting with nature and other visitors (Negra & Manning, 1997; Snepenger, Snepenger, Dalbey, & Wessol, 2007). Such natural settings yield restorative effects such as stress reduction (Davis, Green, & Reed, 2009; Hipp & Ogunseitan, 2011) and promote psychological well-being of visitors (Korpela, Ylen, Tyrvainen, & Silvennoinen, 2009; Parks Forum, 2008). For these and other reasons, they often become favourite places and hold special meanings for many people (Ferreira, 2011). As such, visitors can become dependent on such environments which meet their desired experiences (Scannell & Gifford, 2010a). This can result in increased visitation that put severe pressure on environmental resources, requiring researchers, scholars, and practitioners to find ways to protect natural resources. Environmental behavioural scientists are increasingly seeking to apply principles of behaviour analysis to management of natural areas in an attempt to decrease behaviours that are detrimental to the natural environment and promote pro-environmental ones (Lehman & Geller,

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2004). This argument rests on the premise that conservation of natural resources is likely to happen by influencing visitor behaviour and stimulating responsible actions by visitors (Blackstock, White, McCrum, Scott, & Hunter, 2008). Place attachment is recognised by some researchers as a potential concept that may be used to influence behaviour by capitalising on an individual's willingness to protect important and meaningful places (Dredge, 2010; Ramkissoon, Weiler, & Smith, 2012; Scannell & Gifford, 2010b; Sobel, submitted for publication), although evidences are not conclusive.

Place attachment has been defined differently by researchers and scholars, and the general consensus is that it is a multi-dimensional construct (Halpenny, 2010; Hidalgo & Hernández, 2001; Scannell & Gifford, 2010a). Dimensions of place attachment include place identity (Hinds & Sparks, 2008; Prayag & Ryan, 2012; Stedman, 2002), place affect (Hinds & Sparks, 2008; Kals, Shumaker, & Montada, 1999), place social bonding (Hammitt, Backlund, & Bixler, 2006; Ramkissoon et al., 2012), and place dependence (Bricker & Kerstetter, 2000; Prayag & Ryan, 2012). Research on place attachment has been growing in the literature within several disciplines including environmental psychology, natural resource management, environmental education, and tourism (e.g., Halpenny, 2010; Kyle, Graefe, & Manning, 2005; Ramkissoon et al., 2012; Raymond, Brown, & Robinson, 2011; Vaske & Kobrin, 2001) and considerable theoretical and methodological advancements have been made in this area by researchers and scholars (Kyle et al., 2005).

A number of studies has demonstrated significant associations between place attachment and pro-environmental behaviours of individuals (e.g., Devine-Wright & Howes, 2010; Gosling & Williams, 2010; Halpenny, 2010; Hernández, Martin, Ruiz, & Hidalgo, 2010; Raymond et al., 2011). Pro-environmental behaviour is defined as an action by an individual or group that promotes or results in the sustainable use of natural resources (Sivek & Hungerford, 1989/1990). Although existing research suggests place attachment is a potentially useful concept to promote pro-environmental behaviours, findings on the relationships between the two constructs are contradictory and far from conclusive (Scannell & Gifford, 2010b). This may be due to the fact that the different dimensions of place attachment and their relationships with pro-environmental behaviours have been investigated in various combinations by previous researchers (e.g., Halpenny, 2010; Kyle et al., 2005; Vaske & Kobrin, 2001), with the implication that only a few studies (e.g., Ramkissoon et al., 2012; Ramkissoon, Smith, & Weiler, in press) considers place attachment as a multi-dimensional construct, comprising of place dependence, place identity, place affect, and place social bonding in a single study. Some research also suggests that place attachment influences visitors' satisfaction with a place (Prayag & Ryan, 2012; Yuksel, Yuksel, & Bilim, 2010), and still other studies find that place satisfaction is an important determinant of pro-environmental behaviours (Stedman, 2002; Uzzell, Pol, & Badenas, 2002). However, similar conceptualisation problems of place attachment can be found in many of these studies which fell short of considering place attachment as comprising of several dimensions.

Researchers have argued that the influence of each dimension of place attachment on environmental behaviour is also likely to be different, depending on the types of place attachment (Scannell & Gifford, 2010b; Stedman, 2002). Therefore, studies that take into account all four recognised dimensions of place attachment and the latter's influence on pro-environmental behaviours in a single theoretical model are needed. This study addresses this by considering place attachment as a second-order factor comprising place dependence, place identity, place affect, and place social bonding. In the context of the present study, the second-order model represents the hypothesis that these distinct, but related constructs can be accounted for by a common underlying higher-order construct conceptualised as "place attachment". In contrast to first-order models with correlated factors, second-order factor models have the advantage of providing researchers with a more parsimonious and interpretable model when it is hypothesised that higher-order factors underlie the data (Chen, Sousa, & West, 2005). A second-order model can also test whether the hypothesised higher-order factor (i.e. place attachment) accounts for the pattern of relations between the first-order factors (the different sub-constructs of place attachment) (Gustafsson & Balke, 1993; Rindskopf & Rose, 1988). Chen et al. (2005) argue that a second-order factor model separates variance due to specific factors from measurement error, leading to a theoretically error-free estimate of the specific factors.

Given researchers' assertion that place dependence, place identity, place affect, and place social bonding represent the different underlying dimensions of place attachment needs empirical testing, considering place attachment as a second-order factor is both theoretically and statistically plausible and justified. The research uses confirmatory factor analysis to confirm the dimensionalities of the place attachment construct and structural equation modelling to test the influence of place attachment on place satisfaction and pro-environmental behavioural intentions. The relationships among the theoretical constructs of interest in this study are presented in Figure 1. The model is tested using data collected from visitors to the Dandenong Ranges National Park, Australia.

The study sets out to make some important theoretical contributions to the literature. Researchers (e.g., Devine-Wright & Clayton, 2010; Scannell & Gifford, 2010b) have stressed on the need for more research on the relationship between place attachment and pro-environmental behaviours because findings are unclear and contradictory. Devine-Wright and Clayton (2010, p. 269) have also argued that it is important that researchers and scholars avoid "an increasing fragmentation of the empirical literature" and have urged researchers to empirically test "new conceptual frameworks that can encompass or discriminate between the various dimensions of self-environment relations". Kyle et al. (2005) noted that although existing measures of place attachment appear to be reliable and valid, further research that confirms the factor structure of place attachment is warranted. These researchers called for more studies on place attachment using latent structural equation modelling approaches to confirm the dimensionalities of place attachment. Considering place attachment as a second-order factor model is likely to provide a better theoretical and statistical understanding of its relationship with pro-environmental behaviour. Scholars have also been calling for further studies on place attachment (Dredge, 2010; Tsai, 2011; Yuksel et al., 2010) and place satisfaction in nature-based settings (O'Neill, Riscinto-Kozub, & Van Hyfte, 2010). This study aims to address these gaps in the literature. It seeks to confirm the factor structure of the place attachment construct by providing empirical evidence that the four dimensions of place attachment (place identity, place dependence, place social bonding, and place affect) are an accurate representation of place attachment when considered simultaneously in a single model.

The study seeks to provide important practical implications to managers of nature-based settings. Recognition of the deleterious impacts caused by growing visitation has led to an increasing call to promote environmentally sustainable practices in such settings (Stockdale & Barker, 2009). If not well managed, increased visitation can put at risk the park's resources. Place attachment is seen as a potentially important antecedent to awareness of the value of conserving natural resources, pro-environmental attitudes and