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Associations with bird sounds: How do they relate to perceived restorative potential?

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ABSTRACT

Bird sounds are related to perceptions of attention restoration and stress recovery, but the role of associations in such perceptions is understudied. 174 adult residents of the United Kingdom rated 50 bird sounds on perceived restorative potential (PRP) and provided qualitative data on associations with each sound. Bird sounds were associated with imagined environments, birds and other animals, time and season, and activities within the environment. Bird sounds rated as high in PRP were associated with green spaces, spring and summer, daytime, and active behaviours in the environment. Low-PRP bird sounds were associated with exotic and marine environments, non-avian animals, and showed a non-significant trend towards associations with negative bird behaviour. These findings highlight connections between semantic values and restorative perceptions of natural stimuli. Such connections can inform top-down approaches to study of restorative environments and may benefit conservationists seeking to improve bonds between people and wildlife.

1. Introduction

In recent years, study of restorative environments has broadened to include not just visual experience but also that of environmental sounds. Reflecting similar findings in the visual domain, natural sounds such as wind, water, and birds are perceived to be pleasant, relaxing, and potentially restorative (e.g. Björk et al., 2008; Grahn & Stigsdotter, 2010; Payne, 2013), and can lead to greater recovery from stress than sounds from the built environment (Alvarsson, Wiens, & Nilsson, 2010; Benfield, Taff, Newman, & Smyth, 2014; Medvedev, Shepherd, & Hautus, 2015). Across these findings, birds recur as a characteristic sound of nature; one that individuals bond with and draw inspiration and symbolism from (Mynott, 2009; N'gweno, 2010; Ratcliffe, Gatersleben, & Sowden, 2013).

1.1. Meaning and restorative perceptions

Despite the increased interest in restorative natural sounds, one topic that remains under-examined in both the visual and auditory domains is *why* certain environments and environmental stimuli can be perceived as restorative. In particular, the role of meanings, associations, and other semantic qualities of natural environments and stimuli cries out for further study, as noted by Pretty (2004) and Pretty et al. (2015). In his presentation of an affective, psycho-evolutionary framework of restorative environments, Ulrich (1983, p. 92) notes that, "Evaluation may be accompanied by memories and associations …" yet relationships between restorative perceptions or outcomes and these top-down appraisals remain speculative, due to lack of systematic study. Furthermore, Shaw, Coyle, Gatersleben, and Ungar (2015) report on individuals' imagined restorative environments built up from non-visual perceptions. These aspects of the literature indicate that both past and imagined future experiences can influence perceptions of restorative potential and restoration.

Despite being but one part of the natural world, birds are regarded as one of the most important types of animals and sounds that individuals experience in nature (Cox & Gaston, 2015; Curtin, 2009; Ratcliffe et al., 2013), and they are particularly rich in semantic values and associations (Mynott, 2009). Beyond merely conveying purely practical information, bird sounds can have symbolic value that may affect how they are cognitively and affectively appraised, and perhaps how restorative they are perceived to be. Throughout time birds have symbolised concepts, events, and aspects of human nature as told through stories and

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folklore, to the extent that they feature more than any other animal in Aboriginal Australian stories (Tidemann & Whiteside, 2010). N'gweno (2010) notes that bird sounds are often used to convey meaning and messages in folklore, such as the changing seasons, life events, and fortunes. She suggests that sound is particularly relevant in bird identification and knowledge because they are often heard before they are seen, thus making the bird's sound a symbol in itself for the bird and the concepts it represents. For this reason, bird sounds are an excellent vehicle through which to examine meanings associated with natural stimuli, and in particular how those meanings relate to perceptions of restoration in order to address the semantic gap in the field, described above.

1.2. Bird sounds as symbols of threat

While birdsong in a holistic sense is generally considered to be pleasant (Björk et al., 2008; Grahn & Stigsdotter, 2010), differences occur between bird species in terms of how pleasant or relaxing they are perceived to be (Björk, 1985; Cox & Gaston, 2015; Ratcliffe et al., 2013). Ratcliffe et al. (2013) showed that the associative values of different bird sounds are particularly important in establishing affective appraisals and restorative perceptions. For example, one participant in Ratcliffe et al. (2013, p. 224) described "screeches, owls hooting" as "archetypal spooky sounds … Because they're frightening", suggesting that certain bird sounds can act as symbols for negative valence or fear in an abstract sense, and in turn these sounds are not considered restorative. This view is supported by Cox and Gaston (2015), who suggest that songbirds are preferred over calling, non-songbirds because they are less likely to be associated with aggressive or otherwise threatening behaviour.

The presence of threat in nature has been shown to reduce restorative potential and outcomes in these environments; for example, Andrews and Gatersleben (2010) and Gatersleben and Andrews (2013) reported that environments low in both prospect and refuge (signifiers of safety and security) were associated with reduced restorative perceptions and outcomes. Herzog and Rector (2009) noted that a vignette indicating the presence of a threatening stranger reduced restorative perceptions of an imagined natural environment, and Bixler and Floyd (1997) indicated that non-human threats, such as wild animals or risk of getting lost, may also be found in natural environments. These findings correspond with prevailing theories of restorative environments, in that the presence of threat is likely to increase arousal and negative affective appraisals, limiting restoration from stress (Ulrich, 1983), and to impose cognitive demands that limit restoration from directed attention fatigue (Kaplan & Kaplan, 1989; Kaplan, 1995). However, there is a lack of existing research on how the spontaneous associations with the presence or absence of threat linked to birds might relate to restorative potential, and particularly the potential of specific stimuli such as bird sounds.

1.3. Bird sounds as symbols of resources

Bird sounds can be symbols for times of year associated with resources. Sometimes these associations are generated through folklore or cultural knowledge, and at other times they are formed on the basis of personal memories. For example, in Ratcliffe et al. (2013, p. 65) one participant said of the wood pigeon's song, "That kind of reminds me of summer and sort of long, hot summers", and Mynott (2009) notes that the sound of the crane is associated with autumn and bringing in the harvest. Tidemann and Whiteside (2010) describe an Aboriginal Australian story in which the sound of the Channel-billed Cuckoo is associated with both the start of the rainy season and the presence of manna sugar, an energy-rich food source. In hearing bird sounds, listeners may be made aware of the presence of life-giving elements of nature. It is possible that these sounds may have restorative potential through their associations with vitality and biodiversity, perhaps linking to concepts of survival (Ulrich, 1983).

1.4. Bird sounds as symbols of abstract concepts

Birds and their sounds can also be symbolic of positively and negatively valenced concepts. In Australian Aboriginal storytelling, the Laughing Kookaburra's sound serves as a symbol of both merriment (Tidemann & Whiteside, 2010) and new beginnings, such as daybreak. Mynott (2009) indicates that symbolic associations with birds differ with culture and can be concurrent; for example, the owl has been associated with both wisdom and death, and the robin with both life in the depths of winter and concepts of death and sacrifice. Bird sounds, then, can be associated with concepts and events greater than themselves, and can generate affective appraisals based on those symbolic associations. However, it is not known to what extent this might relate to their restorative potential. Also underexplored are potential associations between nature, including bird sounds, and personal symbolism in the form of memories of one's past, and how these too might relate to restorative perceptions as hypothesised by Ulrich (1983).

1.5. Bird sounds as symbols of environments

If bird sounds can symbolise ideas such as summer, food, death, and beginnings, perhaps they can also symbolise the wider environment that they are drawn from, as shown in Shaw et al. (2015) where participants imagined detailed environments based on the sounds that they heard around them. Tidemann and Whiteside (2010) note that, alongside other animals, birds are invoked in folklore and mythology to explain the formation of topographical features and constellations of stars. In Ratcliffe et al. (2013, p. 225), bird sounds were sometimes discussed in the context of being in green spaces such as a garden, and of doing activities in those spaces. For example, one participant said, "We sit and feed and look after the birds a lot, so certainly I would sit and listen to the birds …", suggesting that the bird sounds he described were linked to the act of both sitting outdoors and caring for the birds, linking themes of environments and activities within them. These findings suggest that bird sounds may trigger associations with natural environments and activities in nature, experiences of which are known to be restorative in themselves (e.g. Hartig, Evans, Jamner, Davis, & Gärling, 2003), but it is not clear how these associations might vary depending on the type of bird sound.

1.6. Aims

This study explored the types of associations and memories generated by listening to 50 bird sounds previously quantitatively rated on perceived restorative potential (PRP). In particular, the study aimed to understand whether a range of bird sounds rated as high, moderate, or low on PRP would generate different associative themes. This mixed-methods approach was undertaken since, as noted above, a single bird sound can be associated with a range of meanings from the practical or instrumental to the highly symbolic or personal, making qualitative techniques most appropriate for identifying these different meanings, which can themselves then by subjected to quantitative analyses. PRP relates to a single meaning (suitability for restoration), making it more appropriate for quantitative measurement. By combining the two techniques, this study aimed to examine associations with bird sounds in participants' own words whilst relating these back to measurable