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## Exploring the interconnections between gender, health and nature

S MacBride-Stewart\* PhD DipCommPsyh

Y Gong PhD MA

J Antell BScEcon

School of Social Sciences and Sustainable Places Research Institute,  
Cardiff University,  
Wales, UK

\*Corresponding Author details

Cardiff School of Social Sciences,

Glamorgan Building,

King Edward VII Avenue

Cardiff

07920422107

macbride-stewarts@cf.ac.uk

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## **Abstract**

This review attempts to contribute to a new sociology of environmental health, by developing and exploring a broad analytical theme - the differing interconnections between gender, health and nature. The paper is an attempt to think through and summarize interconnections that have been subject to extensive academic enquiry between gender and health, health and space, and gender and space. Four dimensions are distinguished (1) evaluations of health benefits and 'toxicities' of nature, (2) dimensions and qualities of nature/space, (3) environmental justice including accessibility, availability and usability, (4) identification of boundaries (symbolic/material) that construct differential relationships between nature, gender and health. The various evaluations, dimensions, activities and boundaries described are used to direct analytical attention to the diverse linkages that constitute overlapping and inseparable domains of knowledge and practice. The main purpose is to distinguish interconnections between gender, health and nature to enable us to articulate the complexities that are evident in different understandings of the environment.

## **INTRODUCTION (4875)**

Internationally, in the public health literature, a great deal has been made of the positive relationship between nature and human health linking exposure to natural environments to health and wellbeing effects, which underpin the promotion of health-promoting behaviours and the use of natural space. Elsewhere, in the environment debate, much has been made of the supposedly natural relationship between women and the environment. However, not all people access natural environments equally, and there is some evidence to suggest that this is the case for gender. In light of these claims however little work has been done to assess the relationship between health, nature *and* gender. Detailed analysis is needed to examine the key literatures relevant to the relationship between nature, health and gender from an interdisciplinary perspective, so that inequities related to gender are identified and addressed. Before exploring the linkages between these three concepts, it is important to set out the sociological definitions of gender, health and natural environment in this paper.

**Constructing 'nature':** concepts related to nature have multiplied and are harboured in a diversity of overlapping terms and debates, which also have their own distinctiveness. In this paper we mostly use the terms outdoor space, public space, natural environment and nature as overlapping but interrelated terms. This is because the concept of outdoor space has come to dominate discussions about the relationship of humans to the natural environment within the contexts of health and gender. The concept of outdoor space describes the functional, structural, and economic relationships that humans have to nature. Most research focuses on specific types of outdoor space or natural environment (i.e. green, blue, informal or rural). This definitional issue can add to the difficulties in configuring a usable definition of outdoor space and nature in general.

**Gender:** Existing theories linking women and nature environment argue that women have an inherent connection, either biologically or as part of cultural rituals, to the environment. In response, Agarwal (1997) proposed a “feminist environmentalist” perspective. Similar to social ecofeminism and a feminist political ecological perspective, it argues that there is no natural, essential biological connection between women and environment, but rather that women’s symbolic and social roles (i.e. economic, reproductive) connect them deeply to the outcomes of the environment. Much of this argument is grounded in the views of poor, rural Third World women based on principles of environmental justice, which identifies that the poor are disproportionately affected by climate changes both as consumers, but also as producers of raw materials of economic machinery. A feminist political ecological perspective adds an intersectionality dimension to this debate, to identify the role of marginalised sexualities, ethnicities, age and social class in compounding the inequalities related to gender and climate change.

These strands point to women’s marginalization from the environment, a lack of access to resources and the marginalization of women’s knowledges. Women have unequal access to the environment because of social inequality and at the same time, gender inequality and ill health are magnified when the environment deteriorates. In short, environment, gender and social equity go hand in hand. As a counter to the pessimism of this

work, academic researchers acknowledged the involvement of women in the public sphere of life, and the possibility that there are now fewer social constraints on women's access to and engagement in natural space than previously, which provide women with greater ability to take up opportunities that improve their health (Green and Singleton, 2006).

## **METHOD**

There are a number of disciplines which contribute to the debates about the relation between outdoor space, gender and health. Many of these take a different perspective from sociology, geography, health, psychology, environment science and epidemiology. After searching electronic databases including Scopus, the Web of Science and PubMed, we have taken two approaches for this review. The first approach has been to provide an overview and analysis of the range of research in the field. We then present a focused analysis and framework of research that pertains to the intersection of gender, health and nature. Through these approaches we have sought to answer the following questions:

1. What health benefits for gender can be attributed to exposure to natural space?
2. What are the limitations of current research on gender, health and outdoor space?
3. How can the findings on gender, health and outdoor space be organised to re-aggregate the literature on gender and health and nature and health to prioritise findings according to gender?
4. What can we say specifically about women, health and outdoor space?

## **RESULTS**

From looking at the literature, while many studies focus on the relations between either two of three concepts (e.g. gender and space, space and health, or health and gender), only a few scholars (Stafford et al., 2005; Richardson and Mitchell, 2010) have brought these concepts together. Many studies used gender as a variable among their analysis, especially those that used quantitative methods, but not as their primary focus. Therefore, what follows is our attempt to think through and separate out different sorts of interconnections between

gender and health, health and space, or gender and space, which have been separately subject to extensive academic enquiry in different disciplines.

We organise our ideas into a framework that helps us identify the complexities and diverse understandings of the environment that are important for understanding human health. The results of the literature review are organised around the following four dimensions: (1) evaluations of health benefits and ‘toxicities’ of nature, (2) dimensions and qualities of nature/space, (3) environmental justice including accessibility, availability and usability, (4) identification of boundaries (symbolic/material) that construct differential relationships between nature, gender and health. The following sections discuss the content and context of each dimension, key findings and their implications.

### **1. Evaluations of health benefits and ‘toxicities’ of nature**

Our review suggests that natural environment in general has a positive impact on the populations’ health. Early studies expanded biomedical and determinist models of health to assert that environmental and social factors are amongst the many factors that influence health (Lachowycz and Jones, 2013; Shortt et al., 2014). Subsequently, a socio-ecological approach emphasised the restorative effects of natural environments, encouraging a raft of studies that examined this claim, sought to identify its restorative effects, and which asked why nature has restorative effects (van den Berg et al., 2010; Beil and Hanes, 2013; Van den Berg et al., 2014).

The view that natural environments are linked to good health and/or have restorative effects is supported by a range of experimental and qualitative studies (Bixby et al., 2015; Triguero-Mas et al., 2015), in natural or urban settings (Beil and Hanes, 2013; Van den Berg et al., 2014). The research suggests that exposure to green space is associated with lower likelihood of poor health; with mortality rates for cardiovascular disease and lung cancer decreasing with increasing city greenness (Bixby et al., 2015). Conversely, individuals who live in highly urbanised areas (i.e. ‘red bricked area’ vs green space) have more symptoms of and a higher risk for mental illness (De Vries et al., 2003, 2013).

Focusing on the question of what environments restore, van den Berg et al. (2010) and others (e.g. Hartig, 2008; De Vries et al., 2013; Mitchell, 2013) have shown a 'positive relation between exposure to nature and restoration from stress and attention fatigue' (p.1203). van den Berg et al. (2010) concluded that there were buffering effects of green space that mitigate against the negative health impacts of stressful life events; large scale green spaces are argued to have more pronounced effect. Mitchell (2013) too found that exposure to public open space had a mental health benefit, particularly when it was a pleasant environment; and that a lower mental health risk is associated with regular use of outdoor space for physical activity.

Evidence of the salutogenic effects of outdoor space also found by Antonovsky (1996). Natural environments are believed to encourage physical activity (Mitchell and Popham, 2008) and to 'encourage healthy behaviours', which then benefit individual's physical and mental health. Kemperman and Timmermans (2014) found that those who perceived their local environment to be green were more likely to participate in physical activity than those who did not perceive their local environment as green. Similarly, McMorris et al. (2015) found that monthly frequency of physical activity of more than fifteen minutes was positively associated with greenness. Additionally, McNeil et al. (2012) found that participating in outdoor activities reduced the risks of cardiovascular disease and obesity and was associated with a longer life expectancy.

While green space can be beneficial for health, research has suggested that women are more susceptible to the effects of environmental degradation in the local environment than men (Kavanagh et al., 2006; Stafford et al., 2005). Problems within the local neighbourhood, such as lack of amenities or poor quality air, reputation of the local area were more likely to negatively influence women's physical health and their activities in that space more than men, often due to concerns over personal safety (Kavanagh et al., 2006). It is worth noting that there are a number of studies whose findings do not support the claim that any green space in the living environment can encourage physical activity of those within that environment (Ord et al., 2013; Tamosiunas et al., 2014; Triguero-Mas et al., 2015).

## 2. Dimensions and qualities of nature/space

The evidence that the natural environment benefits health seems to be qualified by a number of factors, for example, the type and size of green space, its urban/rural location and perception of greenness. Paquet et al. (2013) found that larger, greener spaces that were associated with a lower risk of cardiometabolic diseases. Van den Berg et al. (2010) found that in terms of size, a large space (3 kilometre green zone) moderated the impact of stressful life events for those individuals who reside in an area, but that these effects were reduced when the area was smaller (no effect for a 1 km area). Nutsford et al. (2013) reiterate the idea that large scale green space has restorative value. Studies in this area generally agree that it is not just access to green space but rather access to large green space that is important for physical activity (Paquet et al., 2013; Kemperman and Timmermans, 2014; Tamosiunas et al., 2014).

The quality of space also appears to have a health benefit. Quality can refer to the attractiveness of a space or its aesthetic attributes (Ord et al., 2013; Paquet et al., 2013; Tamosiunas et al., 2014), where aesthetic attributes may indicate its indeterminate yet 'special' (e.g. affective) qualities of nature. For example, when experiencing nature, Hartig (2008) argues that individuals feel a distance from the demands of everyday life along with the possibility of 'aesthetic appreciation'. These are qualities that built environments arguably do not possess, therefore it was a consistent finding that, for restoration, visits to almost any natural environment is better than visiting a built up environment (De Vries et al., 2013; Van den Berg et al., 2014). Hartig (2008) argues that as restoration effects relate to attractiveness of the environment, the restorative value of natural environments can vary. This is supported by a recent experimental study in the UK that found that unstructured, dense vegetation can have an adverse effect on restoration (Van den Berg et al., 2014).

A number of studies have looked into whether exercising in environments which are polluted is detrimental to health, or whether exercise in polluted areas is better than no exercise at all. Both conclusions have been made; with concerns raised about the pollutants taken in while exercising (Sharman et al, 2004) and exercise being considered beneficial regardless (Pucher et al., 2010; Wong et al., 2007). This is a prominent issue, with the



increasing problem of air pollution but also because increasingly public health is trying to encourage active travel (Cakmak et al., 2011; Veisten et al., 2011;).

This debate about quality is important to research on gender and health. Women report preferring to exercise in natural environments, such as the park, instead of the city streets or inside gym because of its perceived aesthetic and therapeutic qualities (Krenichyn, 2006). Krenichyn (2006: 633) found that the scenery and 'the presence of others exercising increased the likelihood of physical activity for women'. They found that the subjective stress levels of women in a 'very natural setting' greatly decreased, but increased after being exposed to a 'mostly built' environment. This was not found for men. Generally speaking, the health benefits of green space for men may be more clearly demonstrated using an objective measure of green space quantity, whereas women's health benefit is more likely to be 'closely associated with subjective indicators of green space quality and perceived personal safety' (Richardson and Mitchell, 2010:573). Furthermore, the perception of the 'social quality of the local environment' was also found to be important for 'the perceived health of women, whereas perceptions of the physical quality of the local environment was important for men' (Molinari et al., 1998; Stafford et al., 2005). The social quality of the environment was based on a measurement of the social problems within the area such as: unemployment, crime and illegal drug use; the physical quality of the environment measured problems of air quality and waste disposal (Molinari et al., 1998; Stafford et al., 2005). Women were argued to be more perceptive to the social problems in their local areas, whereas men are more perceptive to its physical problems. This is in contrast to the findings from Beil and Hanes (2013) who contend that women are more susceptible to environmental conditions in general, not just the local neighbourhood.

In summary, women were found to be more sensitive to the restorative values of natural environments. Notably, it is possible that definitions of green space have influenced findings and conclusions about health impacts. It is evident that different qualities are important to different groups, so from a public health perspective there may be particular challenges in matching the 'right quality' of space, for example, how much green space is

enough? What are the qualities of outdoor space that have the potential to influence gendered health outcomes? If there is a lack in quantity of space, how do we assure there is the right quality?

### **3. Environmental justice including accessibility, availability and usability**

There are two important aspects to the environmental justice argument. The first argues that living in or near a green environment is good for one's health, whereas living in or near a toxic one is bad for one's health. The second aspect is access. Questions have been raised as to whether health is improved by the presence of green space and its accessibility proximity, availability and usability. These concepts are used to identify the various sociocultural factors that influence where people live, how they engage with their environment which may also be shaped by sociocultural factors. For example, individuals living in green environments are generally reported better health than the rest of the population. First there is salutogenic effect that proposes a casual mechanism between living in a green area and health. As such, exposure to green space influences people's health. Second, De Vries et al. (2003) suggest that attractive green areas are more likely to 'attract' healthier and wealthier people (e.g. self-selection), and therefore 'inhabited by more healthy people even if there is no health-promoting effect of living in a green environment' (De Vries et al., 2003:1718).

Accessibility is a key environmental justice goal orientated towards the fair distribution of environmental amenities to improve the health profiles of individuals (Cutts et al., 2009). Accessibility is primarily measured as the distance to the closest green space from the place in which the individual resides (Coombes et al., 2010). However, research has produced mixed results with regards to the relation between accessibility, usage and the potential health benefits of outdoor space. Research that supports the view that access to outdoor space is beneficial for individual health found that better access to green space is related to a decrease in the number of treatments for anxiety/mood disorder (Nutsford et al., 2013). Alternately, restricted access to green space led to poor health outcomes (van den Berg et al., 2010:1203). Mitchell and Popham (2008:1658) found that deprived populations

with greater exposure to green space have a lower mortality than similar populations with less exposure to such areas. Similarly, a decline in user frequency of outdoor space and a greater chance of being overweight or obese, is linked to increasing distance between residential location and 'formal green space' (Coombes et al., 2010; Nutsford et al., 2013; Dallimer et al., 2014; Tamosiunas et al., 2014).

Despite these claims, Hillsdon et al. (2006) and Kemperman and Timmermans (2014) found no evidence of a relationship between access to green spaces, and recreational physical activity or between health problems such as cardiovascular disease (Tamosiunas et al., 2014). This finding may be due to methodological limitations and suggest the need for caution when making assumptions about the availability of green space, accessibility and use. Mitchell and Popham (2008) for example found that those from a lower socioeconomic background have poor accessibility, but that this does not predict usability; rather other factors such as free cost mean that those from lower socioeconomic backgrounds still used these spaces.

In terms of the meanings that different groups attribute to outdoor space, preferences for visiting outdoor space may be regulated by social circumstances. Gender was found to influence choice of leisure spaces, along with how each behaved in leisure spaces. For example, women appear to show a preference for visiting outdoor space with friends or family. Women are also reported to prefer evident forms of 'management and law enforcement' when in outdoor spaces, which may be a way of enabling a sense of safety (Virden and Walker, 1999:232). Certainly, it appears in the literature as if women are preoccupied with uncomfortable feelings in outdoor space. Jin and Whitson (2014) found that the choice of leisure spaces by young women in Beijing was influenced by fear of physical violence and feelings of discomfort.

However, research that is uncritical and appears to normalize women's restriction on mobility in outdoor space risks reproducing expectations about 'masculine domination over space' where outdoor activities are mainly seen as the territory of men (McNiel et al., 2012). Wright Wendel et al (2012) highlight the barriers to women's participation in outdoor space

which primarily locate women within the private space of the family, 'the need to care for children, and significant domestic responsibilities'. Richardson and Mitchell (2010) argue that family circumstances and life stage impact on the relationship between women and their environment more than for men. This is supported by Bell et al.'s (2014) finding that the benefit of local green space was most apparent for men in their early to mid-adult life, while the benefit for women occurred when they were over forty, upon entering the 'empty nest' phase (Janke et al, 2010; Bell et al., 2014). On the other hand, Tamosiunas et al. (2014) found that women were more frequent visitors to parks and spend more time in public green spaces than men because women are more likely to be supervising children and working part time. Rather than concluding that women are simply underrepresented in outdoor space, these findings suggest that the type of space is important in determining who uses it and when.

Proximity to environmental hazards is an important issue from an environmental justice perspective, because certain areas within local communities may be more toxically contaminated than others (Bevc et al., 2007). Bambra et al. (2014) found that large proportions of previously developed sites or industrial sites (known in UK as brownfield sites, or brown sites) are detrimental to individual's health. It has been consistently found that environmental hazards, such as landfill sites, chemical plants, brownfield sites are disproportionately placed in low-income areas (Adeola, 2000; Abel et al., 2001; Pastor et al., 2005; Tyrrell et al., 2013), which means there is an inequality in the distribution of environmental hazards and health risks. The dimension of environmental justice suggests that health effects should not be considered a natural phenomenon but rather one that is influenced by policy, economics and the social conditions of gender. In an interesting critique of accessibility assumptions, those from lower socioeconomic backgrounds have been found to be common users of outdoor space despite being assumed to have poor accessibility, for the reasons described above.

#### **4. Identification of symbolic/indeterminate and determinate/material boundaries that construct differential relationships between nature, gender and health.**

There is a generally held belief that women are closer to nature, partly through the essentialist assumption that women are instinctually nurturers and carers for the environment (Jackson, 1993). This discourse of women's closeness to nature is used to explain why women are more vulnerable to its degradation (Dymén et al., 2013; Jackson, 1993; Resurreccion, 2013) although other research has highlighted the structural and material realities of women's economic and social lives that position them closely to ecological systems relative to men (Jackson, 1993:1949). This perspective has been tested in the literature. In their study on driving and environmental awareness, Dymén et al. (2013) for example concluded that women are more environmentally friendly. They found that men in Sweden drove cars more often than women and that women used transportation in an environmentally friendly way. Women have further been found to be more concerned about the effects of pollution and climate change (Stafford et al., 2005; Dymén et al., 2013).

As our review of the literature on health and outdoor space has demonstrated so far, the meanings about and uses of outdoor space are highly gendered. Women use natural environments in a different way to men, and at the same time, their experiences are poorly represented in the literature (Richardson and Mitchell, 2010). One of the consequences of the social, physical and psychological barriers to women's access and participation in outdoor space (Richardson and Mitchell, 2010) is a politics of safety that constructs women as more vulnerable to, and more concerned about their presence in outdoor space. Richardson and Mitchell (2010:573) found that women reported feeling more uncomfortable in neglected/abused areas and have a 'lower preference for remote natural settings than men'. McNiel et al. (2012:42) also report that women in their study tended to 'view natural environments as more awe-inspiring and mysterious than men'. This 'mysteriousness' of unfamiliar spaces, according to Wesely and Gaarder (2004), is projected as dangerous places for women which further fuels women's fear in outdoor space. So in contrast to men, who prefer more remote natural settings (Virden and Walker, 1999; Richardson and Mitchell, 2010), women are more likely to favour a 'more intimate friend or family outdoor environment' (Virden and Walker, 1999; McNiel et al, 2012:42).

The gendered differences in meanings about outdoor space is reflected in the view that 'girls are taught not to get hurt, not to get dirty, not to tear their clothing... their movements are constrained, and they eventually come to have a feminine walk, way of sitting and other movements' (Roth and Basow, 2004:249-50). These notions about what constitutes a 'female body' reflect how feminine bodies get 'equated with being less [physically] competent' (Wesely and Gaarder, 2004:647). This perception of the feminine body as being less competent can influence the way individuals participate in sport or recreation. As Wesely and Gaarder (2004) argue, girls are discouraged from showing their ableness in sport as this would challenge this notion that the feminine body is less competent and challenge the wider gender norms of behaviour. Conversely, boys are taught from a young age to use their bodies in skilful and forceful way, and are encouraged to assert their abilities in sport and outdoor recreation (Whitson, 1994; Wesely and Gaarder, 2004). Extending from this, McNiel et al. (2012:42) argue that in relation to outdoor activities, women and girls may fear the 'social stigma that can result when women do not comply with gendered norms of physical behaviour' (McNiel et al., 2012). Therefore, not being involved in outdoor recreation or not showing true ableness may be seen as a form of gender regulation.

Gender regulation has important consequences for women's relationship to outdoor space (Wesely and Gaarder, 2004). It can have a discouraging effect on women's participation and assertion of their abilities in sport and outdoor recreation. However, Green and Singleton (2006:865) challenge the 'overtly simplistic and one dimensional labelling of women as 'passive' and 'fearful'. They researched a group of women who they found did not perceive their local environment as dangerous, even at night, and rather they considered "being outside' to be an everyday learning experience' (Green and Singleton, 2006:865). The knowledge that they had acquired of the 'spatial techniques from hanging around on the streets 'enabled them to move around more freely' (Green and Singleton, 2006). Further Theberge's (2003) study which looked at adolescent girls who play ice hockey, found that the girls used their bodies in a powerful and fearless way. These girls did not hesitate to

demonstrate their power or constrain their bodies, offering a very different perspective on feminine embodiment than has been previously proposed.

## **DISCUSSION**

This paper has been an attempt to think through and separate out different sorts of interconnections between the diverse understandings and perspectives on gender, health and nature. We summarise the relevance of the paper's findings for public health practitioners below:

Research has made the claim that green space is linked to positive physical and mental health, and supports a view of the health promoting benefits of outdoor space. It must be noted that these positive health benefits appear dependant on participation in activities that do not appear to carry extreme risks or which are conducted in areas of good environmental quality efforts. Our review also found that women are more susceptible to the effects of environmental degradation. Thus, a determination of the gendered meanings and values that communities and individuals assign to natural environments emerges as a particularly important goal for public health.

The need for a gendered perspective is reflected again in our second dimension, which has evaluated the dimensions and qualities of outdoor space. This review has shown that attractive green areas (defined as absent of litter etc.) and large-scale green space have restorative value. Women were found to place greater value on and/or to receive greater benefit from the aesthetic qualities of outdoor space and generally to be more sensitive to the subjective qualities of an area than men. This suggests that public health practitioners need to be aware that the benefits of outdoor space may be realised by women who are able to exercise in outdoor spaces that they perceive have taken account of needs for personal safety and quality.

In the third dimension we bring together research on accessibility, usability and environmental justice. Public health practitioners similarly are concerned with issues of environmental justice. This dimension emphasises – for the benefit of a public health

audience - the evidence that environmental degradation has detrimental effects on health and is more likely in low-income areas, reflecting inequalities in the distribution of environmental hazards and health risks. Accessibility and usability are affected by social circumstance and can be explained by socio-economic factors, family circumstances, age and gender. As women, in particular, will use outdoor space in ways that take into account these social roles and expectations, it may be necessary for practitioners to recognise the gendered influence of life circumstances as well as barriers that may arise in relation to these roles. Rather than simply concluding that women are underrepresented in outdoor space, it seems important to take into account barriers and constraints related to the use of outdoor space, and promote equity in availability and access as a human right with the public health goal of improving health.

The final dimension considers in depth the symbolic and material connections between gender and the environment represented in the associations between women and nature. Researchers who have examined these representations highlight their relationship to wider gendered norms of behaviour including physical appearance, ability, competence, power and skill, as explanations for how women engage with their environment. It is important for health practitioners to note understand however that as the symbolic and material conditions of men and women's lives shift, we find research that challenges the overly simplistic accounts of women as fearful and limited in their use of outdoor space. This research demonstrates women's necessary engagement and/or familiarity and safety with their environment and their capacity to move through it with pleasure and enjoyment.

## **CONCLUSION**

Specifically – and as this paper has demonstrated - we argue in support of an analytical approach in public health that is attentive to the interconnections between gender, health and nature. This moves past the idea that nature is good for health, and extends our understanding of the complex interrelationships between health, nature and gender. It is attentive to the opportunities, limitations, norms and assumptions that are identified when public health pays attention to the gendered relationship between health and the



environment. Here gender is both an analytic framing and an object for study. The paper therefore leads us to, a view of nature that within the context of public health can take account of its complex, diverse and changing value to human health.

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