



Research Paper

“Blue” space accessibility and interactions: Socio-economic status, race, and urban waterways in Northern Utah



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ABSTRACT

Are urban waterways amenities, and if so, are there inequities in household access? While urban waterways represent a potential site for access to nature within the urban environment, there have been few studies on the accessibility and interactions with water features in particular, what we refer to as “blue spaces.” This study drew on a sample of households in Northern Utah living in neighborhoods with a nearby river or canal to ask if local waterways provide positive impacts to households and if proximity to them increased the likelihood of households spending time at them and being familiar with them. We used multivariate regression to demonstrate that socio-structural and accessibility characteristics shape patterns of familiarity and use, and mediate the impacts of blue space characteristics on households. We found evidence supporting the idea that urban waterways are positive amenities for neighborhood quality of life. We also found that the farther away a household lived from the blue space, the less likely they were to be aware of or use the amenity. Surprisingly, we also found that while high socio-economic status (SES) and white respondents generally lived further from points of access to urban waterways, they reported higher familiarity and were more likely to spend time at them than lower SES and nonwhite Hispanic households. Results suggest that future research and community engagement related to urban blue spaces should be attentive to how social structure and the characteristics of the built environment mediate access to these amenities.

1. Introduction

There is a growing literature showing how proximity to urban green space can produce improved health outcomes like reductions in obesity, diabetes and cardiovascular morbidity (Cutts, Darby, Boone, & Brewis, 2009; Ngom, Gosselin, Blais, & Rochette, 2016). Among urban planners interested in increasing access to public open and green spaces, early studies focused mainly on spatial separation (distance) as the key constraint to resident’s ability to take advantage of these amenities. Technology advancements such as GIS and more widely available geospatial data facilitated access studies by providing easier ways to measure distance to urban amenities (Comber, Brunson, & Green, 2008; Heckert, 2013; La Rosa, 2014). A recent review of the access to green space literature has shown that focusing on proximity alone provides inconclusive results (Rigolon, 2016), and that variation in the size, configuration, and quality of parks and open spaces are as important as simple proximity in shaping patterns of familiarity (awareness and knowledge) and use of green spaces, and thus mediate the benefits they provide.

Urban green spaces are not limited to terrestrial parks and open areas, but also include urban waterways. The benefits provided by water features have been widely acknowledged, both as ecological services (e.g., carbon sequestration, oxygen production, noise reduction, microclimates, etc.) and as places that are used for recreation and social interaction (e.g., exercise, sport, etc.) (Kumar, 2010); (Kondolf and Pinto, 2016; Kondolf & Pinto, 2016). In this paper, we use a multi-method approach to explore how local residents experience different types of urban blue space in a sample of neighborhoods in northern Utah. Our overarching research question is ‘What factors explain variation in household familiarity, time spent, and interactions with urban blue space?’

2. What is blue space?

As blue spaces, we consider hydrographic features that can be waterbodies (e.g., estuaries, ice masses, lakes and ponds, playas, reservoirs, and swamps and marshes) or flowlines that make up a linear surface water drainage network (e.g., canals and ditches, coastlines,

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streams and rivers) (USGS, 2015). Streams, river banks, and riparian areas are sometimes included under the umbrella term “green space” along with urban parks, trails, and open spaces (Roy, Byrne, & Pickering, 2012; Wolch, Byrne, & Newell, 2014). However, urban water features have generally received much less attention from researchers than terrestrial green spaces, prompting a call for more exploration of the specific role and importance of “blue spaces” within urban environments (Gledhill and James, 2008; Gledhill & James, 2008). While the concept of blue spaces overlaps with green space, we argue that blue spaces provide different kinds of benefits to users. They are sensed in different ways, for example, running water has sonic qualities that can be used by urban planners to create relaxing soundscapes (Raimbault and Dubois, 2005; Raimbault & Dubois, 2005: 355). People visit waterways for different recreational purposes, and they attract different kinds of wildlife (e.g., fish, ducks) than terrestrial spaces. While waterways also provide important environmental and economic benefits, we focus on social benefits in this study.

Urban blue spaces have yet to be thoroughly studied as either positive or negative amenities in this literature. On the one hand, ecologically healthy or restored waterways with public access opportunities can contribute to an aesthetically pleasing experience. On the other hand, unmonitored or poorly managed urban waterways can be sites of flooding risk, insect pests, pollution and/or waste disposal. Finally, even ecologically sound wetland systems can be perceived by humans as disamenities, due to the smells of anaerobic decomposition and the insect populations that thrive in them. In the sparse blue space literature that does exist, coastal waterways were shown to provide quality of life benefits, and residents most frequently visited waterways closest to where they lived (Cox et al., 2006; Cox, Johnstone, & Robinson, 2006). Another study explored distance to stormwater ponds in Florida, finding that economically stressed census block groups in the inner-city community tended to be located closer to stormwater ponds with less quality, diversity, and size (Wendel et al., 2011; Wendel, Downs, & Mihelcic, 2011). Meanwhile, inland urban waterways such as rivers and canals remain understudied as neighborhood amenities with potential impacts on urban households. Two meta-analyses focusing on the impacts of blue space on mental health (Gascon et al., 2015) or long-term human health (Völker and Kistemann, 2011; Völker & Kistemann, 2011) found inadequate evidence due to the limited amount of empirical research on the topic.

2.1. Opportunities and barriers for accessing green and blue spaces

Following previous work (El-Geneidy and Levinson, 2006; El-Geneidy & Levinson, 2006; Hansen, 1959), we define ‘access’ as the *opportunities for interaction with* and *ability to use* urban natural spaces. Many cities around the world have initiated urban greening projects such as Hangzhou’s XiXi Wetlands in China (Wolch et al., 2014; Sang, Shu, Zhu, & Su, 2013). Yet a growing body of literature has found disparities in distance to such natural areas in cities in the United States (Dai, 2011; Gobster, 1998; Heckert, 2013; Heynen, Perkins, & Roy, 2006), Canada (Ngom, Gosselin, Blais, Rochette, 2016; Ngom, Gosselin, Blais, & Rochette, 2016), Denmark (Schipperijn et al., 2010), Israel (Omer and Or, 2005; Omer & Or, 2005), and the United Kingdom (Comber et al., 2008), for example. In this paper, we look beyond measures of proximity to understand the full scope of access. Given the links between natural amenity access and human health, previous studies have argued that we should be concerned if access is distributed in ways that allow some social groups to benefit while preventing those same opportunities for others (Heynen et al., 2006; Perkins, Heynen, & Wilson, 2004). Access to public green space is increasingly recognized as an environmental justice issue (Wolch et al., 2014). Even aside from disparities in spatial distribution, racial and ethnic background can shape patterns of use of green space, because of different cultural preferences and because of real and perceived racial discrimination (Gobster, 2002).

Socioeconomic status (SES), such as income, educational attainment, and home ownership influence the decisions about what a household chooses to live near and what options are available to choose from. Studies in the USA have found that white residents and households with higher incomes, higher educational attainment, and higher homeownership rates tend to have access to a higher number of goods and services that make locations attractive (Crawford et al., 2008; Sister, Wolch, & Wilson, 2010; Zhou & Kim, 2013). Differential patterns of access may also reflect dynamics of the housing market across time. In a study of Montreal, Canada, Ngom, Gosselin, and Blais (2016) found evidence of a process by which rising housing values adjacent to urban green spaces have led to a process of “green gentrification.”

Quality of amenities can be just as important than proximity. For example, Boone et al. (2009) found that although black residents in Baltimore, Maryland tended to live closer to parks in general, whites lived closer to parks that were bigger, less heavily trafficked, and potentially provided a more pleasant experience. Others have found a stronger correlation between the size of parks and access than the number of parks and access (Boone, Buckley, Grove, & Sister, 2009; Estabrooks, Lee, & Gyurcsik, 2003; Wen, Zhang, Harris, Holt, & Croft, 2013). Similar patterns might be expected with respect to access to blue spaces with varying qualities. River restoration is increasingly advocated as a strategy facilitating public access and use of urban waterways (Findlay and Taylor, 2006; Findlay & Taylor, 2006; Kondolf & Yang, 2008; Prior, 2016). Studies have found that urban homeowners will pay a premium for properties that allow them to live near both green spaces (Irwin, Jeanty, & Partridge, 2014; Nicholls, 2004) as well as urban riparian corridors (Netusil, 2006). At the same time, private ownership of properties adjacent to waterways can impede use by others if individuals have to trespass in order to access them.

The ability to spend time at an urban waterway can also be structured by household characteristics. Leisure scholars, for example, have long pointed out that social class can constrain access to recreational activities, in other words, the higher the household income, the more money householder members have to spend on gear, permits, and the like (Crawford et al., 1991; Crawford, Jackson, & Godbey, 1991). In addition, the longer people live at their residence, the more time they have to learn about and explore their neighborhood, which can increase awareness and use of these amenities. While empirical tests of this idea are hard to find and provide contradictory clues (Beyer et al., 2014; Chen et al., 2015), others have specifically called for researchers to account for length of residence in studies of access to urban green space (Lackey and Kaczynski, 2009; Lackey & Kaczynski, 2009). Finally, household structure such as how many children under the age of 18 live in the household, might help predict whether or not households know about and seek out their local waterway. On the one hand, youth might be more apt to play along waterways. On the other hand, adults might find these places to be unsafe and discourage their children’s use.

In this paper, we explore how individual and household characteristics (education, race/ethnic background, homeownership status, income, presence of children, and length of residence) are related to familiarity and use of urban blue spaces. Based on the literature, we expect that households whose residents who are white, have higher income, have more education, have children, and have resided longer in the neighborhood are more likely to be engaged with local blue spaces, but that these are mediated by proximity, levels of public access associated with the built environment, and qualities of blue spaces (e.g., waterway type and perceived amenity value). We further explore to what degree household features predict whether households are positively impacted by active (visiting and walking, playing) and passive (sensing sights and sounds, enjoying wildlife) interactions with their local blue spaces. Our study makes the following contributions to the literature. First, we pay particular attention to the role of adjacency, or parcels which directly abut urban waterways, which is often overlooked in the literature but privileges certain households over others in their

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