Urban Parks Reimagined: A Framework for Vibrancy and Inclusivity

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Abstract

Urban parks and greenspaces provide crucial health, economic, and environmental benefits, yet many are underused, becoming inadvertent sites of exclusion and neglect. This phenomenon often results from park designs that do not resonate with the diverse cultural values of their surrounding communities, leading to reduced visitation and engagement. To address this gap, our comprehensive literature review examines historical and contemporary urban park designs, focusing on their impact on inclusivity and use.

Our research identifies a persistent trend in park design from the 19th century to the present, dominated by a 'picturesque' style that, while aesthetically pleasing, often fails to meet the needs of a diverse urban populace. This design approach has contributed significantly to park underutilization, as it does not encourage activities reflecting the rich cultural tapestry of modern urban societies.

Furthermore, our scoping review of over 74 peer-reviewed articles reveals four main factors related to park use and user diversity: park design and programming, neighbourhood built environment, neighbourhood socio-demographics, and temporal conditions. Based on the findings, we propose a multidimensional framework that evaluates parks through spatial, temporal, socio-demographic, and behavioural lenses. Our framework aims to uncover the nuanced barriers to park usage by examining public attitudes, social norms, and accessibility issues. This approach allows us to pinpoint strategies for revitalizing urban parks, emphasizing the need for design modifications that embrace cultural diversity and promote inclusivity. This paper encourages urban planners, designers, landscape architects, and community leaders to reimagine urban parks as vibrant, inclusive spaces that reflect and cater to the diverse communities they serve.

Keywords: green spaces, neighbourhood parks, vitality, border vacuum

Introduction: Unused and Exclusive Parks in a City

Urban parks and greenspaces are foundational to urban quality of life, offering many psychological, social, and health benefits. These greenspaces serve as vital arenas for physical and social activities, acting as communal hubs that foster interaction among diverse populations (Chiesura, 2004; Lee & Maheswaran, 2011). However, the benefits of urban parks are only realized when these spaces are actively used. Alarmingly, many parks do not meet the evolving needs of their surrounding communities, leading to underutilization and making them susceptible to crime and social decay (Cohen et al., 2016).

Recent empirical studies underscore the severity of this underuse. For instance, research across 200 neighbourhood parks in U.S. cities revealed a low average of just two persons per acre, or five persons per ha (Cohen et al., 2016). Park et al. (2020) also observed that 26% of neighbourhood parks were vacant during nearly a quarter of the observations. Considering the significant financial investment required to maintain these parks—approximately $200,000 to develop an acre plus an additional $20,000 annually for upkeep (NRPA, 2023)—the underutilization of these spaces represents not just a fiscal drain but also a missed opportunity for enhancing community well-being.

Several studies have identified critical determinants of park usage, such as park size, the diversity of facilities, and overall maintenance, as pivotal to enhancing park attendance (Cohen et al., 2013; Slater et al., 2013). Demographic variations, such as age groups, sex and gender, race/ethnicity, and socio-economic status, further complicate park use (Mowen et al., 2007; Loukaitou-Sideris & Sideris, 2009).

But few studies have attempted to understand factors related to the park underutilization phenomenon. Moreover, the literature has often overlooked the role of "ecosystem disservices" provided by parks, such as health issues related to allergies, physical damage to infrastructure, emissions affecting air quality, and the social and psychological impacts related to urban forests being perceived as unsafe or inconvenient (Lyytimäki, 2017). Jane Jacobs (1961) introduced the concept of "border vacuums," describing how certain large, single-use areas can create zones of decreased activity, thereby affecting the vitality of the surrounding neighbourhoods. This phenomenon suggests that the problem of park underutilization may be as much about the surrounding urban fabric as it is about the parks themselves.

This study aims to delve into the under-researched phenomenon of empty parks and examine the commonalities among underused parks, their specific problems, and whether the parks' characteristics or the surrounding community environment influences their use. This study uses a multidimensional and interdisciplinary approach to evaluate various factors, including park design, programming, and neighbourhood characteristics. This paper elucidates the nuanced challenges underlying park underuse and non-inclusivity and proposes actionable strategies for revitalizing these critical urban assets.

The Past and the Present of Urban Parks

This section delves into the historical evolution of urban parks since the 19th century, analyzing how design trends and cultural transformations have contributed to their current underutilization and exclusionary characteristics. A detailed examination of various design trends, with a particular focus on the 'picturesque' style, illustrates its profound impact on the

functionality and inclusivity of neighbourhood parks. Understanding this historical context is vital for comprehending contemporary challenges regarding park user volume and inclusivity.

The rapid industrialization and urbanization of the 19th century posed numerous social and public health challenges. Urban planners and policymakers regarded open spaces within cities as essential antidotes to these issues, leading to the development of urban parks designed to enhance citizens' physical and mental well-being (Cranz, 1982). The picturesque style, characterized by winding paths, expansive lawns, and artistic features such as statues, facilitated both passive and active recreation, previously less accessible to the working class (Hunt, 1992). This design philosophy, deeply embedded in Romanticism, posited that natural scenery could uplift and rejuvenate the human spirit (Cranz, 1982; Hunt, 1992).

Parks designed in this picturesque style aimed to catalyze social cohesion, encouraging interactions among diverse societal groups. Frederick Law Olmsted, a pioneer of this approach, envisioned parks as democratic spaces where individuals from various backgrounds could converge, promoting a vibrant mix of voluntary and recreational activities to strengthen the social fabric of democracy (Beveridge & Rocheleau, 1995).

However, during the 19th century, the recreational activities of the working class—often marked by rowdy behaviour—were viewed as undesirable and discouraged in favour of more refined activities such as strolling, jogging, and picnicking (Low et al., 2005). This period in the United States saw a significant shift from passive to active recreation, highlighted by federal investments in local park development that introduced amenities like baseball fields and tennis courts (Cranz, 1982). The picturesque style continued to dominate park design.

Post-World War II saw rapid urban expansion and the rise of suburban living, leading to the widespread adoption of a homogenized park style throughout the U.S. and Canada, which provided a physical and social buffer from the urban core (Bruegmann, 2019). The post-industrial era marked a shift towards the revitalization of city parks, primarily through public-private partnerships in the U.S. and significant public investment in Europe, reflecting a similar evolution in park design across various countries (Gabriel , 2016; Low et al., 2005).

In today's increasingly multicultural and multiclass urban landscapes, parks need to cater to a broad spectrum of uses—not just recreation but also socio-cultural expression, education, environmental conservation, and wildlife habitat preservation. Contemporary park design, described as "ecological" by Cranz and Boland (2004) and "culturally diverse" by Low et al. (2005), strives to meet these varied needs. However, traditional park designs often fail to accommodate this diversity, leading to underutilization and a lack of inclusivity in both urban and suburban settings. Furthermore, the emergence of exclusionary practices, such as electronic monitoring, addresses security concerns but can further restrict park accessibility and inclusivity.

The issue of underused parks extends beyond mere missing opportunities; these spaces can detrimentally impact the vitality of surrounding neighbourhoods. Jane Jacobs (1961) discusses this as the "border vacuum" effect, where large, single-use areas and their adjacent neighbourhoods catalyze social and environmental decay in cities. Mitchell and Lee (2014) noted that rivers and greenspaces could lead to more significant socio-economic disparities between neighbourhoods. These areas can become border vacuums due to various interconnected causes, including the ecosystem disservices they provide.

A Scoping Review of Urban Park Vibrancy

To systematically assess the current state of research on urban park vibrancy and diversity, we conducted a scoping review adhering to the Joanna Briggs Institute (JBI) guidelines (Peters et al., 2020) and the PRISMA-ScR checklist (Tricco et al., 2018). We comprehensively searched two academic databases, Scopus and Web of Science, selecting articles focusing on various aspects of park usage and user diversity. Our search strategy utilized a combination of keywords related to the physical spaces—such as "parks," "urban parks," and "neighbourhood parks"—and terms associated with park engagement, including "use," "utilization," "visitor," "diverse," and "inclusion."

Findings: Descriptive statistics and measures

This scoping review includes 74 papers. Most of these papers (n=69, 93%) primarily explore park usage patterns, while 31 (42%) address aspects of park user diversity to varying extents. Notably, 26 papers (35%) intersect both themes, analyzing how park usage correlates with demographic diversity. The geographical spread of these studies includes a variety of urban green spaces across the globe, with 28 papers focused on sites within the United States, 23 on China, and six on the United Kingdom, showcasing a diverse range of urban contexts and cultural settings. The journals most frequently publishing this research include *Urban Forestry and Urban Greening* (14%), *International Journal of Environmental Research and Public Health* (9%), and *Leisure Sciences* (7%).

Regarding methodologies, site observation emerges as the most prevalent approach, employed in 25% of the studies, followed closely by the analysis of social media data used in 24%. Surveys and interviews also play a significant role, and they are used in 18% and 12% of the papers, respectively, particularly in studies focusing on park user diversity. Further detailing the sources of social media data, Weibo is cited in 10 papers, Baidu in four, and X in another four papers. Additionally, mobile GPS data sources include SafeGraph (3 papers), highlighting the growing importance of digital trace data in urban park studies.

Scholars have employed various metrics to quantify park usage. The measures include the number of visitors engaged in varied activities (Van Dyck et al., 2013), aggregation points within parks (Mehta & Mahato, 2021), and peak density (Loukaitou-Sideris, 1995). Other indicators, such as the energy expended by visitors in park activities (Cohen et al., 2013) and the frequency of visits (Kiplagat et al., 2022), also provide insights into the dynamic patterns of park use. Digital technologies have introduced new ways to estimate park usage through social media analytics. For example, the number of check-ins recorded on apps and websites (Chen et al., 2021; Lyu & Zhang, 2019; Ullah et al., 2020) and the volume of social media posts related to specific parks (Roberts et al., 2017; Song & Zhang, 2020) serve as proxies for gauging park popularity and engagement.

Park user diversity extends beyond simple usage metrics, incorporating multiple socio-demographic factors to offer a broader understanding of park inclusivity. Studies have varied in their approaches to measuring diversity, with some categorizing it based on age, gender, income level, educational background, and family structure (Karuppannan & Sivam, 2013), while others consider additional variables such as race and employment status (Scott, 1997). Moreover, recent research has suggested including behavioural preferences and nature orientation to more comprehensively represent diversity in park usage (Hui & Jim, 2022).

These diverse methodologies highlight the complex nature of how urban parks are used and who uses them, emphasizing the need for multifaceted approaches in urban planning and design to accommodate the wide range of user needs and preferences.

Findings: Factors associated with park (non-)usage and (lack of) diversity

Research identifies numerous factors influencing park usage and diversity, which can be categorized into four groups: park attributes, neighborhood-built environment factors, neighborhood socio-demographic factors, and temporal factors.

Park design and programming

Studies consistently show that park size, the diversity of facilities, and maintenance influence park use (Cohen et al., 2013; Slater et al., 2016; Gobster, 2002). More than the amount of vegetation or park shape, a wide variety of facilities tends to increase park visitation (Fan et al., 2021). Liu et al. (2023) noted that facility diversity also affects the duration of visits, not just the number of visitors. A synthesis of 26 qualitative studies further identified five critical attributes of well-utilized parks: safety, aesthetics, amenities, maintenance, and proximity (McCormack et al., 2010).

Specific facilities that enhance park visitation include children's play areas, sports facilities, formal and informal seating areas, and walking paths (Park, 2020; Chen et al., 2016; Chuang et al., 2022; Fontán-Vela et al., 2021; Mehta and Mahato, 2021; Van Dyck et al., 2013; Zabelskyte et al., 2022). Water features are particularly valued in arid regions (Park, 2020), although they can detract from usable space for diverse activities (Lyu & Zhang, 2019). Providing thermal comfort through shade is crucial for promoting usage, especially in warmer climates (Lin et al., 2013).

William Whyte (1980) emphasized that 'people attract people.' The presence of others enhances the sense of safety and makes parks more attractive (De la Barrera et al., 2016). Regarding the perception of safety, fear is not solely due to environmental attributes but results from complex interactions among environmental, social, and individual factors, such as age, gender, and past experiences (Sreetheran and van den Bosch, 2014).

Different settings within parks afford specific activities preferred by various subpopulations. For older adults, the lack of organized activities, safety concerns, and inadequate amenities pose significant barriers (Fontán-Vela et al., 2021; Hung and Crompton, 2006; Mowen et al., 2007). In Hong Kong, a rich arrangement of landscape layers and aesthetic diversity significantly appeals to older adults (Yang et al., 2021).

The presence of playgrounds, natural features, and good levels of maintenance were shown to be significant factors affecting children's park use (Loukaitou-Sideris and Sideris, 2009). However, McCormack et al. (2014) highlight that areas designed for socializing are as crucial as playgrounds, especially for older children and teenagers.

Patterns of park usage also vary by ethnicity and race. Non-white users, particularly Black and Hispanic groups, often engage in social activities like picnics and tend to gather near play facilities and water features. In contrast, White users more frequently engage in solitary activities such as running and walking (Ganji and Rishbeth, 2020; Goster, 2002; Loukaitou-Sideris, 1995). Facilities that draw diverse users (e.g., age, sex and gender, race and ethnicity)

include children's play areas, informal seating like steps, benches, active water play areas, swings, picnic areas, and open areas for multiple uses (Mehta and Mahato, 2021).

Neighbourhood built environment

While parks are envisioned as urban oases, they do not exist in isolation from the surrounding urban fabric. Research has highlighted that neighbourhood design characteristics significantly impact park usage, where environmental barriers can deter certain groups from using parks. Studies conducted in China demonstrate that external factors like the density of nearby amenities—such as retail, restaurants, and public services—have a more pronounced effect on park user volume than internal factors like park design and programming (Fan et al., 2021; Lyu and Zhang, 2019).

Moreover, denser environments tend to have higher park visitation rates (Can Traunmuller et al., 2023; Liu et al., 2023). Accessibility and safety, facilitated by pedestrian and public transportation networks, also play critical roles in enhancing park usage (Baran et al., 2014; Fan et al., 2021; Dong et al., 2022; Can Traunmuller et al., 2023; Huang et al., 2020). Specifically, in Beijing, studies have found that transportation convenience, population density, and proximity to commercial facilities significantly boost urban greenspace usage, with commercial facilities being particularly influential (Li et al., 2017).

Neighbourhood socio-demographic environment

The impact of socio-demographic characteristics of surrounding neighbourhoods on park usage and diversity is complex and multifaceted. The interplay between social and physical environments significantly shapes perceptions and usage patterns of park spaces (McCormack et al., 2010). In Santiago, Chile, middle and lower-income neighbourhoods show a more intense, socially oriented use of greenspaces compared to upper-income areas, where parks are predominantly viewed as recreational venues for children (de la Barrera et al., 2016). Conversely, in Madrid, Spain, parks in lower socio-economic neighbourhoods experience lower visitation, hindered by barriers such as limited leisure time, security concerns, and poor park maintenance, with these issues being more pronounced among women and working-class residents (Fontán-Vela et al., 2021). Additionally, the role of social capital in promoting park use has been emphasized, highlighting its importance beyond individual and park-level factors (Broyles et al., 2011).

Other factors

Park usage varies significantly with temporal patterns. Usage tends to be lower on weekdays and mornings (Huang et al., 2020; Park, 2020; Van Hecke et al., 2017). The relationship between weather and outdoor activities shows that park activities peak at 20-29 °C (Wolff and Fitzhugh, 2011). Furthermore, the time of day, day of the week, and season affect park user diversity, with variations such as fewer young adults during early afternoons and fewer women during the morning (Scott, 1997; Van Dyck et al., 2013). These temporal factors underscore the need for adaptive park management strategies considering these fluctuating usage patterns to enhance park inclusivity and vitality.

Conceptual framework of park usage and diversity

Our conceptual framework integrates temporal, spatial, socio-demographic, and behavioural aspects to understand park use comprehensively. It moves beyond the simplistic notion of park emptiness as merely the absence of visitors by investigating various factors that contribute to park underutilization. The framework serves as a foundational tool for deciphering the complexities of why parks remain underused—both in general and by certain groups—and for directing future research and practical interventions.

This framework in Figure 1 shows that the underuse of parks and the lack of diversity among park users are influenced by a combination of four categories: the intrinsic attributes of the parks themselves, the characteristics of the surrounding built environment, the socio-demographic conditions of the neighbouring community, and various temporal elements. Specifically, it points to deficiencies in park design and maintenance, a non-inclusive and non-accessible built environment, socio-demographic disparities such as inadequate social capital or lack of cultural representation, and temporal constraints like adverse weather or inconvenient times of the day.

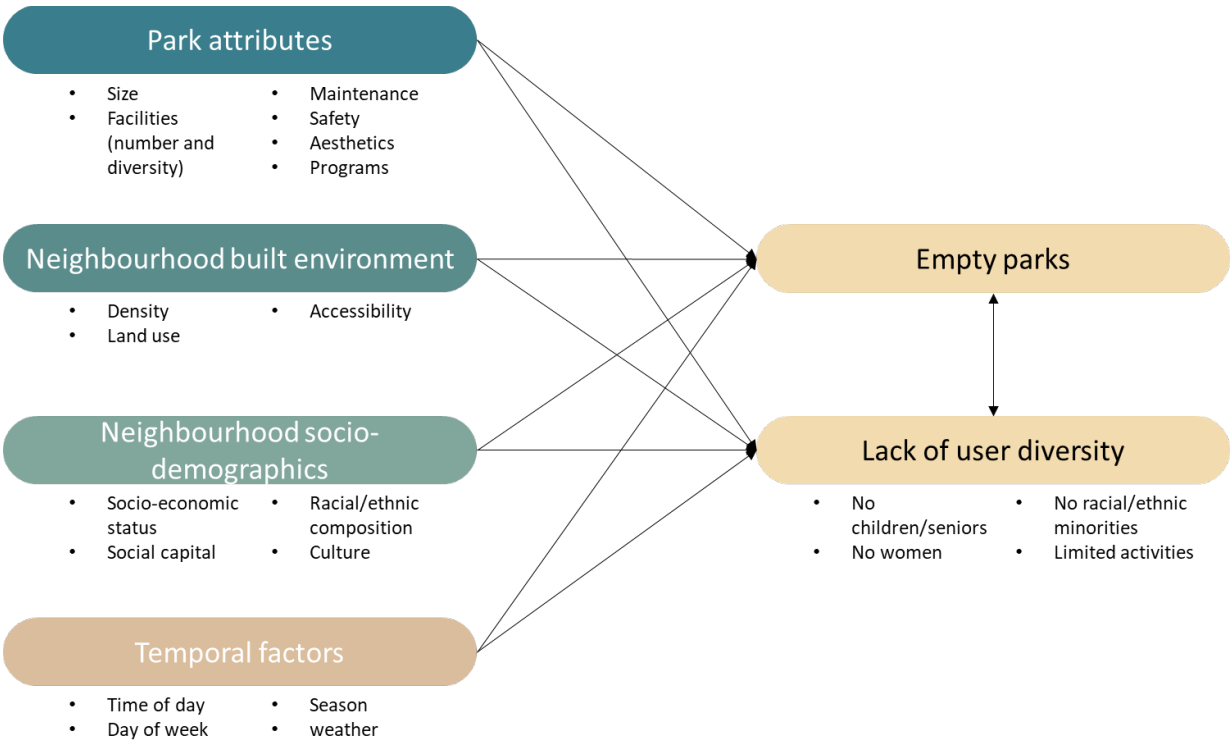

Figure 1. Conceptual framework of park usage and diversity

The relationship between diversity in park users and the extent of park utilization is bidirectional. An underused park may not provide a welcoming atmosphere for various population groups, deterring visitation. For example, when there are not enough people present, certain groups, such as children, older adults, and women, may feel unsafe. Conversely, the absence of diverse groups can lead to a perception of the park as unwelcoming or unsafe, reducing visitation intentions further.

To counteract these perceptions and encourage diversity, Taylor (2000) suggests that more people of colour should be represented in imagery associated with parks, and this can

apply to other minority or disadvantaged groups. Such landscape design and promotion strategies counter the prevailing image of wilderness as a domain from which minorities are excluded and encourage a broader community to view parks as their space. In addition, the literature advocates community engagement in park usage and development for both ethical and pragmatic reasons: ethically, because it's right that those affected by changes should have a say in them; pragmatically, because the success of parks and heritage sites hinges on community support and active participation (Low et al., 2005).

Conclusions: Towards vibrant and inclusive urban parks

In this study, we have traversed the historical landscape of urban park development, discerning the legacy of the 19th century's picturesque style and its lasting impact on the underutilization and exclusivity of modern parks. Reflecting on the evolution of urban parks illuminates the complex socio-cultural and design challenges that underpin contemporary park usage. Recognizing that parks, once envisioned as democratic spaces to foster social cohesion, now face challenges in attracting a representative cross-section of urban populations, we propose strategic approaches to reclaim their vibrancy and inclusivity.

Our findings indicate a complex interplay of park design and programs, the characteristics of the neighbourhood's built environment, the socio-demographic context of adjacent communities, and temporal factors. It becomes evident that reimagining urban parks is not only a design challenge but also a socio-cultural endeavour. Parks with poor design and inadequate maintenance, surrounded by non-vibrant, inaccessible environments, consistently fail to attract a diverse range of users. This is compounded when the socio-demographic profile of the surrounding area lacks representation or when temporal factors such as unfavourable weather or inconvenient hours deter visitors. Hence, interventions must be multifaceted, targeting these areas to create a welcoming and utilized space.

To enhance the vibrancy and inclusivity of urban parks, we recommend the following strategic approaches:

- **Design Innovation**: Embrace flexible designs in parks that cater to diverse needs and activities, ensuring broad usage through changing seasons and daily patterns.
- **Inclusivity in Planning**: Include a broad spectrum of community voices in park planning and utilize both quantitative and qualitative metrics to ensure designs reflect the diversity of users.
- **Community Engagement:** Implement participatory design workshops and digital feedback mechanisms to facilitate direct community contribution to park development, fostering ownership and relevance.
- **Accessibility and Connectivity**: Enhance park access with improved transit links and pedestrian routes, making parks more welcoming and accessible to all.
- **Programmatic Diversity**: Diversify park programming to cater to varying ages, cultural backgrounds, and interests, reflecting the community's multifaceted nature.
- **Maintenance and Safety**: Commit to rigorous park maintenance and incorporate safety through design, ensuring parks are well-kept and secure for all visitors.

- **Temporal Flexibility**: Adjust park accessibility based on user patterns, with innovative solutions like adaptive lighting and shelters, to offer comfortable experiences in all weathers and times.
- **Advocacy for Diversity**: Promote a narrative of inclusivity through imagery and storytelling that reflects the diversity of the community, countering any perceptions of exclusivity.

Our goal is to nurture parks that are not only green sanctuaries but also vibrant hubs of community life, reflective of the rich diversity and dynamics of urban communities. Such transformation necessitates collaborative efforts from urban planners, designers, policymakers, and community stakeholders, informed by the lessons of history, to infuse new life into urban parks, assuring their continued relevance and vibrancy into the future.

References

Baran, P. K., Smith, W. R., Moore, R. C., Floyd, M. F., Bocarro, J. N., Cosco, N. G., & Danninger, T. M. (2014). Park use among youth and adults: examination of individual, social, and urban form factors. Environment and Behavior, 46(6), 768-800.

Beveridge, C. E., & Rocheleau, P. (1995). Frederick Law Olmsted. New York, NY, USA: Rizzoli International Publications.

Broyles, S. T., Mowen, A. J., Theall, K. P., Gustat, J., & Rung, A. L. (2011). Integrating social capital into a park-use and active-living framework. American Journal of Preventive Medicine, 40(5), 522-529.

Bruegmann, R. (2019). Sprawl: A compact history. University of Chicago press.

Can Traunmüller, I., İnce Keller, İ., & Şenol, F. (2023). Application of space syntax in neighbourhood park research: an investigation of multiple socio-spatial attributes of park use. Local Environment, 28(4), 529-546.

Chen, Y., Liu, T., Xie, X., & Marušić, B. G. (2016). What attracts people to visit community open spaces? A case study of the Overseas Chinese Town community in Shenzhen, China. International journal of environmental research and public health, 13(7), 644.

Chen, D., Long, X., Li, Z., Liao, C., Xie, C., & Che, S. (2021). Exploring the determinants of urban green space utilization based on microblog Check-In data in Shanghai, China. Forests, 12(12), 1783.

Chiesura, A. (2004). The role of urban parks for the sustainable city. Landscape and urban planning, 68(1), 129-138.

Chuang, I. T., Benita, F., & Tunçer, B. (2022). Effects of urban park spatial characteristics on visitor density and diversity: A geolocated social media approach. Landscape and Urban Planning, 226, 104514.

Cohen, D. A., Lapham, S., Evenson, K. R., Williamson, S., Golinelli, D., Ward, P., ... & McKenzie, T. L. (2013). Use of neighbourhood parks: does socio-economic status matter? A four-city study. Public health, 127(4), 325-332.

Cohen, D. A., Han, B., Nagel, C. J., Harnik, P., McKenzie, T. L., Evenson, K. R., ... & Katta, S. (2016). The first national study of neighborhood parks: Implications for physical activity. American journal of preventive medicine, 51(4), 419-426.

Cranz, G., & Boland, M. (2004). Defining the sustainable park: a fifth model for urban parks. Landscape journa

Cranz, G. (1982). The politics of park design: A history of urban parks in America. The MIT Press.

De la Barrera, F., Reyes-Paecke, S., & Banzhaf, E. (2016). Indicators for green spaces in contrasting urban settings. Ecological indicators, 62, 212-219.

Dong, Q., Cai, J., Chen, S., He, P., & Chen, X. (2022). Spatiotemporal analysis of urban green spatial vitality and the corresponding influencing factors: A case study of Chengdu, China. Land, 11(10), 1820.

Fan, Z., Duan, J., Lu, Y., Zou, W., & Lan, W. (2021). A geographical detector study on factors influencing urban park use in Nanjing, China. Urban forestry & urban greening, 59, 126996.

Fontán-Vela, M., Rivera-Navarro, J., Gullón, P., Díez, J., Anguelovski, I., & Franco, M. (2021). Active use and perceptions of parks as urban assets for physical activity: A mixed-methods study. Health & place, 71, 102660.

Gabriel, N. (2016). “No place for wilderness”: Urban parks and the assembling of neoliberal urban environmental governance. Urban Forestry & Urban Greening, 19, 278-284.

Ganji, F., & Rishbeth, C. (2020). Conviviality by design: the socio-spatial qualities of spaces of intercultural urban encounters. Urban Design International, 25(3), 215-234.

Gobster, P. H. (2002). Managing urban parks for a racially and ethnically diverse clientele. Leisure sciences, 24(2), 143-159.

Huang, J. H., Hipp, J. A., Marquet, O., Alberico, C., Fry, D., Mazak, E., ... & Floyd, M. F. (2020). Neighborhood characteristics associated with park use and park-based physical activity among children in low-income diverse neighborhoods in New York City. Preventive medicine, 131, 105948.

Hui, L. C., & Jim, C. Y. (2022). Unraveling visiting-activity patterns of heterogeneous communities for urban-park planning and design. Forests, 13(6), 841.

Hung, K., & Crompton, J. L. (2006). Benefits and constraints associated with the use of an urban park reported by a sample of elderly in Hong Kong. Leisure studies, 25(3), 291-311.

Hunt, J. D. (1992). Gardens and the picturesque: studies in the history of landscape architecture. Mit Press.

Jacobs (1961) The death and life of great American cities.

Karuppannan, S., Baharuddin, Z. M., Sivam, A., & Daniels, C. B. (2014). Urban green space and urban biodiversity: Kuala Lumpur, Malaysia. Journal of Sustainable Development, 7(1), 1.

Kiplagat, A. K., Koech, J. K., Ng'etich, J. K., Lagat, M. J., Khazenzi, J. A., & Odhiambo, K. O. (2022). Urban green space characteristics, visitation patterns and influence of visitors’ socio-economic attributes on visitation in Kisumu City and Eldoret Municipality, Kenya. Trees, Forests and People, 7, 100175.

Lee, A. C., & Maheswaran, R. (2011). The health benefits of urban green spaces: a review of the evidence. Journal of public health, 33(2), 212-222.

Li, F., Zhang, F., Li, X., Wang, P., Liang, J., Mei, Y., ... & Qian, Y. (2017). Spatiotemporal patterns of the use of urban green spaces and external factors contributing to their use in central Beijing. International journal of environmental research and public health, 14(3), 237.

Lin, T. P., Tsai, K. T., Liao, C. C., & Huang, Y. C. (2013). Effects of thermal comfort and adaptation on park attendance regarding different shading levels and activity types. Building and Environment, 59, 599-611.

Liu, Y., Lu, A., Yang, W., & Tian, Z. (2023). Investigating factors influencing park visit flows and duration using mobile phone signaling data. Urban Forestry & Urban Greening, 85, 127952.

Loukaitou-Sideris, A. (1995). Urban form and social context: Cultural differentiation in the uses of urban parks. Journal of planning education and research, 14(2), 89-102.

Loukaitou-Sideris, A., & Sideris, A. (2009). What brings children to the park? Analysis and measurement of the variables affecting children's use of parks. Journal of the American Planning Association, 76(1), 89-107.

Low, S., Taplin, D., & Scheld, S. (2005). Rethinking urban parks: Public space and cultural diversity. University of Texas Press.

Lyu, F., & Zhang, L. (2019). Using multi-source big data to understand the factors affecting urban park use in Wuhan. Urban Forestry & Urban Greening, 43, 126367.

Lyytimäki, J. (2017). Disservices of urban trees. In Routledge handbook of urban forestry (pp. 164-176). Routledge.

McCormack, G. R., Rock, M., Swanson, K., Burton, L., & Massolo, A. (2014). Physical activity patterns in urban neighbourhood parks: insights from a multiple case study. BMC Public Health, 14, 1-13.

McCormack, G. R., Rock, M., Toohey, A. M., & Hignell, D. (2010). Characteristics of urban parks associated with park use and physical activity: A review of qualitative research. Health & place, 16(4), 712-726.

Mehta, V., & Mahato, B. (2021). Designing urban parks for inclusion, equity, and diversity. Journal of Urbanism: International Research on Placemaking and Urban Sustainability, 14(4), 457-489.

Mitchell, R., & Lee, D. (2014). Is there really a “wrong side of the tracks” in urban areas and does it matter for spatial analysis?. Annals of the Association of American Geographers, 104(3), 432-443.

Mowen, A., Orsega-Smith, E., Payne, L., Ainsworth, B., & Godbey, G. (2007). The role of park proximity and social support in shaping park visitation, physical activity, and perceived health among older adults. Journal of Physical Activity and Health, 4(2), 167-179.

NRPA (2023) NRPA Park Metrics (https://www.nrpa.org/publications-research/ParkMetrics/)

Park, K., Lee, S., & Choi, D. A. (2020). Empty Parks: An Observational and Correlational Study Using Unmanned Aerial Vehicles (UAVs). Journal of Digital Landscape Architecture, 262.

Park, K. (2020). Park and neighborhood attributes associated with park use: An observational study using unmanned aerial vehicles. Environment and Behavior, 52(5), 518-543.

Peters, M. D., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., ... & Khalil, H. (2020). Updated methodological guidance for the conduct of scoping reviews. JBI evidence synthesis, 18(10), 2119-2126.

Roberts, H., Sadler, J., & Chapman, L. (2017). Using Twitter to investigate seasonal variation in physical activity in urban green space. Geo: Geography and Environment, 4(2), e00041.

Scott, D. (1997). Exploring time patterns in people's use of a metropolitan park district. Leisure Sciences, 19(3), 159-174.

Slater, S., Fitzgibbon, M., & Floyd, M. F. (2013). Urban adolescents' perceptions of their neighborhood physical activity environments. Leisure Sciences, 35(2), 167-183.

Slater, S., Pugach, O., Lin, W., & Bontu, A. (2016). If you build it will they come? Does involving community groups in playground renovations affect park utilization and physical activity?. Environment and Behavior, 48(1), 246-265.

Song, X. P., Richards, D. R., He, P., & Tan, P. Y. (2020). Does geo-located social media reflect the visit frequency of urban parks? A city-wide analysis using the count and content of photographs. Landscape and Urban Planning, 203, 103908.

Sreetheran, M., & Van Den Bosch, C. C. K. (2014). A socio-ecological exploration of fear of crime in urban green spaces–A systematic review. Urban Forestry & Urban Greening, 13(1), 1-18.

Taylor, D. E. (2000). Meeting the challenge of wild land recreation management: Demographic shifts and social inequality. Journal of leisure research, 32(1), 171-179.

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., ... & Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Annals of internal medicine, 169(7), 467-473.

Ullah, H., Wan, W., Ali Haidery, S., Khan, N. U., Ebrahimpour, Z., & Luo, T. (2019). Analyzing the spatiotemporal patterns in green spaces for urban studies using location-based social media data. ISPRS International Journal of Geo-Information, 8(11), 506.

Van Dyck, D., Sallis, J. F., Cardon, G., Deforche, B., Adams, M. A., Geremia, C., & De Bourdeaudhuij, I. (2013). Associations of neighborhood characteristics with active park use: an observational study in two cities in the USA and Belgium. International journal of health geographics, 12, 1-9.

Whyte, W. H. (1980). The social life of small urban spaces.

Wolff, Dana, and Eugene C. Fitzhugh. "The relationships between weather-related factors and daily outdoor physical activity counts on an urban greenway." International journal of environmental research and public health 8.2 (2011): 579-589.

Yang, Y., Lu, Y., Yang, H., Yang, L., & Gou, Z. (2021). Impact of the quality and quantity of eye-level greenery on park usage. Urban forestry & urban greening, 60, 127061.

Zabelskyte, G., Kabisch, N., & Stasiskiene, Z. (2022). Patterns of Urban Green Space Use Applying Social Media Data: A Systematic Literature Review. Land 2022, 11, 238.