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ParkIndex: Using Key Informant Interviews to Inform the Development of a New Park Access Evaluation Tool

Elizabeth L. Oliphant [recent graduate],

Department of Parks, Recreation, and Tourism Management at North Carolina State University.

S. Morgan Hughey [assistant professor],

Department of Health and Human Performance at the College of Charleston.

Ellen W. Stowe [doctoral student],

Department of Health Promotion, Education, and Behavior at the University of South Carolina.

Andrew T. Kaczynski [associate professor],

Department of Health Promotion, Education, and Behavior at the University of South Carolina.

Jasper Schipperijn [associate professor],

Department of Sports Science and Clinical Biomechanics at the University of Southern Denmark.

J. Aaron Hipp [associate professor]

Department of Parks, Recreation, and Tourism Management at North Carolina State University.

Executive Summary

The relationship between park availability, physical activity, and positive health outcomes has been documented across the globe. However, studying how people access parks and why they use the parks is difficult due to a lack of consensus with respect to measurement approaches and assessment of park environments. Establishing a parsimonious method and tool for quantifying both park availability and park quality represents a major step that could advance park and physical activity research and practice. This paper describes phase one of the effort to develop such a measurement tool, known as *ParkIndex*. *ParkIndex* is a two-year National Institutes of Health (NIH)-funded study to create an evidence-based tool that will assist citizens and professionals in understanding and using information regarding community park access and use. Phase one consisted of key informant interviews conducted with research and practice leaders to inform development and provide insight on the essential foundations of *ParkIndex*. Twelve professionals from practice and academia, including parks and recreation, landscape design, and public health sectors, were interviewed in fall 2016. Key informants were interviewed on four topics concerning the content, value, feasibility, and dissemination of *ParkIndex*. Trained research assistants employed double, emergent, open, and axial coding methods to develop key themes and concepts to guide phase 2 and further development of *ParkIndex*. Key themes throughout the interviews included measures for park use, including distance, safety, neighborhood characteristics, route and travel mode to park, and overall park characteristics. Park elements discussed included quality of, and availability of, amenities, activity spaces, programming, and park management, as well as the context of the park and the engagement of the local community.

Please send correspondence to Aaron Hipp, jahipp@ncsu.edu.

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Respondents determined that *ParkIndex* could benefit park planning and community development and provide for a standardized method for evaluating park access. Interviews and themes offer parks and public health practitioners and researchers—and this specific *ParkIndex* development team-the opportunity to refine and evaluate measures to be included in a comprehensive park access and use tool. Key informants repeatedly referenced the need, especially within parks and recreation management, for consistent, reliable, and valid measures of park access and use, such as *ParkIndex* seeks to provide. We believe a well-conceived, integrated index will at the very least allow for greater comparison between parks and park systems and at best will facilitate the many park stakeholders to best design, maintain, program, research, and advocate for their local parks.

Keywords

Community design; park access; park management; park use; parks and recreation; physical activity; public health; qualitative research

Introduction

The relationship between park availability, physical activity, and positive health outcomes has been documented across the globe (Schipperijn et al., 2017). Proximity to parks has health benefits for populations across the lifespan, including youth (Almanza, Jerrett, Dunton, Seto, & Ann Pentz, 2012; Morgan Hughey et al., 2017; Roemmich et al., 2006; Wolch et al., 2011), adults (Kaczynski, Potwarka, & Saelens, 2008; Sugiyama et al., 2014), and older adults (Barnett, Barnett, Nathan, Van Cauwenberg, & Cerin, 2017; Mowen, Orsega-Smith, Payne, Ainsworth, & Godbey, 2007). Despite the growing body of evidence regarding parks and health, little consensus or commonality exists with respect to measurement approaches such as buffer sizes, proximity metrics, and assessment of park environments (Brownson, Hoehner, Day, Forsyth, & Sallis, 2009; Higgs, Fry, & Langford, 2012; James et al., 2014; Joseph & Maddock, 2016; Kaczynski & Henderson, 2007). The variety of measures defining park access, along with multiple audit tools to assess park characteristics, has led to a fragmented body of literature, limiting the ability to compare results across studies, disciplines (i.e., parks and recreation, public health, urban planning) and contexts (e.g., cities and countries) (Bancroft et al., 2015; Berrigan et al., 2015; Ekkel & de Vries, 2017; Joseph & Maddock, 2016).

Parks and recreation and public health professionals and researchers have identified and used a variety of metrics to quantify park availability and access (Ekkel & de Vries, 2017). Three frequently used park availability metrics are distance to closest park, total number of parks, and amount of park space (e.g., acreage). (Ekkel & de Vries, 2017; Schipperijn et al., 2017; Hughey et al., 2017). The approach taken largely depends on the unit of measurement (e.g., individuals, community) and specific research questions. For example, a researcher may study whether individuals who live closer to parks are more likely to achieve more physical activity (Schipperijn et al., 2017), while another pertinent research topic may focus on the community level, examining whether parks are equitably distributed across a city or county (Hughey et al., 2016; Nicholls & Shafer, 2001; Vaughan et al., 2013). This example highlights the importance of the distance value applied in park availability measurement. A

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wide variety of distances have been used in this area of research and well-founded reasons for varying distances include being specific to the population of interest or the population density of the area (Ekkels & de Vries, 2017; James et al., 2014). Recently, a common park availability, or proximity, metric has been adopted by several national organizations. The National Recreation and Park Association, the Trust for Public Land, and the Urban Land Institute have partnered to launch the “10-minute walk” campaign advocating for a high-quality park within a 10-minute walk for every person across the U.S. (National Recreation and Parks Association, 2018). Similarly, the National Park Service and the Centers for Disease Control and Prevention suggested that a key park proximity metric was the percentage of a population that lives within a half-mile of a park, which is approximate to a 10-minute walk (Merriam, Bality, Stein, & Boehmer, 2017). The adoption of this common metric by leading organizations may help stream-line measurement of park availability and access, but there still remains a wide array of indicators applied by practitioners and researchers. Comparing multiple metrics within studies, using evidence-based measurement, and adopting functional applications has been recommended for quantifying availability and access to green space (Ekkel & de Vries, 2017).

In addition to the range of metrics used to quantify park availability and park access, numerous tools are currently available that are used to evaluate park characteristics (Joseph & Maddock, 2016). Indeed, a recent review compared five environmental park audit tools that have been developed and used by researchers, practitioners, and individual citizens (Joseph & Maddock, 2016). These five prominent tools include the Bedimo-Rung Assessment Tool-Direct Observation (BRAT-DO) (Bedimo-Rung, Gustat, Tompkins, Rice, & Thomson, 2006), Community Park Audit Tool (CPAT) (Kaczynski, Wilhelm Stanis, & Besenyi, 2012), Environmental Assessment of Public Recreation Spaces tool (EAPRS) (Saelens et al., 2006), Physical Activity Resource Assessment (PARA) (Lee, Booth, Reese-Smith, Regan, & Howard, 2005), and Quality of Public Open Space Tool (POST) (Giles-Corti et al., 2005). The BRAT-DO tool was primarily designed to assess the physical structures within parks (Bedimo-Rung et al., 2006). Similarly, the CPAT captures park activity areas, but also includes measurement items to assess park access and surrounding neighborhood, as well as park quality indicators (Kaczynski, Wilhelm Stanis, & Besenyi, 2012). To date, the EAPRS represents the most comprehensive audit tool with 751 items, while the PARA is the shortest tool in length with 49 items on one page and can also be used for multiple physical environments (e.g., churches, schools) (Lee, Booth, Reese-Smith, Regan, & Howard, 2005; Saelens et al., 2006). Finally, the POST contains a total of 88 items and was intended to capture attributes of public open spaces that can influence physical activity (Giles-Corti et al., 2005). Each of these five tools provides a mechanism to evaluate environmental attributes of parks, but the characteristics and items of these tools differ substantially (Joseph & Maddock, 2016).

These park environment audit tools vary widely in length, from one page (PARA) to 59 pages (EAPRS), and all tools were designed for use by both researchers and practitioners (Joseph & Maddock, 2016; Lee et al., 2005; Saelens et al., 2006). All tools showed moderate to good inter-rater reliability, yet only one tool assessed validity (Joseph & Maddock, 2016). Each tool also captures a wide array of park features from children’s play areas, running and walking features, restroom facilities, neighborhood characteristics, and more (Joseph &

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Maddock, 2016). While there were some park features that all tools assessed (e.g., children's play areas), there were discrepancies in the degree of detail for park features. For example, all five tools measure the presence of play structures, but the CPAT includes the total number of playgrounds and eight specific features (e.g., useable, good condition, distinct areas for age groups, colorful equipment, shade cover, benches, fencing, separation from road), while the BRAT-DO measures the specific type of play structures (e.g., swings, slides) as well as play area surfacing, condition, safety, and rules and signage (Kaczynski et al., 2012; Bedimo-Rung et al., 2006). The availability of multiple environmental park audit tools provides many options and flexibility, but this can also create difficulty for researchers and practitioners to discern the best tool to use in each situation and compare across park systems or between park systems. Inevitably, the use of various tools and measurements in studies and parks and recreation management creates a challenge to compare approaches and findings across contexts and professions.

Experts have utilized geographic information system (GIS) and survey research tools to measure park availability and park access, while researchers have also developed and employed a variety of park environment assessment tools to characterize the features within and surrounding parks. Establishing a parsimonious method and tool for quantifying park availability, park features, and park quality represents a major step that could advance park and physical activity research and practice (Kaczynski et al., 2016).

A pilot endeavor to develop such a measurement tool, *ParkIndex*, was completed using data on park availability, park characteristics, and park use in a sample of adults in Kansas City, Missouri (Kaczynski et al., 2016). In short, the *ParkIndex* prototype estimated the chance of a person living at any given address in Kansas City visiting a park at least once per month as a function of park availability and park quality. The attributes of each park in Kansas City had previously been assessed using CPAT (Kaczynski et al., 2014), and park availability was calculated in GIS. Specifically, 891 adult respondents self-reported their park use and it was found that the number of parks and average quality of parks within 1 mile were positively associated with using parks at least once per month. Based on this empirical data, we constructed a probability function for visiting a park at least once per month that was then extrapolated to all addresses in Kansas City, and a prototype *ParkIndex* map surface was created visualizing how the probability of visiting a park differed across the city.

The current aim of *ParkIndex*, a 2-year NIH-funded study, is to develop a simple, standardized, rigorous, composite measure of park access to benefit both research and practice. *ParkIndex* has the potential for practical and conceptual significance in that it can be used by researchers in diverse disciplines (e.g., to apply consistent, empirically derived metrics of park access across studies) and by parks and recreation, public health, and urban design professionals as a scenario planning tool for encouraging greater population-level park access and use. For example, *ParkIndex* could be used to estimate the effects of adding a certain-sized park to a neighborhood, or a sports field or restroom to an existing park.

Following the development of the initial prototype, (Kaczynski et al., 2016) refining *ParkIndex* and assessing the predictive value and external validity of the tool was a key priority. The first step in refining *ParkIndex* was to organize and engage a multidisciplinary

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advisory board comprised of experts from parks and recreation, public health, and academia. Convening and eliciting diverse stakeholder expertise was critical to creating a measure that is applicable across contexts and professions. Via key informant interviews, the *ParkIndex* advisory board and other local and national experts provided feedback on the inclusion and relative importance of different elements for the *ParkIndex* tool (content validity) and the value and feasibility of creating, implementing, and disseminating such a tool. The objective of this paper is to examine input from national and international experts in the fields of parks and recreation, public health, and academia on the development of the *ParkIndex* tool.

Methods

Participants

Key informants were individuals with a deep understanding of parks and/or public health-related fields, selected from national and international agencies, organizations, and research groups. They were chosen for their knowledge or role in the field and their willingness to provide feedback on the development of the tool (DiCicco-Bloom & Crabtree, 2006). The sample included twelve key informants that are described further in Table 1. These key informants were selected from a limited convenience sample of known leaders with regards to parks and recreation and public health research regarding the development, use, and applications of park audit tools.

Key informants were invited to participate via email from the *ParkIndex* team. Eleven of 12 interviews were conducted via web conference call (Adobe Connect) along with one in-person interview between October and December 2016. Interviews were digitally recorded and had durations from 28 to just over 60 minutes, with an average duration of 51 minutes. All participants were read a confidentiality statement and provided verbal consent. Employing responsive interviewing techniques, the researchers followed an interview guide, while also maintaining a degree of flexibility to allow participants to expand on particular issues most important to them (Flick, 2009). Field notes recorded the overall sense of the interview, details about the context of the interview, and any notes pertinent to the interview. All procedures were approved by the University of South Carolina Institutional Review Board.

Key informants were asked to respond to open-ended questions focused on four topics: the *Content, Value, Feasibility*, and *Dissemination* of *ParkIndex*. The first topic, *Content*, included questions on what park access measures and elements of parks are most important for park use and was a key topic for gaining multiple perspectives on the importance of various metrics that should be tested in the validation of the development of the *ParkIndex* tool. The second topic, *Value*, focused on how the development of *ParkIndex* could contribute to the mission of the key informant's organization, department, and/or city. This topic also included suggestions for how *ParkIndex* could be improved to better add value to research and practice. This topic was essential to the key informant interviews to understand the various potential uses of this tool to inform tool algorithm and design from the onset of the project. The third topic, *Feasibility*, entailed questions on what challenges informants foresaw in the development of *ParkIndex* and ways to improve the feasibility of creating and implementing *ParkIndex*. Understanding challenges from diverse perspectives will assist

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researchers to streamline the refinement and validation of the tool. Finally, the fourth topic, *Dissemination*, focused on factors that could positively or negatively influence dissemination of *ParkIndex*, as well as any individuals or organizations that could be key partners in disseminating the tool. In summary, these four interview topics were chosen to gather diverse expert opinions to inform *ParkIndex* validation, as well as to gain critical foresight that the research team could incorporate into development in order to streamline the process from the beginning.

Analysis

Trained research assistants transcribed the interview recordings verbatim and a preliminary open code list of key terms and topics was created. Code development was guided by the conceptual categories used to structure the interviews and focused on the content, value, feasibility, and dissemination of *ParkIndex*. Analysis and organization of the interviews were completed using NVivo version 11. Following an inductive approach, emergent (i.e., coding several times to identify emerging themes), open (i.e., defining and developing categories), and axial coding (i.e., relating codes to each other) methods were employed to identify themes and concepts for consideration in the development of *ParkIndex* (Glaser, 2002). The axial codes were identified for common themes, unique considerations, and recommendations for the tool. The set of axial codes were shared amongst all authors to establish consensus.

Results

Findings from the key informant interviews are organized within the four development and utility topics of *ParkIndex*. The following sections describe key themes within each topic. Table 2 provides a comprehensive list of the themes within each area.

Content

Discussion on content focused on two aspects: park access measures and park elements important for use. Six key themes arose concerning park access measures and six for park use (Table 2). There was general agreement among key informants over the complexity of measuring park access and the need for standardized tools to evaluate access. Distance to parks was discussed in all but one interview as a key factor to park access. Within the discussion of distance, specific measures included half-mile or 10-minute walk distance to parks from individuals' residences. In each interview, discussion of distance was connected to a variety of factors, including road network, walk-ability, safety, park system characteristics (e.g., park policy, rules, hours, cost), route to park, and travel mode. As one local parks and recreation professional said, "It's not even based on a certain distance, necessarily, [but] understanding what the person's experience would actually be to access the space."

Discussion on route to park touched on issues of cleanliness of route, convenience, physical barriers arriving at the park entrance, and signage to help people locate and access the entrance. Informants even spoke specifically to the need for different age groups to be considered related to the route to the park. As a local parks and recreation professional said,

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"the quality of the infrastructure around the park, such as safe road crossings if it's near busy roads, that will support access from different demographic groups is obviously important for [these groups'] ability to access the park."

Travel mode focused on car access (e.g., parking lots and parking fees), public transportation (e.g., is the park near a bus stop?), and the walkability and bikeability of routes to parks. As one public health professional stated:

> How can people actually access a park if it's not right down the street? If there isn't access [close by], is there a way for people to get to the park who potentially can't drive? Are there great trails to walk or bike to get here? Are parks that are more frequently used on some local transit routes so that people could take a bus or train or some other way to get to the park?

The elements of parks most discussed in interviews included quality of amenities, variety of activity spaces, programming, and park management. Quality was the most mentioned theme including issues of aesthetic appeal, overall comfort (e.g., clean air, shade, low noise levels), and day-to-day maintenance of parks (e.g., cleanliness of facilities). Similar to quality is overall availability and condition of facilities and amenities within parks, including restrooms, water fountains, trails and walking paths, and the design of facilities. An academic studying public health and physical activity remarked:

> Our research has shown that the actual amenities and the actual facilities in the park are more important than the distance. They will travel farther to get to a higher quality park rather than visit their closest park that hasn't got the most desirable amenities.

The available activity spaces in parks was also a fundamental aspect of park use. Many key informants commented on the importance of a good mix of elements, including both active and passive spaces (e.g., both ball fields and benches), and spaces for different ages, including intergenerational spaces where parents could exercise while their children play. An academic and practitioner in park design said, "It's about making sure you've got a series of spaces available that can accommodate a variety of different activities and programs and needs."

A key thread throughout the topic of content for *ParkIndex* was the role safety plays in access to and use of neighborhood parks. Safety was discussed both in terms of getting to the park (i.e., the route to the park), as well as perceptions of unsafe activities within the park. A key informant who works as a public health professional put it this way, "Proximity and safety are the top two factors in people's decisions on whether they decide to walk or bike to a park."

Safety also considered the needs of diverse demographic groups, from children to older adults. Further, it was mentioned in relation to keeping parks from becoming a public nuisance. A local public health professional said, "If you don't have a park that is really being used for specific things or it doesn't have good programming or services, it's creating this vacant place in a community, [and] activities start happening there that you don't want to happen."

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Value

Key informants were asked to discuss the potential value *ParkIndex* could bring to their organization, department, or city, and ways to increase that value. Four key themes arose concerning how *ParkIndex* could add value and five themes for suggestions to improve value (see Table 2). All but one key informant emphasized the value of a tool such as *ParkIndex* in informing the planning and development of parks and programming and determining priorities, as well as overall community development. These planning aspects included where to add new parks for underserved populations, how to address health inequalities and disparities in access, and what features could be added to parks to increase use. As one national parks professional said, "There are so many national initiatives out there that are pushing for tools and resources like the *ParkIndex*, especially as we're talking about health equity and disparities in access to opportunities like park and recreation facilities."

Many key informants highlighted the need for consistent, standardized practices in measuring park access and use. A key informant who works for a national parks and recreation research group said:

> One of the best things that could happen would be to have a tool that researchers can use across studies. It makes the findings a lot more generalizable [and our organization] would look to use this tool as part of any research project that we are doing focused on parks.

Several informants also discussed the value of creating an objective method of measurement. A public health professional commented:

> I think the key positive is that it's evidence-based [and] I think that is something that all organizations look to: What's it based on? How is this made up? So, I think the fact that it's evidence-based is already a really key factor.

Another key informant who has worked both in practice and academia said, "The idea of acceptance, common acceptance, [the tool] becoming something that everyone knows about or accepts what it is, and you don't have to go in and explain it and validate it every time you use it adds huge value."

When asked about improving value, the two suggestions mentioned most were importance of clarifying the purpose and abilities of the tool and integrating local perspective to the extent possible. Clarity of purpose was mentioned in relation to convincing the general public as well as elected officials of the value of the tool for use in the public sphere, as well as for park employees who might be averse to using new techniques or technologies. This also touched on the issue of having clearly defined meanings within the tool (e.g., distance, park, boundaries) and a simple user interface. Discussion on integrating local perspectives was related to challenges of the overall feasibility of the tool (discussed below). Several informants felt obtaining data from, and working with, local levels would lead to greater value in the tool for diverse communities.

Additionally, informants spoke to the need to integrate *ParkIndex* data with additional data and the tool itself within existing organizational standards. Supplemental data types included

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municipal, federal, and census data, and cost analysis data. A parks and recreation professional said:

> One aspect of *ParkIndex* that could make it more useful for an agency [is] to try and have a way for it to be adapted to new streams of data… [Trying] to figure out how to be able to leverage existing municipal data on park amenities and quality across several different jurisdictions.

Data management and integration was a theme throughout as informants discussed potential challenges to creating a valuable, useful tool. One additional theme was finding ways to incorporate park-user data in the tool to provide a "sort of crowd-sourcing way" as one park professional said, to provide information to potential park users.

Feasibility

The topic of feasibility included discussion on factors that could potentially challenge or improve the feasibility of *ParkIndex* as a useful and effective tool. Five themes arose in discussions about potential challenges and three concerning ways to improve feasibility (see Table 2). The issues of variability, in terms of communities, types of parks, and park users, were all key themes when discussing potential challenges. Discussion on variability within communities included issues of culture and race, socioeconomic factors, urban and rural areas, availability of transportation, and regional variations. In relation to the issue of diversity of demographic variables, one parks and recreation professional emphasized the need to pilot test in diverse locations:

> We are becoming a more and more diverse country and just ensuring that this tool is being pilot tested in, for example, a Hispanic community or a primarily African-American community, I think that would add a lot of value to ensuring that it's going to be a useful tool.

Additionally, specific to rural areas, one public health professional said, "How [does the tool] address rural areas? The buffer for a rural area is going to be very different. What is a good distance and how are people in those rural areas getting to the park?"

To address these issues, key informants discussed the importance of acquiring local perspectives beyond local parks and recreation departments and engaging in partnerships with a variety of organizations at national and local levels. Concerning variability of geographic location and proximity, a key informant who works on park design in both research and practice said:

> People are different. Neighborhoods are different. Some of these variables will matter more in some places and less in others … It's not even a matter of raw distances, as it's a matter of how people are able to get around. In places where people have private automobiles and the traffic isn't bad, distance is a very different measure than [other] places.

Other challenges to feasibility included difficulty communicating the measure of *ParkIndex* and integrating it into practice at local levels. Many local parks and recreation departments have limited resources and capacity to integrate new tools and measures. As a parks and recreation professional from a national organization said, "You'll find some people saying,

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'we just don't have the capacity to [implement *ParkIndex*].' They don't have the expertise, the capacity, the time." Additionally, key informants discussed how inconsistent metrics and data formats used across parks and recreation departments can constrain the potential of the tool to establish a national standard.

In response to these challenges, key informants discussed ways to improve the feasibility of *ParkIndex*. The most mentioned solution was ensuring the purpose and capability of the tool is clearly defined. As a public health researcher said, "Think about the purpose of the tool. Who is it going to be use for? What are its uses? And does this score answer those questions or make those objectives clears?" Additionally, the value of partnerships with park agencies, universities, and nonprofits highlighted the need for a variety of perspectives and input from all levels in the development of *ParkIndex*. One key informant who works for a national parks and recreation agency emphasized local-level partnerships saying, "The more you can talk to local-level people, like the parks, the more robust this tool can become." Other informants discussed larger, national park associations, such as the National Recreation and Park Association (NRPA), the Trust for Public Land (TPL), and the National Park Service (NPS). These partnerships, as one informant with experience in both park design and research discussed, allow "everybody [to be] on the same page with what the protocols are" and the partner agency can be that entity "who is going to promote it and get behind it, and be the go-to source." Similarly, the idea of an organization to champion *ParkIndex* was also discussed.

Dissemination

The topic of dissemination focused on potential factors that can negatively or positively influence the dissemination of *ParkIndex*. Three key themes arose concerning factors that could hinder the dissemination of *ParkIndex*, and five themes that could positively influence it (see Table 2). In terms of factors challenging to the dissemination of *ParkIndex*, the most discussed topic was the need to make *ParkIndex* unique, to differentiate it from other tools. As one informant who works at a national parks organization said:

> There are so many tools that are already out there, so just [make] sure that it's fully defined what the intent of the tool is and how it is unique compared to some of the other apps and online tools that are being developed.

Another theme was the division between academia and practice and the tendency of the academy to resist data sharing. Key informants discussed this problem in terms of the amount of time it takes for research to get into the hands of practitioners, as well as some hesitancy on the part of practitioners when research only comes from the academy. As one key informant who has worked in both practice and the academy said,

> I think if it just came from the university, if it was just an academic tool, I think that's going to hinder it because there's a communications break between the academy and practice. There [are] a lot of barriers between information going back and forth, so if it's just coming out as an academic tool, that's going to hinder it.

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Finally, the fact that data will need to be collected and regularly updated to keep the tool current was brought up as a challenge due to resource limitations, particularly at local government levels.

Factors that could positively affect the dissemination of *ParkIndex* include the value of incorporating diverse stakeholders in the project. Related to stakeholders, key informants recommended getting partners involved at the onset of the project and taking advantage of momentum from other projects. Relative to early involvement, a local public health official said,

> I think one of the things that it feels like [the *ParkIndex* team] is doing is making sure from the very beginning that you are getting input from a diverse group of stakeholders so that when you eventually do want to put out the tool to use, there is a diverse group of people who will say "Oh, the people who work in parks provided input on this too, you know, 'my people.'"

A final recommendation to positively influence dissemination of *ParkIndex* was creating a robust digital platform and taking advantage of potential technological platforms. A parks and recreation professional discussing the value of technology said:

> The fact that it could be an app-based tool or web-based tool makes it easier to use, [and] limits paperwork. Today with technology and people walking around with their tools and iPads and things like that just makes it easier for people to actually use the tool if it's based on technology or offers technology.

Discussion

Informed development of *ParkIndex* is critical to the creation of a tool that would allow for evaluation of the potential for park access and use for a given location. Key informants from various parks and public health-related fields identified both unique and valuable opportunities as well as common challenges that accompany the development of a reliable, standardized, park access measurement tool. Crosscutting themes emerged from the four topics of Content, Value, Feasibility, and Dissemination. The need for a parsimonious, standardized measure of park access and potential use was reiterated throughout the interviews. Key informants emphasized that *ParkIndex* should be developed with contributions from a diversity of stakeholders, and as such would be a tool relevant to many different types of end-users, including parks professionals, academics, planners, public health practitioners, community members, and policy makers. Related, equity in upfront data contribution and product web literacy are essential for broad relevancy and use. Finally, *ParkIndex* must be flexible to the diversity of communities and habitats across the United States, and potentially other countries, and adaptable to the rapidly-changing information environment such that new data and sources can be integrated into the tool and not lead to rapid obsolescence.

The topical and intersecting themes point to the need for a definitive metric for parks but also highlight the challenges in developing and disseminating *ParkIndex* to be inclusive and widely usable. Ekkel and de Vries (2017) published a recent review of accessibility metrics to green space and point to several salient findings. First, a meta-analysis of park access and

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health is currently impossible due to the diversity of metrics used in the literature. Second, a variety of data requirements and algorithms (as proposed with *ParkIndex*) are by their nature more complex and thus may alien-ate some users. They concluded, “that ease of use does not equate to usefulness” (p. 219), reinforcing the tenuous balance between rigorous data and input and accessible and beneficial output. Finally, the authors offer that the health-related behaviors and outcomes are many when it comes to park proximity, access, and use, and that tools separated by function may indeed be necessary.

Overall, the interviews and themes offer parks and public health practitioners and researchers—and this specific *ParkIndex* development team—the opportunity to refine and evaluate measures to be included in park access and use tools. This was indeed the purpose of this phase of *ParkIndex* development. Multiple key informants expressed the importance of the journey to the park and the potential both for barriers and healthy opportunities along the route to parks, a finding reinforced by the U.S. Centers for Disease Control and Prevention’s recent National Environmental Public Health Tracking Network (NEPHTN) Access to Parks Indicator (Ussery et al., 2016). A challenge to *ParkIndex* and other indicators of access is the development of tools and guidelines based on urban areas and thresholds of access associated with walking. While walking to local parks is a public health ideal, for many residents this is simply not feasible or safe. Kaczynski et al. (2014) found significantly reduced odds in park use and park-based physical activity when respondents lived in neighborhoods with low intersection density or with high speed roads along their route to the nearest park.

Another content challenge to *ParkIndex* and other park metrics is inclusion of programming. Programming has been found to accentuate and extend the use of parks beyond the physical facilities, but has not been consistently considered and measured when assessing park access, features, or quality (Cohen et al., 2016). Further, programming is ever changing across seasons, staff, and with general trends in recreation (e.g., Tae Bo, Zumba, TRX circuits) (Cohen et al., 2017). Programming may also have associated costs and may be indoor or outdoor activities. Incorporating programming into a tool or metric becomes difficult due to its transience and the limited research into reliable metrics of programming associated with park-based physical activity. For example, is a simple dichotomy of programming (present/not) enough, or is diversity of programming, frequency, length, level of participation, etc., essential for understanding programming’s role in promoting park use, and can this be captured accurately and incorporated into a tool such as *ParkIndex*? Further research is needed to understand how to best capture programming and determine its value within a composite park access and use metric such as *ParkIndex*.

For value and feasibility, much of the discussion with key informants centered on who the end user will be and the importance that this be as many people as possible in terms of professional stakeholders (e.g., park practitioners, public health professionals, researchers), community stakeholders (e.g., politicians, community advocates, families), and a diversity of users across age, gender, race, and ethnicity. Parks serve many functions and thus have many stakeholders (Chiesura, 2004). During the second and subsequent phase of our project, *ParkIndex* will be developed using quantitative access and use data from a representative sample of the general public, but ideally such tools could be tailored to specific user groups

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and population segments. In addition to user groups, there is the potential of *ParkIndex* to be used as a tool for all stages of park development: siting, planning, improvements, resource allocation, maintenance, and advocacy. This could permit users to adjust weighting based on their own specific needs and uses (trail, lighting, restroom, etc.), and develop and evaluate environmental and policy interventions based on *ParkIndex* scores in communities (e.g., the impacts of adding facilities or amenities or improving park proximity or quality). These adaptations respond to documented needs to better inform and engage residents and policymakers about local parks and the features therein (Lackey & Kaczynski, 2009; Macintyre, Macdonald, & Ellaway, 2008; Spotts & Stynes, 1984), as well as to create tools that facilitate interdisciplinary collaboration between researchers and professionals in parks and recreation, public health, planning, real estate, and commerce, among other areas.

As with all research, there are limitations to both the qualitative interviews and to *ParkIndex*'s potential. Key informant interviews were limited to twelve experts, and all but one from the U.S. Though each are community members in their own right, we did not interview non-expert community members, nor frontline park staff (e.g., maintenance). *ParkIndex* will be a score, or index, of park access and use. The index will not be adaptive to community and design challenges external to the park, especially related to perceptions such as safety or objective factors such as land use mix. These limitations notwithstanding, *ParkIndex* is guided by experts from a variety of fields and will incorporate extensive observational, environmental, secondary, and survey data to develop a tool that will be useful to many stakeholders.

A subsequent phase within the broader *ParkIndex* project, informed by the pilot prototype and these key informant interviews, will involve the collection of detailed park access and use data in four diverse communities across the U.S. Specifically, the large, metropolitan centers of Brooklyn, New York, and Seattle, Washington, as well as the more regional cities of Raleigh, North Carolina, and Greenville, South Carolina, will be used to validate and refine a *ParkIndex* model and algorithm for measuring park access for any defined geographic area (e.g., individual addresses, neighborhoods, census tracts, council wards, entire communities, etc.). In each location, a select number of census block groups will be identified based on two dimensions: high or low park availability and high or low household income (based on the median value for each variable in each location). Randomly-selected households within each block group will be sampled and recruited to participate in a detailed survey about use of local parks using an innovative online, map-based survey platform (Maptionnaire.com). Concurrently, all parks within each community will be audited using the Community Park Audit Tool (Kaczynski et al., 2012) to ascertain their detailed facilities, amenities, and quality. This combination of comprehensive park proximity, park attributes, and park use information will prove invaluable for parsing out the specific elements necessary to develop a predictive, yet parsimonious metric of park access useful to a variety of stakeholders.

The key informant interviews described herein provided vital recommendations for ways *ParkIndex* can be improved and leveraged to the benefit of diverse stakeholders. For example, with respect to content, multiple experts suggested examining park access within a half-mile area, which differs from the 1-mile buffer employed around points in the

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ParkIndex prototype developed in Kansas City, MO (Kaczynski et al., 2016). Related to value, multiple innovative suggestions will be adopted in subsequent stages of *ParkIndex*'s development and implementation, including incorporating and engaging park users in the accruement and ongoing refinement of park data through crowdsourcing and using *ParkIndex* to identify park deserts and disparities across communities. For feasibility, key informants emphasized retaining flexibility within the standardized measure to identify or differentially weight elements more relevant to particular regions or research questions. Consequently, *ParkIndex* will be comprised of multiple, integrated components related to park availability and quality. Finally, with respect to dissemination, key informants underscored the need to engage diverse partners, and stakeholders such as parks professionals, researchers, citizens, real estate agents, and medical professionals will continue to be consulted as development progresses. In these ways and many others, data provide from the current key informant interviews provided valuable insights for informing a preeminent *ParkIndex* model and system.

In summary, key informants repeatedly referenced the need, especially within parks and recreation management, for consistent, reliable, and valid measures of park access and use, such as *ParkIndex* seeks to provide. This should be an inclusive process, especially informed by those who would use and benefit from *ParkIndex*. We have attempted to initiate that process here and present our findings related to content, value, feasibility, and dissemination. The expectations, desires, and potential barriers listed herein are not trivial and point to the many ways parks impact our communities and respond to the communities in which they are located. We believe a well-conceived, integrated index will at the very least allow for greater comparison between parks and park systems and at best will facilitate the many park stakeholders to best design, maintain, program, research, and advocate for their local parks.

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Table 1

List of Key Informant Organization and Role

Organization	Role
Active Living Research, La Jolla, CA	Researcher
Centers for Disease Control and Prevention, Atlanta, GA	Community Planner
Deakin University, Melbourne, Australia	Researcher
Design Concepts, CLA, Inc., Denver, Colorado	Park Designer/Researcher
Greenville, South Carolina, Parks and Recreation	Park Professional
National Park Service-Healthy Parks Healthy People, St. Louis, MO	Park Professional
National Recreation and Park Association, Washington, D.C.	Health and Wellness, Park Professional
New York City Department of Parks & Recreation	Park and GIS Professional
Pennsylvania State University, State College, PA	Researcher
Raleigh, North Carolina, Parks, Recreation & Cultural Resources	Park Professional
Seattle and King County, Washington, Public Health	Public Health Practitioner
Trust for Public Land, San Francisco, CA	GIS Professional

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Table 2

Key Themes from Interviews

Questions	Key Themes	
Content of *ParkIndex*		
What park access measures are important for park use?	• Distance to park • Neighborhood • Park characteristics	• Travel mode to park • Route to park • Safety
What are elements of the park important for park use?	• Activity spaces • Quality • Amenities • Programming	• Community engagement • Park management
Value of *ParkIndex*		
How could the development of *ParkIndex* add to your organization/ department/city?	• Park planning and development • Community development • Objective methods	• Consistent, standardized practices
Do you have suggestions for how *ParkIndex* could be improved to better add value to research and/ or practice?	• Clarity in tool's abilities and procedures • Advice on integrating local perspective • Integrate into organizational standards	• Integrating additional data • Park use data
Feasibility of *ParkIndex*		
What challenges do you foresee in developing *ParkIndex?*	• Variability in communities • Difficulty integrating into practice • Inconsistent metrics or data formats	• Variability in park users and types of parks • Communicating the measure
What factor or organizations could improve the feasibility of developing *ParkIndex*	• Defined purpose, capability, data • Partnerships	• Organizational champions
Dissemination of *ParkIndex*		
What factors will negatively influence the dissemination of *ParkIndex?*	• Division between academia and practice • Updating, collecting data	• Differentiating the tool
What factors will positively influence the dissemination of *ParkIndex*?	• Ease of use • Diverse stakeholders • Early involvement	• Good communication • Momentum