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Physical activity of youth in non-urban parks: an observation-based assessment

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Public parks play an important role in healthy, active living, but the extent to which parks influence the physical activity (PA) of diverse youth outside of urban areas has not been adequately explored. This study used systematic behavioural observations to examine demographic factors and environmental attributes associated with youth PA in non-urban state parks of Georgia, USA. Young park visitors ($n = 9072$) were observed in two zones: lakefront and trail/multi-use areas. A majority of youth (67.3%) were observed in a state of either moderate or vigorous physical activity. Demographic variables were associated with PA levels in each zone. In lakefront zones, males, younger children and African Americans were most likely to be active. Activity levels at trails and multi-use areas were highest for white youth and lowest for Latinos. As racial and ethnic diversity increases, efforts to encourage youth PA in park settings should account for distinct recreation preferences among different cultural groups.

Keywords: adolescent health; child health; parks; physical activity/exercise; race/ethnicity

Les parcs publics jouent un rôle important pour mener une vie active et saine; toutefois, l'influence des parcs sur l'activité physique des divers groupes de jeunes en dehors des espaces urbains n'a pas été adéquatement explorée. Cette étude fait appel à l'observation comportementale systématique pour examiner les facteurs démographiques et les attributs environnementaux associés à l'activité physique des jeunes dans les parcs étatiques non urbains de la Géorgie, aux États-Unis. Les jeunes visiteurs du parc ($n = 9,072$) ont été observés dans deux zones: bordure de lac et sentiers/espaces polyvalents. La plupart des jeunes (67,3%) ont été observés dans un état d'activité physique modérée à intense. Les variables démographiques ont été associées au niveau d'activité physique dans chaque zone. Dans les zones en bordure de lac, les hommes, les jeunes enfants et les Afro-américains sont plus susceptibles d'être actifs. Les niveaux d'activités sur les sentiers et les espaces polyvalents sont les plus élevés chez les jeunes blancs et les moins élevés chez les Latino-américains. Alors que la diversité raciale et ethnique augmente, il faudrait consentir des efforts pour encourager l'activité physique chez les jeunes dans les parcs en tenant compte des préférences récréatives des divers groupes culturels.

Mot-clés: santé des adolescents; santé des enfants; parcs; activité physique/exercice; race/ethnicité

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Introduction

Health benefits of regular physical activity (PA) for children and adolescents are well documented (Evenson & Mota, 2011). As a result, efforts to increase youth PA have received substantial attention within and outside of the health community. While studies focused on individual-level correlates of leisure time PA (e.g., internal beliefs and motivations, social relationships) remain important, ecological models of health behaviour increasingly emphasize the powerful influence of physical surroundings and environmental factors on PA (Sallis, Owen, & Fisher, 2008). For example, growing evidence suggests public parks provide outdoor recreation opportunities that may encourage youth PA (Blanck et al., 2012). However, researchers are just beginning to explore the extent to which and the mechanisms whereby parks contribute to youth PA (Gardsjord, Tveit, & Nordh, 2014).

Using various combinations of questionnaires and interviews (Carroll-Scott et al., 2013; Tucker et al., 2009), behavioural observations (Baran et al., 2014; Floyd et al., 2011; Spengler et al., 2011) and objective measurement (Cohen et al., 2006; Ries et al., 2009), many studies – including but certainly not limited to those mentioned above – have demonstrated relationships among neighbourhood characteristics, environmental features of parks and park-based PA among children and adolescents (Ding, Sallis, Kerr, Lee, & Rosenberg, 2011). Research has revealed that the PA patterns and site use preferences of youth differ by demographic factors such as gender, age and race/ethnicity (Baran et al., 2014; Child et al., 2014; Floyd et al., 2011; Kaczynski, Wilhelm Stanis, Hastmann, & Besenyi, 2011). Despite this progress, most investigations of youth PA in parks have focused exclusively on urban settings (Gardsjord et al., 2014; Han et al., 2014), and few have specifically examined physically active leisure participation among different racial/ethnic groups (Mock, Wilson, Smale, & Hilbrecht, 2013; Spengler et al., 2011). Additional research is therefore needed to identify PA correlates in parks that are: (1) located in non-urban areas (e.g., state or provincial parks), where residents are less likely to meet physical activity recommendations (Michimi & Wimberly, 2012); and (2) frequented by a demographically diverse population of visitors. To address this research gap, this study used an observational approach to examine demographic characteristics and environmental attributes (e.g., park facilities and amenities) associated with youth PA levels in non-urban state parks.

Methods

This study focused on three state parks in Georgia, a state whose population consistently ranks among the most inactive and obese in the United States (Centers for Disease Control & Prevention, 2010). All parks were located more than 30 miles from a major metropolitan area, contained similar facilities and attributes (e.g., lake, beach, hiking trails, picnic areas, campgrounds), and, according to anecdotal reports from park managers, attracted racially and ethnically diverse visitors. Data ($n = 9072$ individual youth observed across 217 observation sessions) were collected from May to September 2010 using an adapted version of the System for Observing Play and Recreation in Communities (SOPARC, <http://activelivingresearch.org/soparc-system-observing-play-and-recreation-communities>), a strategy developed by McKenzie, Cohen, Sehgal, Williamson, and Golinelli (2006) for objectively assessing PA in a variety of park-based settings. For more detailed information about the SOPARC implementation procedure, including why and how SOPARC was adapted for use in the state park setting, see Whiting, Larson, and Green (2012).

Observation sessions were scheduled based on a stratified random sampling protocol that ensured equal coverage across days of the week (weekdays and weekends), times of the day (divided into four time intervals: morning, early afternoon, late afternoon and evening), and two different zones within the parks that accounted for a majority of day use: lakefront (including beaches and nearby picnic areas) and trail/multi-use zones (primarily trailheads and adjacent courts and ball fields). A total of 76.6 hours was spent conducting SOPARC observations, with an average observation session length of 8.9 minutes (excluding trailhead observations, which were always 30 minutes). Session length ranged from 1 to 60 minutes, and visitor counts (which included adults) during the sessions ranged from 0 to 501. On average, SOPARC data collection allowed researchers to count 516 people per researcher hour. While scans in each park zone were deliberately scheduled at staggered intervals to minimize the possibility of double counting visitors (e.g., early afternoon scan would not follow morning scan on the same day), some individuals may have been counted multiple times within the same day.

During each SOPARC session, researchers recorded the apparent age (i.e., child, 0–12 years; teen, 13–17 years; and adult, 18 or older; adult observations are not reported in this study), gender, race/ethnicity (i.e., White, African American, Latino, Asian/Other), and PA level (i.e., sedentary, moderate or vigorous) of recreation participants at the moment that they were observed. Categorizations were based on existing SOPARC protocols (Bocarro et al., 2009; Floyd et al., 2011), and PA intensity for various activities were based on estimates provided by Ainsworth et al. (2000) and subjective interpretation of the observers. For example, running and rapid swimming constituted vigorous activity, whereas leisurely walking was classified as moderate and floating on a swim raft was categorized as sedentary. High levels of inter-rater reliability based on 13 paired observation sessions (intra-class correlation coefficients among paired observers ≥ 0.888) indicated agreement among observers for all demographic categories. Demographic differences in overall park-based PA and youth numbers and activity levels within different observation zones were examined using χ^2 tests. Factors predicting the likelihood of an observation being “sedentary” or “active” (i.e., moderate and vigorous activity combined) within park use zones were assessed using logistic regression.

Results

Across zones, 64.4% of observed youth were moderately active and 2.9% were vigorously active. Males, younger children and African American children were observed in an active state more often than other groups of youth (see Table 1). The proportion of children observed participating in PA was highest at trail/multi-use zones (see Table 2). Racial/ethnic ratios of youth observed at each location were also different: 45.1% of children in lakefront zones were white compared to 80.5% of children in trail/multi-use zones (see Table 2).

In lakefront zones, the logistic regression predicting PA level revealed significant effects for gender, age and race/ethnicity, and time of day (see Table 3). Males, children 12 years of age or younger and African Americans were more likely to be active in lakefront areas than children from other groups. At trail/multi-use zones, the only variable significantly associated with PA was being Latino (see Table 3). Youth in this category were less likely to be active in these trailhead or multi-use areas than children from other groups.

Table 1. Demographic distribution of youth observed (% of total) participating in various levels of physical activity (PA) in Georgia State Parks, summer 2010.

Demographic	Observed physical activity level ^a			χ^2 ^b	df	p
	Sedentary (n = 2969)	Moderate (n = 5841)	Vigorous (n = 262)			
Gender				45.38	2	<0.001
Female (n = 4509)	35.0	63.1	1.9			
Male (n = 4563)	30.5	65.7	3.8			
Age				113.89	2	<0.001
Child (0–12 years, n = 6334)	29.3	67.7	3.0			
Teen (13–17 years, n = 2738)	40.7	56.8	2.5			
Race/Ethnicity				56.73	6	<0.001
White/Caucasian (n = 4305)	32.0	64.9	3.1			
Hispanic/Latino (n = 3434)	35.4	62.6	2.0			
Black/Afr. Amer. (n = 1003)	26.1	68.7	5.2			
Asian/Other (n = 330)	34.8	63.6	1.5			

Notes: ^a Proportions reflect pooled sample of all visitors to three focal state parks across all sampling periods.

^b Test of the H_0 : distribution of youth observed at each physical activity did not differ by demographic variable (gender, age, or race/ethnicity).

Table 2. Demographic ratios of youth observed (% of total) in different zones of Georgia State Parks, summer 2010.

Demographic	Park zone ^a		χ^2 ^b	df	p
	Lakefront zones (n = 8462)	Trail/multi-use zones (n = 610)			
Gender			2.86	1	0.091
Female	49.9	46.4			
Male	50.1	53.6			
Age			12.62	1	<0.001
Child (0–12 years)	70.3	63.4			
Teen (13–17 years)	29.7	36.6			
Race/Ethnicity			333.40	3	<0.001
White/Caucasian	45.1	80.5			
Hispanic/Latino	40.1	7.0			
Black/African American	11.4	6.7			
Asian/Other	3.5	5.7			
Activity level			190.17	2	<0.001
Sedentary	34.5	8.0			
Moderate	62.8	86.1			
Vigorous	2.7	5.9			

Notes: ^a Proportions reflect pooled sample of all visitors to three focal state parks across all sampling periods.

^b Test of the H_0 : distribution of use in different park zones (lakefront or trail/multi-use) did not differ by demographic variable (gender, age or race/ethnicity)

The most common activities observed in lakefront zones across all groups of youth were swimming (53% of total youth observed in a physically active state) and walking (27%). Hiking/walking was the most common activity observed for physically active

Table 3. Logistic regression estimates (with standard errors) for factors associated with youth's observed moderate/vigorous physical activity participation in Georgia State Parks, Summer 2010 (dependent variable was the observed activity level where "moderate or vigorous" = 1 and "sedentary" = 0).

Variable	Lakefront zones ^a				Trail/multi-use zones ^b			
	β	SE	OR	Percentage of obs.	β	SE	OR	Percentage of obs.
Constant	0.792	0.091			2.953	0.602		
Park (Fort Mountain) ^c	0.036	0.068	1.04	19.8	0.287	0.456	1.33	47.0
Park (Fort Yargo) ^c	-0.092	0.055	0.91	45.8	-0.346	0.477	0.71	32.5
Day (Weekend/Holiday) ^d	0.037	0.056	1.04	71.9	0.094	0.361	1.10	66.7
Session (Morning) ^e	0.187	0.091	1.21*	12.6	-1.032	0.563	0.36	17.5
Session (Early Afternoon) ^e	-0.107	0.073	0.90	30.2	-0.329	0.557	0.72	36.1
Session (Late Afternoon) ^e	-0.183	0.069	0.83**	40.5	-0.568	0.507	0.57	27.7
Gender (Male)	0.181	0.046	1.20***	50.1	0.560	0.314	1.75	53.6
Age (Teen)	-0.549	0.421	0.58***	29.7	-0.249	0.316	0.78	36.6
Ethnicity (Black) ^f	0.421	0.084	1.52***	11.4	-0.445	0.650	0.64	6.7
Ethnicity (Latino) ^f	-0.039	0.053	0.96	40.1	-1.400	0.483	0.25***	7.0
Ethnicity (Asian/Other) ^f	-0.112	0.127	0.89	3.5	-0.611	0.589	0.54	5.7

Notes: *, ** and *** denote significance of odds ratio (OR) at $\alpha = 0.05, 0.01$ and 0.001 , respectively.

^a % Active = 65.5%; $n = 8462$; Model fit statistics: χ^2 (df = 11) = 207.12, $p < 0.001$, Hosmer & Lemeshow χ^2 (df = 8) = 5.38, $p = 0.717$, Nagelkerke $R^2 = 0.03$.

^b % Active = 92.0%; $n = 610$; Model Fit Statistics: χ^2 (df = 11) = 22.62, $p = 0.020$, Hosmer & Lemeshow χ^2 (df = 8) = 14.61, $p = 0.067$, Nagelkerke $R^2 = 0.09$.

^c Red Top Mountain State Park served as the reference category.

^d Weekdays served as the reference category.

^e Evening observation session served as the reference category.

^f White served as the reference category.

youth in the trail/multi-use zones (75%). Activities observed in trail/multi-use zones differed by race/ethnicity. Hiking and biking were most commonly observed activities for white children whereas African American, Latino and Asian/Other children were more likely to be observed using playgrounds or engaging in team sports such as basketball or soccer.

Discussion

Although previous research has examined the relationship between visitor characteristics and overall PA in US state parks (Mowen, Trauntvein, Graefe, & Son, 2012), few studies have explored interactions among demographic characteristics, distinct site use patterns and youth PA. This study showed that, similar to urban-proximate park environments, a majority of youth were active during visits to non-urban state parks. The observed PA participation differed slightly across demographic groups. Males were typically more

active than females, supporting findings in studies of urban park users (Cohen et al., 2007). Younger children were more active than teens, which may partially help to explain weak relationships between adolescent PA and rural park access documented by previous research (Babey, Hastert, Yu, & Brown, 2008). Contrary to findings of studies of urban youth (Spengler et al., 2011), race/ethnicity was significantly associated with children's overall PA during park visits. Racial/ethnic minorities, particularly African Americans, generally were more physically active in state parks than white youth. Our findings suggest that efforts to enhance the accessibility of non-urban parks to racial/ethnic minorities could lead to higher levels of PA for these groups, who typically face more structural (e.g., cost, access) and social constraints (e.g., concerns about safety, support from others) to recreation (Beaulac, Bouchar, & Kristjansson, 2009; Carver, Timperio, & Crawford, 2008; Zanon, Doucouliagos, Hall, & Lockstone-Binney, 2013) and are at a higher risk of physical inactivity and associated health consequences than other segments of the general population (Sallis, Prochaska, & Taylor, 2000).

Results indicated that young children were more active in lakefront zones, which typically provide key amenities such as playgrounds and picnic areas that facilitate family-oriented outdoor recreation. These amenities may be especially attractive to racial/ethnic minority youth (Larson, Whiting, Green, & Bowker, 2015), who were observed more frequently than white youth at the lakefront zones. Considering a majority of state park visitors were white, proportional differences in observed use of lakefront zones for Latinos and African American youth were even more pronounced. The opposite pattern was observed in the trail/multi-use zones, where white youth were more commonly observed and more active. Similar cultural differences have been observed in studies of adults using parks, with African Americans and Latinos consistently displaying an affinity for social activities in developed settings (Gobster, 2002). As the population grows and becomes more racially and ethnically diverse, efforts to encourage youth park-based PA should acknowledge and account for these distinct patterns and preferences of leisure behaviour and their implications for health and well-being (Mock et al., 2013).

Future research could address several limitations of the present study. First, SOPARC observations only accounted for researcher-categorized PA levels at the precise moment of sampling, yielding few details about activity frequency and duration throughout the visit. For example, a child who engaged in vigorous activity during most of his/her park visit might have been in a sedentary state at the time of observation. Longitudinal observations of individual youth or objective measures of activity budgets throughout an entire park visit could help to mitigate this potential problem (Evenson & Mota, 2011). Second, the delimitation of this sample to summer state park visitors in north Georgia may constrain inferences to other seasons and geographical areas, including parks that offer different types of facilities and amenities. Finally, a more comprehensive approach involving a comparative sample of non-visitors is needed to determine the relative contribution of state parks to youth's overall PA.

Despite these limitations, this study used an innovative observational approach that could be used to supplement conventional surveys and self-reported measures, thereby providing new insights into relationships among demographic characteristics, site use patterns and PA in a state park setting. Enhanced knowledge of the physically active recreation behaviour of children and adolescents in different types of parks could help to inform ecological models of health promotion that explicitly acknowledge the influence of the built environment (including but not limited to parks) on youth PA across diverse urban and non-urban communities.

Disclosure statement

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