

Park Improvements and Park Activity

A Natural Experiment

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Background: Parks are an important setting for leisure-time physical activity. Understanding how to attract residents to parks and encourage park users to be physically active is an important public health initiative. Natural experiments are a research priority for investigating whether changes to the physical environment affect physical activity; however, natural experiments involving parks have rarely been conducted.

Purpose: This natural experiment examined whether improvements to a park in Victoria, Australia, increased its use and park-based physical activity of users.

Methods: Observational data were collected on park use and park-based activity among park users at the intervention park and a control park at three time points; baseline (T1, August 2009); post-improvement (T2, March 2010); and 12 months after baseline (T3, August 2010). At each time point, observations were undertaken during three 1.5-hour periods each day on 9 days. Analyses were conducted in 2011.

Results: In the intervention park, there were significant increases from pre- to post-improvement in the number of park users (T1=235, T3=985) and the number of people observed walking (T1=155, T3=369) and being vigorously active (T1=38, T3=257). At the control park, counts of usage decreased over the same period and no differences in walking or vigorous activity were observed.

Conclusions: Improving the features of a local neighborhood park may lead to increased usage and physical activity.

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Introduction

Exposure to parks has a positive effect on health,^{1,2} and parks are important settings for physical activity.³ It is important to understand how to attract residents to parks and encourage park users to be physically active, particularly in disadvantaged neighborhoods where residents are at an increased risk of inactivity and associated poor health.^{4–6} Observational studies in the U.S. have shown that more than half of park users engage in sedentary behavior (i.e., primarily sitting) in the park.^{7,8} Further, park aesthetics and specific features have been shown to be associated with park visitation and physical activity within the park.^{9–12}

Natural experiments are a research priority for investigating causal associations between the built environment and

physical activity.¹³ Because of the financial costs and logistic challenges, research in this area is scarce,^{14,15} and few studies have focused on neighborhood parks.¹⁶ An opportunity to conduct a natural experiment in Victoria, Australia, presented through collaboration with a local government that was planning to improve a neighborhood park. This represented an opportunity to examine whether improvements to park facilities and amenities led to changes in (1) park use; (2) the active (or sedentary) nature of activities undertaken in the park; and (3) whether any observed changes were maintained over time.

Methods

A park was refurbished (intervention park) and identical measures were conducted at the intervention park (size: 25,200 m²) and a control park (size: 10,000 m²) before and after park refurbishment. Pre-refurbishment, the intervention park was primarily an open space area with few amenities. The refurbishment took place in November–December 2009 and included the establishment of a fenced leash-free area for dogs (12,800 m²); an all-abilities playground; a 365-m walking track; a barbecue area; landscaping; and fencing, to prevent motor vehicle access to the park. The control park was selected based on being located within the same neigh-

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borhood as the intervention park and having similar features at baseline. The neighborhood was within the most-disadvantaged decile in the state of Victoria according to the 2006 Socio-Economic Index for Areas (SEIFA) index of relative socioeconomic disadvantage.¹⁷ Ethics approval was granted by the Deakin University Human Research Ethics Committee.

Measures

The System for Observing Play and Recreation in Communities (SOPARC) has been shown to be a reliable observation instrument for assessing physical activity in community settings¹⁸ such as parks.^{7,8,19} In the current study, trained observers used a modified version of SOPARC to characterize park users according to gender; age group (2–4 years, 5–18 years, and adult); and the activity in which they were engaged (sedentary [lying down, sitting, standing], walking, or very active [vigorous]). Because of the size of the parks, it was possible to observe all users at one time point and therefore scans were conducted for the entire park and not target areas.

Observations were conducted every 15 minutes (or seven times) during three 1.5-hour periods on each day of data collection; morning (7:30AM–9:00AM), midday (11:30AM–1:00PM), and afternoon (3:30PM–5:00PM). Data were collected for 9 days (spread over 4 weeks), including 5 weekdays and 4 weekend days. This resulted in a total of 27

observation periods of 1.5 hours each, at each park. Observations were completed at three time points: baseline/pre-intervention (T1: August–September 2009); following park improvement (T2: March–April 2010); and 12 months after baseline (T3: August–September 2010). The scheduling of the observations was consistent across the three time points.

Statistical Analyses

Park counts were collected during 25 observation sessions for the intervention park at T1 and 27 observation sessions at T2 and T3, and for all time points for the control park. Counts of the total number of people using the park and the number of people walking and being vigorously active were positively skewed and transformed with square root or logarithmic transformations. Two-way ANOVAs examined the effects of park (intervention vs control) and time point (T1 vs T2 vs T3) on the total number of people observed in the park, and the number of people walking and being vigorously active. Analyses were conducted in 2011.

Results

Table 1 shows the counts of park users. There was a significant interaction between park and time for the

total counts of park users, $F(2, 154)=14.99$, $p<0.0005$; counts of people walking in the park, $F(2, 154)=11.70$, $p<0.0005$; and counts of people being vigorously active, $F(2, 154)=4.98$, $p=0.008$. At the intervention park, there were more people observed in the park at T2 and T3, compared to T1; however, at the control park, there were fewer people observed at T3 compared to T2 and no differences between T1 and T2. At the intervention park, there were more people observed walking at T3 compared to T1 and T2; and more people being vigorously active at T3 compared to T1, with no differences between T1 and T2. At the control park, there were no differences in walking and vigorous activity among the three time points (Figure 1).

Table 1. Descriptives of counts of park users *n*, from park observations

	Intervention park			Control park		
	T1 ^a	T2	T3	T1	T2	T3
Total number of counts of users	235	582	985	83	114	51
Male	130	330	517	43	47	30
Female	105	252	468	40	67	21
Age (years)						
2–4	14	89	65	1	4	1
5–18	57	122	359	14	13	2
>18	164	371	561	68	97	48
Time of day						
7:30AM–9:00AM	34	193	167	23	42	19
11:30AM–1:00PM	68	122	377	21	28	15
3:30PM–5:00PM	133	267	441	39	44	17
Weekdays	106	249	477	45	61	22
Weekend days	129	333	508	38	53	29
Activity levels						
Lying down/sitting	6	119	61	0	4	0
Standing	36	131	298	3	17	0
Walking	155	195	369	75	92	51
Vigorously active	38	137	257	5	1	0

Note: T1=August 2009; T2=post-improvement, March 2010; T3=12 months after baseline, August 2010.

^a25 observations were completed at T1 at the intervention park; 27 observations were completed at all other time points.

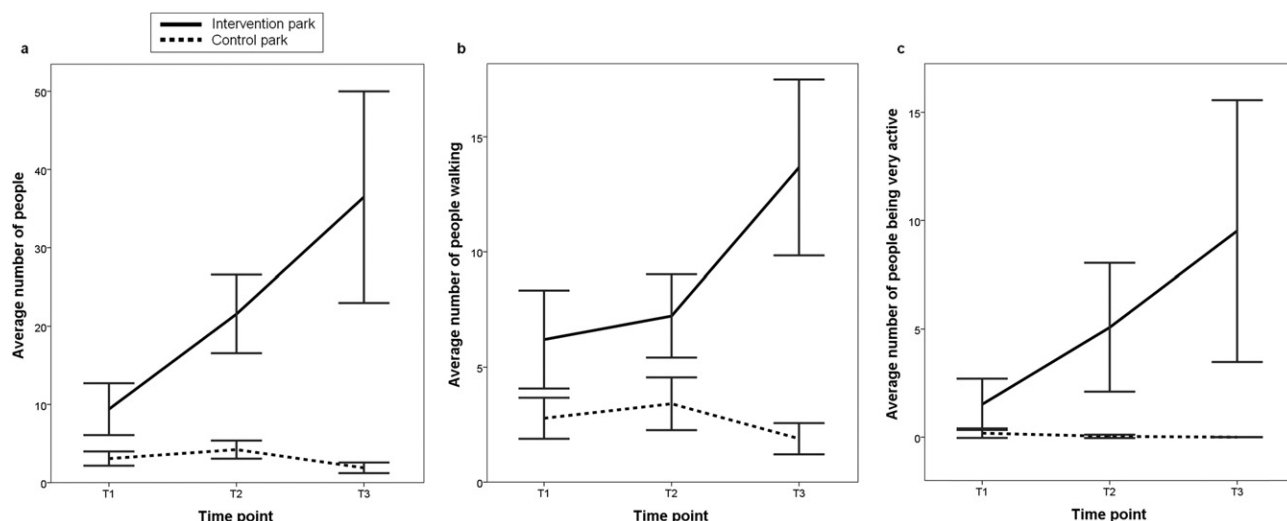


Figure 1. Average counts of people observed at intervention and control parks: (a) overall; (b) walking; and (c) being vigorously active

Note: Averages are per 1.5-hour observation period. Lines show mean counts. Error bars show 95% CI of means. T1=August 2009; T2=post-improvement, March 2010; T3=12 months after baseline, August 2010

Discussion

The current study demonstrated that improving an existing park resulted in an overall increase in park use across genders and all age groups, and an increase in the counts of park users walking and being vigorously active. Importantly, increases were observed immediately post-intervention, with further increases observed at T3, demonstrating that visits to the refurbished park continued to increase over time. The current results are consistent with U.S. studies^{14,15} that observed increases in visitors and physical activity after improvement of sporting playfields and greenways/trails, respectively. A Canadian study⁹ found that park features, but neither size nor distance, are associated with physical activity in parks.

Limitations and Strengths

The study findings are limited to one intervention and control park. In addition, although the control park had similar features to the intervention park at baseline, it was smaller (by more than 50%); however, after adjusting for park size, the results remained unchanged. Observational scans were conducted for the entire park at one time and not target areas; therefore, it is not possible to associate increases in park use to any particular areas such as the playground. Also, it was not possible to determine whether park use increased among original park users or whether new users and residents from other neighborhoods were attracted to visit the refurbished park. Strengths include the incorporation of a control park, the objective measurement of park use, and the three measurement time points (two of which were after park im-

provement), which enabled maintenance of changes in park use to be observed.

Conclusion

Future studies may benefit from including multiple parks of different sizes and in neighborhoods of varying SES; examining which elements of park improvement make the greatest difference to park use and physical activity and whether specific improvements target use by different population groups; and whether the overall physical activity levels of park users actually increased or whether the park-based activity displaced activity that was previously undertaken at an alternative setting. The present study provides evidence that park renewal has the potential to positively influence park use and park-based physical activity. The findings have implications for future park-renewal projects and can assist urban planners and designers to develop parks that attract users and facilitate greater levels of physical activity.

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