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Park improvements increase park activity: A natural experiment

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Abstract

**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 impact 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 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 (2009), and post-improvement and 12 months after baseline (2010). At each time point, observations were undertaken during three 1.5 hr periods each day on nine days. Analyses were conducted in 2011.

**Results:** In the intervention park there were significant increases post-improvement in the number of park users and the number of people observed walking and being vigorously active. At the control park, counts of usage decreased over the same period and no differences in walking or vigorous activity were observed.

**Conclusion:** Improving the features of a local neighborhood park may lead to increased usage and physical activity. Future research should explore the impact of structural modifications further in diverse neighborhoods and parks.
Introduction

Exposure to parks has a positive effect on health,\(^1\) 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.\(^6\) (+ another ref) Observational studies in the US have shown that more than half of park users engaged in sedentary behaviour (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,\(^9\) 10-11 (ALR)

Natural experiments are a research priority for investigating causal associations between the built environment and physical activity\(^12\). Due to the financial costs and logistical challenges of conducting natural experiments, research in this area is scarce\(^13\) 14 and few studies have focused on neighborhood parks.\(^15\) An opportunity to conduct a natural experiment in Victoria, Australia presented through collaboration with a local government who were 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 25,200m\(^2\)) and a control park (size 10,000m\(^2\)) pre- and post park refurbishment. Pre-refurbishment, the intervention park was primarily an open space area with few amenities. The refurbishment took place between November-December 2009 and
included the establishment of: a fenced leash-free area for dogs (12,800m²); an all-abilities
playground; a 365m walking track; BBQ area; landscaping; and, fencing to prevent motor
vehicle access to the park. The control park was selected based on being located within the
same neighborhood 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 Socio-economic
Disadvantage.\textsuperscript{16} Ethics approval was granted by the Deakin University Human Research
Ethics Committee.

Measures
SOPARC (System for Observing Play and Recreation in Communities) has been shown to be
a reliable observation instrument for assessing physical activity in community settings\textsuperscript{17} such
as parks.\textsuperscript{7-8, 18} In the current study, trained observers used a modified version of SOPARC to
characterize park users according to sex; age groups (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]. Due to the size of the parks it was possible to observe all users at
the one time and therefore scans were conducted for the entire park and not target areas.
Observations were conducted every 15 minutes (or 7 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-5pm). Data were collected for nine days (spread over 4 weeks) including
five weekdays and four weekend days. This resulted in a total of 27, 1.5 hr observation
periods 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. In 2011, 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.

| Insert Table 1 Here |

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 = .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 significant differences in walking and vigorous activity between the three time points.

| Insert Figure 1 Here |
Discussion

This study demonstrated that improving an existing park resulted in an overall increase in park use for both males and females, and across 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 park continued to increase over time. Our results are consistent with US studies that observed increases in visitors and physical activity after improvement of sporting playfields and greenways/trails respectively\(^{13-14}\) and a Canadian study that found park features, but neither size nor distance to be associated with physical activity in parks\(^9\).

This research is important, however, the study findings are limited to one intervention and control park. In addition, whilst the control park had similar features to the intervention park at baseline, it was smaller (by more than 50%), however, after adjusting our analyses for park size, results remained the same. Observational scans were conducted for the entire park at the one time and not target areas; therefore, it is not possible to associate to any increases in park use to particular areas such as the playground. We were also unable to determine whether park use increased among original park users or whether new users and residents from other neighbourhoods 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 post park improvement, which enabled maintenance of changes in park use to be observed.

Future studies may benefit from including multiple parks of different sizes and in neighborhoods of varying socio-economic status; 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.

This 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 will assist urban planners and designers to develop parks that attract users and facilitate greater levels of physical activity.

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References


Figure 1. Average counts of people observed at each observation period (a) overall, (b) walking, and (c) being vigorously active at intervention and control parks.