



A Mixed Method Study to Inform the Implementation and Expansion of Pop-Up Parks for Economic, Behavioral, and Social Benefits

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Abstract The availability of parks and urban green spaces has been associated with a number of benefits, including increased physical activity, improvements in mental health, increases in social interactions, improvements to the environment, and increases in property values. The installation of temporary pop-up parks in urban areas is one way for urban communities to obtain

these benefits. In this mixed-methods study, quantitative and qualitative data were gathered by researchers, the city council, a local investment company, and community residents that informed the initiation, iteration, and incremental expansion of a series of temporary, summer pop-up parks in the downtown business district of the City of Los Altos in Northern California over a 4-year period (2013–2016). Results showed that the parks were visited by a large, multigenerational group of users who engaged in leisure-time physical activity, shopped at local stores, attended programmed events, and socialized with others. Direct observation and survey data gathered in year 2014 also indicated that foot traffic into businesses directly fronting on a pop-up park ($n = 8$) was higher during a 4-day period when the park was in place, as compared to a similar 4-day period before the park was installed. The majority of downtown business owners/managers reported no decrease in sales compared to the month before the pop-up park was installed. City sales tax data indicated increases in year-on-year sales tax revenue in the summer quarter of 2014 and 2016 compared with the year (2015) when there was no downtown pop-up park. Perspectives of community residents collected before, during, and after the installation of the pop-up parks indicated that the pop-up park created a vibrant space in an otherwise underutilized area that was enjoyed by a variety of people in a host of ways (e.g., children playing, families relaxing, people shopping and eating at downtown stores and restaurants, people of all ages attending scheduled park events). These results informed a number of discussions and meetings between key stakeholders about the pop-up

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parks, culminating in a temporary park that was held in a new location in 2017 that was substantially larger in size, installed for a longer time period, cost more, and had more scheduled park events. Results from this prospective investigation of the initial impacts of pop-up parks in this urban location provide insights regarding the potential benefits and viability of such temporary parks for residents and businesses alike.

Keywords Pop-up parks · Mixed-methods study · Citizen science · Public-private partnerships · Physical activity · Economic development

Introduction

The availability of parks and urban green spaces has been associated with a number of benefits, including high self-rated health, increased physical activity and social interactions, improvements in mental health, as well as improvements to the environment and increases in property values [1–5]. However, the availability of parks and urban green spaces is often constrained due to limited physical space in urban environments, competing demands for space, lack of funding to develop and maintain these resources, complicated city processes and politics, and inequitable accessibility [6]. To respond to these challenges, various approaches have come forth over the past 10 to 15 years. One such perspective, called tactical urbanism, uses low-cost, short-term, and scalable interventions and policies to achieve neighborhood built environment changes. *Tactical urbanism* makes use of open and iterative development processes, the efficient use of resources, and the creative potential unleashed by social interaction [7]. It is used by a range of entities, including governments, for-profit and nonprofit organizations, citizen groups, and individuals. *Participatory urbanism* is a complementary approach to park and green space development, which is comprised of community-driven actions that are typically small, incremental, low cost, and can be implemented in a short time frame [8]. In essence, community residents act as agents of change by collecting and sharing information about their local community via mobile technologies [9].

Examples of parks and urban green spaces include pop-up parks, pocket parks, and open streets initiatives. Pop-up, or temporary parks, are often located in urban areas where traditional parks would seldom

exist, for example, in town squares or plazas, on closed off city streets, in parking lots, and on vacant land [10, 11]. They incorporate concepts from both tactical and participatory urbanism as they are short-term, low-cost, and scalable interventions that require the coordination and collaboration of multiple stakeholders (e.g., local government, civic organizations, local businesses, and community residents). Similar to traditional parks, pop-up parks offer a place for residents to congregate and engage in leisure pursuits and may ameliorate poor health and enhance well-being by providing places for people to be physically active, be outdoors, and engage with others. Pocket parks are similar to pop-up parks in that they are usually small; however, pocket parks are permanent spaces. Despite being small in size, evidence shows that as much or more physical activity can occur in pocket parks as in traditional larger parks [12]. Open streets initiatives in which streets are temporarily closed to motorized vehicles to prioritize physical activities such as walking and cycling have been associated with numerous benefits, including positive economic impacts for local businesses. For example, in one study conducted in San Diego, 81% of attendees reported purchasing food and drinks and shopping at local stores. Businesses that held promotional activities at the open street event, such as setting up tables, providing live music, giving away promotional goods, and offering items for sale reported increased revenue on the open street Sunday compared to typical Sundays [13]. Parks that also provide recreational programming have been found to be more effective at promoting physical activity than park access alone [14].

Relative to traditional parks, the scientific literature on pop-up parks is an emerging area of interest. This publication is an extension of previous pop-up park research carried out by our team [15]. Our initial work focused on two pop-up parks that were implemented in one location of the downtown business district of Los Altos, California, during the summer of 2013 and 2014. The research aims of this early work were to (1) quantify overall and active use of the pop-up park, (2) describe overall patterns of pop-up park utilization, and (3) identify the effect of the pop-up park implementation on individual and community-level outcomes (time spent outdoors, time spent downtown, time spent in front of a screen, time spent at a park). Characteristics of the pop-up

parks and users' physical activity within the pop-up parks by gender, age group, race/ethnicity, time of day, weekend vs weekday, and target area of the park were described. Key findings indicated that the pop-up park attracted a multigenerational group of users; park use remained high during most hours of the day; among all users, children and adolescents were most likely to be physically active at the pop-up parks, and finally that the presence of the pop-up park was associated with decreased screen-time, increased likelihood of being in the downtown area, and increased overall park time use.

Gaps in our prior research that are addressed in this current paper include (1) describing longitudinal patterns of use of the Los Altos pop-up parks over a 4-year period, (2) identifying characteristics and perceptions of pop-up park users, (3) determining the impact on local businesses of pop-up park implementation, and (4) documenting the perceptions of pop-up park organizer key informants. This paper aims to compile critical information about the scale-up process and sustainability of the Los Altos pop-up park initiative, to help replicate this type of public-private partnerships in other cities around the world for enhancing access to parks. For the purposes of this publication, we use the definition of pop-up parks put forward by tactical urbanists: the “temporary or permanent transformation of underutilized [urban] spaces into community gathering areas through beautification.” [16].

Study Design and Conceptual Framework

A mixed-methods approach integrating quantitative and qualitative data was utilized to provide greater insights than would have been achieved by either method alone [17]. Both quantitative and qualitative data were collected from and by park users, local business owners, and city administrators. Findings from the convergent qualitative and quantitative data gathered in the first year of the study (2013) were added to in both an exploratory and explanatory sequential approach in 2014. The exploratory data gathering process enabled an exploration of the impact of the pop-up parks on local businesses. In contrast, the explanatory data gathering process enabled the identification of park user “citizen scientists” perceptions about pop-up parks [18]. Key longitudinal data were gathered again in 2016 and data were merged for analysis.

Methods

Study Setting and Pop-Up Park Installation Timeline: Los Altos, California




The city of Los Altos is located along the peninsula of the San Francisco Bay, CA. The 2017 population estimate of Los Altos was 30,743, with a median age of 45.7 years, median household income of approximately \$187,656, a high educational attainment level with 98% having graduated high school or higher, and ethnicity that is predominantly white (65.9%) or Asian (27.3%) [19].

For 6 weeks in July and August 2013, a large-scale construction project in the City of Los Altos necessitated the closure of a city block (~8200 ft²) to traffic. Rather than leave this space unused and to mitigate the effects of the downtown construction on local businesses and residents, the city of Los Altos, in partnership with a locally owned investment company, converted the closed street into a temporary pop-up park during the 6-week period (location A). Artificial turf, chairs, tables, and shade umbrellas were installed, and a number of planned activities were hosted daily with special events in the evenings. In May and June 2014, the same city block was closed again while the construction work was finalized and, again, the street was converted temporarily into a pop-up park with limited programming for 3 ½ weeks (location A). The popularity of the park led to the installation of another temporary pop-up park 2 months later in August 2014 located a few blocks away from the previous pop-up park (location B). The park in the second site (location B) was ~2300 ft² and was constructed independent of any city construction activities. In 2015, there was no pop-up park installation due to city-wide road repair work. In 2016, however, the temporary pop-up park was re-installed in the smaller location B (~2300 ft²) for 2 ½ weeks in August. The installation timeline, features, programming, funding, and progression of parks are summarized in Table 1.

Data Collection

The multivariate measurement battery included several different levels of measurement (i.e., individual, organizational, environmental), types (i.e., self-report, observational, electronic data capture), and sources (i.e., collected by researchers vs. collected by businesses or

Table 1 Progression and expansion of temporary pop-up parks in Los Altos

			
Size			
Location A (State St) Green space (8,200 ft ²) Skate park (2,700 ft ²)	Location A (State St) Green space (8,200 ft ²) Skate park (2,700 ft ²)	Location B (Third St) Green space 2,300 ft ²	Location B (Third St) Green Space 2,300ft ²
Timing and Duration			
July–August 2013 6 weeks	May – June 2014 3.5 weeks	August 2014 4 weeks	August 2016 2.5 weeks
Programming			
20 events including free concerts, children’s entertainment, exhibits and festivals	Limited programming including, live music	Limited programming including, live music, arts and craft classes	Live music, movie screenings, events for teens, exercise classes, bike safety inspections, ice-cream social
Logistics			
<ul style="list-style-type: none"> • City staff: early planning, installation, daily support, restoration to non-park state • Installation and management: City Public Works, Economic Development, Public Information and Recreation • City of Los Altos, CA: provision of performance stages, barricades, signs and power • Locally owned investment company: provision of artificial turf, outdoor furniture, specialty play pieces, rolling planters, website hosting • Skate shop: provision of skate park equipment • Several downtown merchants: special programming 	<ul style="list-style-type: none"> • City Council: supported the return of the green on a smaller scale • Locally owned investment company: provision of artificial turf, outdoor furniture, and light programming 	<ul style="list-style-type: none"> • Special event planning company: contracted to cover infrastructure, set up, daily clean-up, security, insurance, programming of six key events. • Steering Committee formed to provide input and direction 	
Funding and Resources			
<ul style="list-style-type: none"> • \$250,000 • Locally owned investment company covered capital expenses of park • City managed the installation, ongoing maintenance and programming of events and activities • Events were predominantly funded by the locally owned investment company, sponsored by the City and downtown merchants and were held at no direct cost to the City 	<ul style="list-style-type: none"> • \$50,000 • Locally owned investment company paid for installation, maintenance, removal costs, planning and management of special events and activities 	<ul style="list-style-type: none"> • \$60,000 • Locally owned investment company paid for same expenses as in 2014 and the City contributed \$5,000 	

No park in 2015 due to city-wide road repair work

residents themselves). The array of measures used to answer each research question are summarized in Table 2 and described below.

System for Observing Play and Recreation in Communities (SOPARC) The validated direct observation

System for Observing Play and Recreation in Communities (SOPARC) was used to measure physical activity and user characteristics in the pop-up parks in location A in 2013 and 2014 [20]. SOPARC observations were conducted every hour from 7 AM to 8 PM on two randomly selected weekdays,

Table 2 Research questions, data gathered, and timeline of study of pop-up parks in Los Altos

Research questions	Type of data	Instrument/methods	Data collected	Location (year)			
				A (2013)	A (2014)	B (2014)	B (2016)
Describe patterns of use of pop-up park	Quantitative	System for Observing Play and Recreation in Communities	Observation of physical activity in public spaces	✓	✓	✓	✓
Describe characteristics and perceptions of pop-up park users	Both qualitative and quantitative	Park user intercept surveys	Perceptions of park users	✓	✓		✓
		Park user citizen scientist data collection of audio narratives and photos via a mobile app	Before, during, and after perceptions of the pop-up park by local citizens			✓	
		On-line survey data collected by locally owned investment company	Perceptions of the public about the pop-up park			✓	
Determine impact on local businesses of pop-up park implementation	Both qualitative and quantitative	Local business owner/manager survey	Downtown business owners/managers' perceptions	✓			
	Quantitative	Direct observation of business foot traffic	Foot traffic into businesses facing onto the pop-up park		✓		
	Quantitative	Sales tax data collected by city government	Objective data about the effects of the pop-up park on business revenues	✓	✓	✓	✓
Explore perceptions of pop-up park organizer key informants	Qualitative	Key informant interviews	Park organizers' perceptions				✓

and one Saturday and one Sunday during a randomly selected week [21]. SOPARC observations were conducted separately for each target area of the park (i.e., a designated skate park area and a green space). In location B in 2014 and 2016, SOPARC was also used with observations being conducted at 10 am, noon, 4 pm, and 7 pm on four consecutive days (i.e., Thursday through Sunday). In both years, the 4-day observation period was conducted during the mid-point of park duration. At each time point, the researchers adhered to the SOPARC protocol by observing and recording all park users' physical activity levels (sedentary, moderate, or vigorous) and demographics (gender, age group, and race/ethnicity). To ensure the highest quality data possible, research assistants were trained, prior to

the commencement of the research activities, to gather SOPARC data using standardized protocols [22]. Additional information on the SOPARC protocol, and rater standardization process used for this study, are available in our previously published manuscript [15]. In addition, SOPARC experts on the study team (JAB, DS) conducted periodic in-field quality control checks to ensure best practices were being followed.

Park User Intercept Surveys Trained data collectors administered intercept surveys to pop-up park users using a standardized protocol on the same days as SOPARC observations during 2013 and 2014 (location A) and 2016 (location B) [22]. Surveys were interviewer-administered in English. Data collectors

recorded the respondents' gender, age group (child, adolescent, adult, older adult), and race/ethnicity (white, Black, Latino, Asian, other) based on direct observation. At location A, park user intercept surveys were conducted every hour between 7 am and 8 pm, and at location B in 2016, the intercept surveys were conducted at 10 am, noon, 4 pm, and 7 pm. The same questions were asked on all occasions to gather demographic information and information about pop-up park use and perceptions (resident's reason for visiting the park, what he/she would be doing if the park was not there, how much time the person planned to spend in the park that day, and what he/she liked most/least about the park). Some of the questions had categorical response options and others were open-ended.

Park User Citizen Scientist Data Collection of Geo-Tagged Audio Narratives and Photos via a Mobile App To better understand local residents' perceptions about the installation of the pop-up parks, additional explanatory sequential qualitative data gathering was conducted in 2014 (location B). Specifically, following a brief training by members of the research team, nine community resident volunteers conducted an assessment of the park space using a hand-held computer tablet and the Stanford Healthy Neighborhood Discovery Tool [18] app to record photographs and audio narratives about their perceptions of the space before, during, and after the park was in operation. The Discovery Tool is an easy to use mobile environmental assessment app that allows community resident "citizen scientists" to capture neighborhood features by taking geocoded photos and recording audio narratives. Data were gathered on the same day of the week and the same time of day for each of the observation periods.

On-Line Survey Data Collected by Locally Owned Investment Company In the month following the pop-up park at location B during 2014, the locally owned investment company that sponsored the initial pop-up parks conducted an on-line survey via their Facebook account to collect community member data on pop-up park visitation frequency, details about when the visits to the pop-up parks occurred, what they did at the park, how often they visited the downtown area, whether or not they thought the pop-up park attracted people to downtown, if spending time at the park made them more inclined to visit local shops and/or restaurants, how they heard about the pop-up park, if they would like to see

the pop-up park rolled out again in the future, and open-ended questions on what they liked most about the pop-up park and what could be improved.

Local Business Owner/Manager Survey At location A during the summer of 2013, the researchers gathered survey data from owners, managers, and employees of all 95 street-level businesses in the 8-block shopping district of downtown Los Altos, CA (i.e., this included both businesses fronting the pop-up park location, as well as all other businesses in the remaining blocks composing the central business district of downtown Los Altos). These data were collected because of concerns that had been expressed to the Los Altos City Council that a pop-up park may hurt local businesses during its operation period, and because some park users expressed similar concerns about the effect of the pop-up park on local businesses when responding to the open-ended questions in the intercept survey. Local business owners/managers were asked to report changes in sales and foot traffic compared with the previous month (with no pop-up park) and with the same time the previous year.

Direct Observation of Business Foot Traffic Due to the concerns regarding the potential harmful impact of the pop-up park on local businesses, additional exploratory sequential quantitative data gathering was conducted in 2014. Specifically, trained researchers observed and counted the number of individuals entering into eight retail stores that bordered the location A pop-up park during the observation periods. The stores were an art gallery, skate shop, bookstore, pet shop, restaurant, nail salon, coffee shop, and print shop. Data were collected between 7 am to 10 am, 11 am to 2 pm, and 4 pm to 7 pm on four consecutive days (i.e., Thursday through Sunday) without the pop-up park, and 2 weeks later during a similar period with the pop-up park.

Sales Tax Data Collected by City Government Sales tax data routinely collected by the city of Los Altos was analyzed by Los Altos city staff to determine the financial implications of the pop-up parks for local businesses.

Key Informant Interviews In 2017, structured interviews were conducted by members of the research team with City of Los Altos officials and the Executive Director of the locally owned investment company that

initiated and funded the first pop-up parks. The purpose of these interviews was to obtain a deeper understanding of the benefits and challenges experienced by the public-private partnership in implementing the pop-up parks. Questions were crafted to gather information about challenges faced in this public-private partnership, unexpected benefits, lessons learned, and future possibilities.

Data Analysis

SOPARC Data SOPARC data collected for each 4-day observation period in 2013, 2014, and 2016 was summarized as follows: total number of park users, number and percent of park users by gender, age group, race/ethnicity, park target area (green space vs. skate park where applicable), weekend vs. weekday, and activity level (sedentary, walking, and vigorous activity). The average number of total and physically active park users and their distribution by age group were calculated by time of day.

Park User Intercept Survey Data Categorical data gathered in the park user intercept surveys in 2013, 2014, and 2016 that was summarized included demographics and park use frequency, duration, and timing. An inductive coding approach was used to code the open response data in the park user intercept surveys [23]. Our team conducted a thematic analysis of the open-ended data on reasons for visiting the park, what people would have been doing if they were not at the park, what people liked most and least about the park, and what they thought generally about this type of initiative. Descriptive statistics (percentages) were calculated for the identified themes, for example, to identify the main reasons park users provided for visiting the pop-up park.

Park User Citizen Scientist Data Collection of Audio Narratives and Photos via a Mobile App Percentages were calculated to summarize citizen scientist demographics, including gender, age range, and race/ethnicity. Qualitative data were transcribed verbatim to assess perceptions about the city block/space used for park implementation, before, during, and after the pop-up park installation.

On-Line Survey Collected by Locally Owned Investment Company Quantitative data gathered by the locally

owned investment company via an on-line survey was summarized as follows: frequency and timing of park use, activities undertaken while at the park, frequency of visits to the downtown area, the potential of the park to attract businesses to the downtown area, inclination to shop at local businesses while visiting the park and what future iterations of the park would be preferred (longer, different time of year, etc.).

Local Business Owner/Manager Surveys Changes in foot traffic and sales were self-reported by business owners/employees in 2013 and summarized as follows: total people entering businesses fronting on to pop-up park location before and during park implementation; and increases, decreases, or no change in sales one month before the park was installed and a year before in the same month the park was installed. In addition, a pedestrian-enhanced street network in ArcGIS [24] was built and used to calculate the walking distance from each business in downtown Los Altos to the pop-up park. Logistic regression analysis was used to estimate the effect of walking distance to the pop-up park location on sales and foot traffic.

Direct Observation of Business Foot Traffic Total counts of business foot traffic (i.e., number of people entering businesses) fronting on to the park in 2014 were computed.

Sales Tax Data City government officials calculated change in sales tax revenue over the period 2013–2016, comparing the quarters with and without the pop-up park. Raw data were not provided to the research team.

Key Informant Interviews Qualitative data were transcribed verbatim and inductively coded and summarized to extract key lessons learned.

Results

Longitudinal Patterns of Use of the Los Altos Pop-Up Parks over a 4-Year Period

More people used the park in location A in 2014 than 2013; however, fewer people used the park in location B in 2016 than 2014. Park use was most frequent in the late afternoons and evenings compared to earlier in the

day and during the week compared to the weekend. Although the parks were primarily used for sedentary behavior, moderate and vigorous physical activity were also documented. Selected key findings regarding park use and physical activity garnered from the SOPARC assessments are shown in Table 3.

Characteristics and Perceptions of Pop-Up Park Users

The main results of the park user intercept surveys in 2014 in location A have been reported previously [15]. Table 4 provides information about why park users said they were visiting the park.

The Los Altos community resident citizen scientists who volunteered to use the Discovery Tool mobile app to record photos and audio narratives before, during, and after the location B pop-up park in 2014 were mostly female (88%), and had the following demographic characteristics: age ranges were < 17 years = 4 people, 18–35 years = 1 person, 50–64 years = 2 people, and 65–89 years = 1 person; and racial/ethnic breakdown was white = 5 people, Asian = 2 people, and other race = 1 person. Select quotes from each participant collected

before, during, and after the installation of the park are shown in Table 5.

There were 69 responses to the on-line survey administered in the month following the pop-up park in location B in 2014 by the locally owned investment company. A majority of respondents (71%) indicated that they visited the park once a week or more, most frequently between 4 pm and 6 pm (41%). Over half the respondents (59%) indicated that they regularly visited downtown Los Altos 2–3 times per week or more frequently and 58% indicated spending time in the pop-up park made them more inclined to visit local shops and restaurants either while they were at the park or at a later time. Respondents were overwhelmingly in favor of having the park rolled out again in the future (83%).

Impact on Local Businesses of Pop-Up Park Implementation

Results from surveying business owners/managers in 2014 ($N = 95$, 100% response rate) about their perceptions of impacts on their businesses from the location A park show that compared to the month before the pop-

Table 3 Selected key findings regarding park use and physical activity collected using the System for Observing Play and Recreation in Communities (SOPARC)

Location A [15]	Location B
Park use	
<ul style="list-style-type: none"> •More park users were observed during 2014 than 2013 (2116 vs. 1770) •Mean park use was highest in the evenings (6 pm to 8 pm), and lowest during the early mornings (7 am to 9 am) •Fewer adolescents used the park (11.6% in 2013, 19.9% in 2014) compared to adults (48.1% in both years) and children (40.3% in 2013, 32.0% in 2014) •About half of park users were female (55.6% in 2013 and 51.3% in 2014) 	<ul style="list-style-type: none"> •More park users were observed over the 4-day consecutive period in 2014 than in 2016 (636 vs 516) •More users were reported on the two weekdays than on the weekend days (2014 week = 76%, weekend = 24%, 2016 week = 59.1, weekend = 40.9%) •In 2016, there were more children in the park than in 2014 (43.4% vs 36.2%) •Park users in both years were mostly white (2014 = 75%, 2016 = 70.7%)
Physical activity	
<ul style="list-style-type: none"> •The proportion of park users engaged in moderate to vigorous PA was greater in 2014 (33.1%) than 2013 (21.2%) •A greater proportion of males than females were physically active at the park: 22.6% active males vs. 20.1% active females in 2013 and 35.7% active males vs. 30.5% active females in 2014 	<ul style="list-style-type: none"> •In 2014, similar rates of sedentary behavior and walking were noted (45.9% and 46.4%) •In 2016, more users were observed being sedentary (67.2%) compared to walking (22.9%) •Similar rates of vigorous physical activity were observed in both years (2014 = 7.7%, 2016 = 9.9%)

Table 4 Perceptions of pop-up park users collected via intercept surveys in 2013 and 2014 at location A and in 2016 at location B

Location A [15]	Location B
Respondent characteristics	
<ul style="list-style-type: none"> • Respondents ($N = 147$) were primarily female (54.4%) and adult (66.9%), but also included children and adolescents (12.5%) and seniors (20.6%) 	<ul style="list-style-type: none"> • All respondents were adults ($N = 114$), including 20% who were seniors. Respondents were primarily female (65%)
Top 3 reasons for visiting the pop-up park	
<ul style="list-style-type: none"> • Eat or drink at a local business (32.6%) • Engage in leisure-time activity (28%) • Socialize with others (16.9%) 	<ul style="list-style-type: none"> • Engage in leisure-time physical activity (28%) • Shop at local stores (18%) • Attend an event (14%)
Other key facts	
<ul style="list-style-type: none"> • Buying food or drink locally was the most frequent reason for visiting the pop-up park (32.6%) <ul style="list-style-type: none"> o only reason reported for every time period (higher between 9 am and 10 am) o most frequently provided reason every hour except between 2 pm–3 pm and 6 pm–7 pm (active leisure) and 4 pm–5 pm (social) 	<ul style="list-style-type: none"> • Park users reported that they most liked the park because of the opportunities to be social (19% and outside (15%) • The majority of respondents (59%) said they would not have been in downtown Los Altos had it not been for the park

up park, most businesses reported no change in sales (60.5%) or foot traffic (70.0%). Results were similar for the previous year (see Table 6). Mean walking distance from the businesses to the pop-up park was 290.7 ± 199.5 ft. Logistic regression analyses indicated that walking distance was not significantly associated with reported changes in sales or foot traffic.

For all but one of the eight businesses in which foot traffic into the business was observed (i.e., a print shop), foot traffic was higher on the 4 days evaluated during the park, as compared to the 4 days without the park (see Fig. 1). The increase was most marked for the art gallery, which saw foot traffic increase from only 4 individuals to 93 (2225% increase) during the observation periods, and the skate shop, which saw foot traffic increase from 113 to 506 (348% increase). The foot traffic into the bookstore increased from 131 to 247 (89% increase), into the pet shop increased from 199 to 369 (85% increase), and into the restaurant increased from 252 to 383 (52% increase). Two businesses saw only slight increases; foot traffic into the nail shop increased from 81 to 88 (9% increase) and into the coffee shop increased from 1434 to 1545 (8% increase) (shown separately on Fig. 1 due to differences in scale). Only foot traffic into the print shop was observed to decrease from 18 to 13 (28% decrease).

The city of Los Altos reported that the temporary pop-up parks were associated with an increases in year-

over-year sales tax revenue in the third financial quarter by 9% in 2013, 13% in 2014, and not at all in 2015 when there was no temporary pop-up park.

Perceptions of Pop-Up Park Organizer Key Informants The key stakeholders in the initiation, iteration, and incremental expansion of the pop-up parks were City staff ($N = 2$ interviewed) and the Economic Development Manager of the locally owned investment company who also acted as the Downtown Green Project Manager ($N = 1$ interviewed). They shared similar views regarding the challenges, benefits, and lessons learned and agreed that the pop-up parks were worthy of continuation (see Table 7).

Discussion

In 2013, the necessary closure of a street in downtown Los Altos provided an opportunity for a locally owned investment company to partner with the City in an experiment to convert the closed street into a temporary pop-up park. By partnering with researchers and collecting data from a variety of sources over an extended period of time, key data were obtained to inform future iterations of the pop-up parks over several years. The data showed that the parks were visited by a reasonably large, multigenerational group of users who

Table 5 Select quotes from park user citizen scientists collected before, during, and after the pop-up park

Theme: Few people in location B when no pop-up park

- There are not enough people here, so it does not feel like there's enough life or that it's energetic. *Before quote, male, aged 17 years or younger*
- It's really quiet now that the park is gone. When the park was here this was filled with people. *After quote, female, aged 18–35 years*

Theme: Pop-up park resulted in more people in location B

- There are definitely more people around and that really adds life. *During quote, male, aged 17 years or younger*
- I see little family groups sharing a meal. Other folks are just kind of sitting around relaxing. *During quote, female, aged 50–64 years*

Theme: Pop-up park attracts people to local businesses

- It [the pop-up park] allows people to explore what kinds of shops they have around and what downtown Los Altos is like. *During quote, male, aged 17 years or younger*
- People in the park are bringing business to nearby businesses by purchasing their items. *During quote, female, aged 17 years or younger*

Theme: Pop-up park attractive to all ages

- A variety of ages including elderly people, middle age adults and children are enjoying the park. *During quote, female, aged 17 years or younger*
- I liked the mix of people it attracted. *After quote, female, aged 65–89 years*

Theme: Enjoyment of activities at the pop-up park

- I'm looking at a group of children playing on a chalkboard. I see little family groups sharing a meal. Other folks are just kind of sitting around relaxing. *During quote, female, aged 50–64 years*
- They have a lot of chairs and ... activities. They also have some good plantings. This a piano that they have left here now for a week. *During quote, female, aged 65–89 years*

came to engage in leisure-time physical activity, shop at local stores, attend programmed events, and socialize with others. From a business perspective, the data collected in 2014 indicated that foot traffic into seven of eight businesses directly fronting on the location A park increased during a 4-day period when the park was in place, compared to a similar 4-day period when the park was not present. All downtown business owners/managers ($N = 95$) were surveyed and the vast majority (70.3%) reported no decrease in sales compared to the month before when the pop-up park was not in place. City sales tax data also indicated increases in year-on-year sales tax revenue in the financial quarter in which the parks were in place (2014 and 2016), but not for 2015 when there was no pop-up park.

Perspectives of community residents collected before, during, and after the installation of the pop-up park at location B in 2014 provide rich contextual data that indicate that the pop-up park created a vibrant space in an otherwise underutilized area that was enjoyed by a variety of people in a host of ways (children playing, families relaxing, people shopping and eating at downtown stores and restaurants, people of all ages attending the programmed events). The goals of the Los Altos City Council in implementing the pop-up parks appear to have been met (i.e., increased foot traffic downtown, particularly in the evenings; increased retail sales; provision of a community gathering space; and engagement and support of local businesses).

The array of complementary data collected informed a number of discussions and meetings between city staff and city council members, representatives of the locally owned investment company, retail associations, the general public, and members of the research team. As a result, the temporary park that was held in a new location in July and August 2017 following the end of the current research endeavors was substantially bigger in size (14,000 ft²), duration (7 weeks), cost (\$110,000), and programming (68 events). Based on information collected by the research team, it has been noted that park programming occurred every day and was designed with input from co-sponsoring business and community groups with the intention of providing an enjoyable community gathering space and allowing residents to interact with downtown businesses and restaurants. Pedestrian counters installed by the city of Los Altos at two locations at the 2017 temporary park site indicated that during the park period, foot traffic increased by approximately 25% compared to the immediate post-park period (average of 10,300 people compared to 8870 people). Programming in the 2017 pop-up park was run entirely by the Los Altos Parks and Recreation Department and included making arts and crafts, seven movie screenings, health education classes, six live music concerts, special events specifically geared for teens and for older adults, minicamp activities hosted by parks and recreation, pot luck meals, and fitness classes. The 2017 pop-up park was so successful that the City of Los Altos committed to having the park for another 5 years and committed \$25,000/year to match a \$25,000 pledge made by the Los Altos Community Investments group. The 2018 Los Altos pop-up park was underway during the development of this manuscript.

Table 6 Reported change in sales and foot traffic comparing the month and year when the pop-up park was in place in 2014 with the month and year before the pop-up park was in place

N = 95 businesses	Comparison of change in sales		Comparison of change in foot traffic	
	Previous month (%)	Previous year (%)	Previous month (%)	Previous year (%)
Increased	9.6	11.6	9.7	7.9
No change	60.7	60.5	69.9	71.9
Decreased	25.6	22.1	16.1	13.5
Not reported	4.3	5.8	4.3	6.7

Concerns that were raised and resolved during previous pop-up park installations in Los Altos included the cost, the burden on city staff, the loss of parking spaces that were incorporated into the pop-up park area, and the need to include retailers and local residents in all aspects of the park planning and installation. The 2017 pop-up park was sponsored by a consortium of local civic organizations, Los Altos Community Investments, the Chamber of Commerce, the Los Altos Village Association, the Town Crier local newspaper and the City of Los Altos. In addition, the pop-up park was supported by a special event planning company to minimize the burden to City staff. The new location was carefully chosen to minimize disruption to the downtown area, traffic flow, and loss of parking spaces. Extensive input was obtained from local retailers and the general public at City Council meetings and other events to increase community-wide buy-in.

The pop-up park stakeholders learned valuable lessons during their collaboration that may be of use to other partnerships seeking to implement pop-up parks. Communication with all stakeholders and affected parties (City Council members, city staff, the public, local retailers) should be done early and often. Resistance to change should be expected and managed with continual communication that includes listening and appropriately responding to concerns. To install and maintain a vibrant pop-up park requires more than a modest amount of time and financial resources from various community groups. A project manager can be hired to minimize city staff and volunteer burden, coordinate the different groups that want to be involved in park programming, manage key relationships to obtain initial and sustained buy-in, and optimize the park experience for users. Funding and in-kind services can be sought from a consortium of local groups, including the city, local businesses, and not-for-

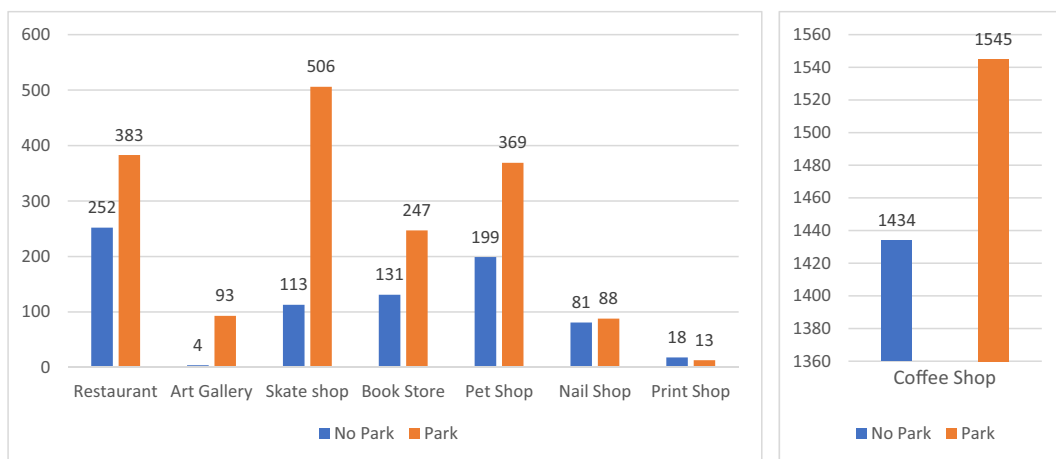


Fig. 1 Sum of foot traffic into businesses on days with and without the pop-up park

Table 7 Data provided by key informants during structured interviews

Theme: Biggest challenges

- To obtain initial approval and support from a number of parties each representing different constituents and operating within given mandates
- To align the contribution of different stakeholders—initial impetus of the pop-up park was conceived and funded by the local investment company and arranged/facilitated by the city council. Over time a more evenly shared public/private partnership has developed, with the city contributing more staff time, resources, and funding
- To overcome concerns on the part of the city council about the many unknowns resulting from the innovative pop-up park initiative. These concerns were alleviated by ongoing and transparent communication
- No financial return for the locally owned investment company as the time and money spent on the pop-up parks was donated. The return on investment for the locally owned investment company could be viewed as making the city a more desirable place
- City staff were being asked to do new things for which they had no training or experience
- There was a range of diverse and strong opinions about what should happen in the public realm with little existing process for conversations about public spaces

Theme: Unexpected benefits

- Community building: people felt so strongly (in a positive way) about the parks. The parks provided a free, shared space with opportunities for people to get to know each other
- The incremental nature of the pop-up parks gave people an appetite for public green space in the downtown. There was substantial interest in helping to do programming at the parks

Theme: Lessons learned

- This was a way to test the community's appetite for bolder programming and innovative initiatives and to learn what is important to city residents
- It is a challenge to make public spaces that are at once welcoming, friendly, clean, safe, and well-maintained but on the other hand not over-curated and managed
- It is one thing to create public spaces, and another thing to maintain them over time

profit organizations. Implementing a pop-up park may require tasks outside the usual realm of city staff expertise and knowledge, for example, negotiating contracts for liability. This expertise can be sought from the broader community and the process institutionalized for future efficiency.

The Urban Land Institute has developed “10 Principles for Building Healthy Places” that include putting people first; recognizing economic value; empowering champions for health; energizing shared spaces; making health choices easy; ensuring equitable access; mixing it up in terms of offerings and activities; embracing the

unique character of the locale; promoting access to healthy food, and making places supportive of activity [25]. The pop-up parks that have occurred since 2013 in Los Altos incorporate many of these principles and have helped to raise the profile of the city in the San Francisco Bay Area, attract people and businesses to the downtown area, and increase foot traffic.

A limitation of this study is that the setting was a predominantly white and affluent community and so the results may not be generalizable to more diverse, less affluent communities. While there is scant published research about temporary parks in more diverse, less affluent neighborhoods, the literature regarding permanent parks indicates that parks are visited less frequently when they are perceived as less safe [26, 27], have more incivilities (for example, graffiti and vandalism example) [28, 29], have fewer amenities and features [30], and are located in areas with more adverse social environments [31, 32]. Socioeconomically disadvantaged neighborhoods are more likely to have parks of lower quality compared to more advantaged neighborhoods [32]. As with permanent parks, temporary pop-up parks that involve participatory engagement and governance could potentially ameliorate these barriers to park use by encouraging more “eyes on the street” that may increase perceptions of safety [33, 34]; reducing incivilities (for example, by engaging community residents in maintaining parks) [33] and by involving local communities in activity programming [35]. Such activities have the potential to increase access to park spaces and decrease health inequities [36].

Other novel ways to create public spaces for social interaction include such things as temporary community gardens, urban agriculture, art installations, event venues, eateries and cafés, and pocket parks such as has occurred in Christchurch, New Zealand, in vacant post-earthquake sites [37]. The “Lighter, Quicker, Cheaper” approach has successfully been used in a variety of environments to engage community residents, entrepreneurs, planners, developers, and local government in iterative action plans made richer due to multiple perspectives [38]. “DIY urbanism” includes the concept of “meanwhile use” that provides interim access to vacant spaces zoned for more long-term use for pop-up projects such as art galleries, craft studios, food markets, and other creative community projects [39]. And “Depave” is a nonprofit organization that harnesses the enthusiasm and hard work of volunteers to replace paved spaces with green public gathering spaces [40].

As future efforts to implement temporary pop-up parks in diverse areas continue, including multivariate data gathering by cities, community resident citizen scientists, local business owners, and researchers to both the planning and implementation of pop-up parks will provide further information that can be used to address concerns and track benefits for all stakeholders, as well as inform future pop-up park installations.

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