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Who visited urban forests and trails more or less during the COVID-19 pandemic and why?: A case study in Salt Lake City, UT, USA

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Abstract

While the COVID-19 pandemic caused a decrease in travel and social activities, there was an exception—travel to parks and trails. Urban residents needed refuge to relax, exercise, and socialize. Nevertheless, trips to parks and trails vary by socio-demographic characteristics, disadvantageous to those having health issues or low-income. Without appropriate community design and planning interventions, such conditions may worsen existing environmental injustice and health issues. This study explores the demographic profile of those who used urban parks and trails more or less during the COVID-19 pandemic in Salt Lake City, UT, USA. Data comes from an online and intercept survey with 4,325 responses and focus groups with 52 participants. Quantitative analyses show that park and trail use during the pandemic decreased among older adults, females, homeowners, and low-income households. Also, people living in a denser, more walkable, and more park/trail accessible neighborhood likely increased their visitations.

Our qualitative analysis further examines how residents feel about their use of parks and trails during the pandemic and how they would improve them in the future. Respondents in disadvantaged neighborhoods felt safe visiting parks, highlighting the value of urban nature as a resilience infrastructure and community asset during a crisis. This study presents transformative ideas to engage communities and promote stewardship, which are relevant to cities looking into the New Normal.

Keywords: green space; equity; health; SARS-CoV-2; urban forest; urban planning

Introduction, scope and main objectives

The COVID-19 pandemic has resulted in a general decrease in travel and social activities across the globe (De Vos, 2020). But the literature shows an exception—travel to parks, forests, trails, and other outdoor recreation facilities. Park visitation has increased since the COVID-19 outbreak in most countries (Geng et al., 2020). Recreation activities in trails also increased (Venter et al., 2020; Zhang & Fricker, 2021). People used parks, forests, and trails as a refuge to relax, exercise, and socialize, and thus, to overcome physical and mental issues caused by shelter-in-place and limited social relationships (Ugolini et al., 2020, 2021).

Nevertheless, changes in travel to parks and trails vary among different socio-demographic groups. People having pre-existing health issues (e.g., older adults, those with disabilities) or low-income

may have more concerns or lack opportunities to visit parks and trails during the pandemic (Abedi et al., 2020; Palgi et al., 2020). Such a socio-demographic discrepancy may worsen well-documented environmental injustice issues in access to parks and trails (Park et al., 2021; Rigolon, 2016; Wolch et al., 2014). Without appropriate community design, planning, and programming interventions, such a condition may worsen existing environmental injustice and health issues in park accessibility and usability. But there is a lack of comprehensive studies examining how much and why disadvantaged people reduced their park and trail use during the pandemic.

Previous studies show conflicting findings regarding the role of population density and neighborhood compactness on park use and outdoor activities. For example, people in compact areas with smaller homes and a lack of private greenspaces may still visit parks and outdoor recreation facilities (Hamidi & Zandiatashbar, 2021), while low-density neighborhoods may provide a better perception of social distancing in visiting parks (Mitra et al., 2020). Thus, this study also accounts for neighborhood built environment characteristics to explain pandemic-related park and trail use.

This mixed-methods study explores the relationships between socio-demographic and built environment attributes and park/trail use during the COVID-19 pandemic in Salt Lake City, UT, USA. The study findings could help park and recreation organizations and municipalities understand their (potential) users and develop effective design and programming solutions amid the pandemic and afterward ("a New Normal") to promote good health outcomes.

Methodology

1- Survey data and environmental data

As part of Salt Lake City's Public Lands Master Plan process, we conducted online and in-person surveys from August to September 2020 (Figure 1). Using social media posts and flyer distribution in public spaces, we first collected 3,717 online surveys. The remaining surveys (609 responses) were collected by visiting parks, natural areas, and other public spaces in person. For regression analyses, we selected a subset of the online survey data that have valid XY coordinate information. As a result, the final sample for the spatial analysis includes 1,235 responses.

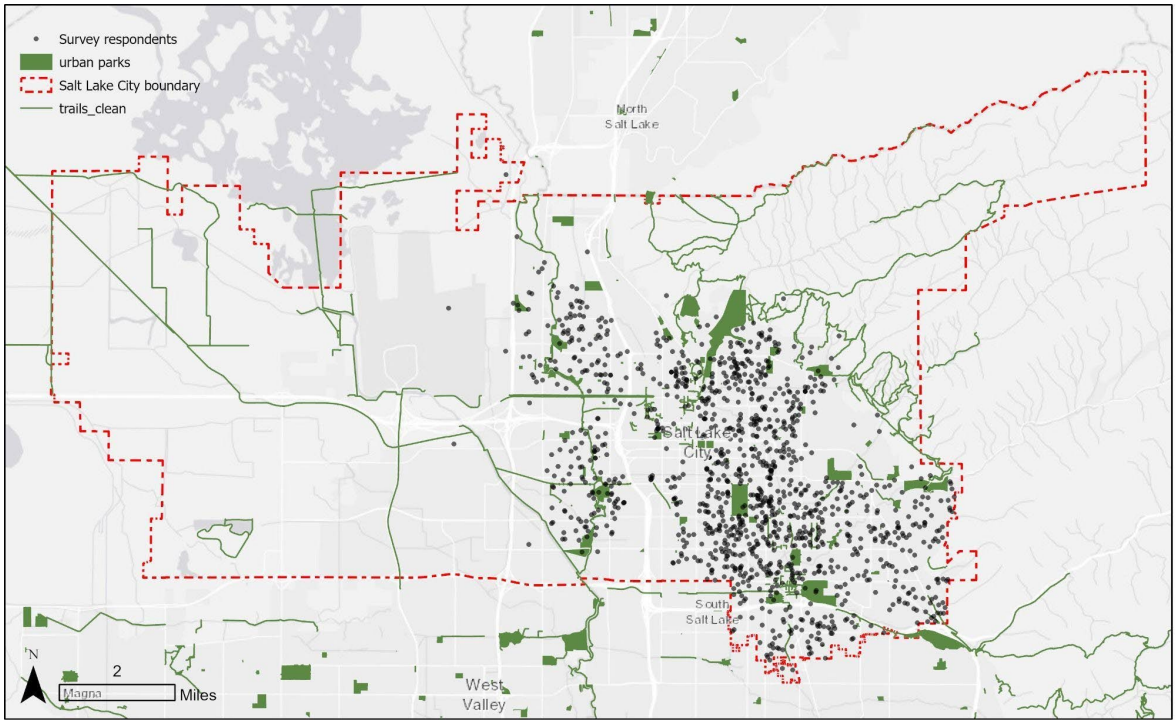

Fig. 1: Study area in Salt Lake City, UT, marked with survey respondents, parks, and trails (*n*=4,325)

Also, in October of 2020, six focus groups (four in Zoom and two in-person) were conducted with 52 individuals from low-income neighborhoods to ask about using parks and trails and what they would like to see improved. Invitations were sent out through community partners. The focus of the interview guide had questions about the use of parks during COVID-19, the value of parks, stewardship, equity, and improving parks.

Park and trail location data were downloaded from Utah Geospatial Resource Center. Park and trail accessibility were calculated using Network Analyst tools in ArcGIS Pro. Then, the total acreage of parks intersecting with each buffer was calculated. We collected socio-demographic data at the Census block group level from the American Community Survey 2015-2019 estimates (Manson et al., 2020). Three built environment variables that might be related to park and trail use were included. First, the population density variable was computed as the number of residents divided by the gross area of a Census block group (1,000 persons per square mile). Also, the proportion of four-way intersections as a measure of street connectivity and walkability was computed using data from the Metropolitan Research Center at the University of Utah. Lastly, transit stop density was measured as the number of public transit stops (bus, rail) per square mile.

2- Data analysis

To provide a more holistic understanding of park and trail use during the COVID-19 pandemic, this study employs mixed methods combining quantitative analyses of the questionnaire survey data and qualitative analyses of the focus group interview (Creswell & Plano Clark, 2018; Millard-Ball & Kim, 2020). The findings from the quantitative models inform focused interview transcript coding, and the findings from the qualitative interview are used to validate and complement the findings of the quantitative analyses. Focus groups were transcribed and then coded using the four themes explored in the conversation: use and value of parks, stewardship, equity, and improving parks.

Quantitative analyses have two parts: bivariate analyses of the demographic profile of park and trail users and a regression model. In the first part, the demographic profile of park and trail users was compared among three groups—those who used parks and trails more, less, or the same frequency in 2020, compared with 2019. Two regression models explain the frequency change of park and trail uses in 2020, respectively. Explanatory variables include personal demographics, park/trail accessibility, built environment characteristics, and neighborhood socio-demographic attributes. The outcome variables are ordinal because they have three ordered options—used parks/trails more, at the same frequency, or less in 2020. Thus, we use ordinal logistic regression. In the model result, the coefficient estimate can be exponentiated to be an odds ratio (the odds of being a particular category, compared to the odds of being the other two categories).

Results

1- Demographic profile of park and trail users during the pandemic

People who used parks less often during the pandemic than in 2019 were older, more female, less non-Hispanic White, and more homeowners than those who used parks more often (Table 2). Park users whose visitation frequency had not changed during the pandemic were among the oldest, most male, most non-Hispanic White, highest income, and most owners. In addition, people who used trails less often during the pandemic than in 2019 were older, more female, less non-Hispanic White, had lower income, and more homeowners than those who used trails more often (Table 2). All group-wise differences in park and trail use frequency are statistically significant at $p<.05$ level.

Table 2. Mean values of demographic variables by frequency change to parks and trails in 2020 compared with 2019 (n=4,325)[1]

Frequency change in 2020	%	Age	Age (over 60)	Gender (male)	Race/ethnicity (non-Hispanic White)	Income level	Home ownership (owner)[2]
Park use							
visiting parks less often	16.2%	42.9	20.1%	45.0%	75.6%	$91,849	76.9%
same frequency	39.7%	44.3	22.5%	58.0%	81.7%	$98,467	77.8%
visiting parks more often	43.6%	38.6	11.6%	49.2%	79.2%	$92,951	66.5%
p-value[1]	-	<.001	<.001	<.001	.003	.002	<.001
Trail use							
Using trails less often	15.1%	44.2	24.5%	48.7%	75.3%	$87,641	72.4%
same frequency	42.9%	43.2	22.0%	55.3%	80.5%	$96,017	75.1%
Using trails more often	41.4%	38.8	9.5%	49.9%	80.2%	$96,413	70.4%
p-value[1]	-	<.001	<.001	.001	.014	.001	.012

[1]. We ran an ANOVA test for continuous variables (age and income level) and a chi-squared test of independence for categorical variables (over 60 years old, gender, race/ethnicity, and homeownership).
[2]. Homeownership variable is only available for web surveys but not intercept surveys.

Table 3 shows the results of the two ordinal regression models. A ten-acre increase in the park area within a ¼-mile of a respondent location is associated with a 3% increase in the odds of "visiting

parks more often." The odds of an older adult visiting urban parks more often during the pandemic is 45.2% less likely (1 minus 0.548) than younger people.

Respondents in a neighborhood with higher population density, high percentages of commercial parcels, four-way intersections, and older adults population, and a lower percentage of low-income households were more likely to use parks more often than those living in a neighborhood with opposite conditions. These findings suggest that denser, mixed-use neighborhoods with better street network connectivity can lead residents to visit urban parks more frequently during the COVID-19.

A trail use model shows similar results regarding being older (negative), population density (positive), and the percentage of the senior population of a neighborhood (positive). Unlike the park model, where the objectively measured park access was significant, this model shows that perceived access to a trail in a neighborhood increases the likelihood of visiting trails more often during the pandemic (32% higher odds).

Table 3. Ordinal regression results of park and trail uses during the COVID-19 pandemic (*n*=1,158)

Variables	Coefficient estimate	Odds ratio	*p*-value[1]
Park Use Model (less often/same/more often)			
Perceived park access: Yes	0.014	1.014	0.941
Park acres within ¼ mile	0.003	1.003	0.035*
61 years or older: Yes	-0.601	0.548	<0.001***
Gender: male	0.087	1.091	0.449
Race/ethnicity: non-Hispanic White	-0.116	0.891	0.473
Renter: Yes	0.174	1.190	0.251
Annual income[2]	0.002	1.002	0.860
Population density (1,000 people/sq.mi.)	0.057	1.059	0.002**
% commercial properties	0.855	2.352	0.006**
% 4-way intersections	0.900	2.459	0.011*
% low-income households	-1.741	0.175	0.008**
% non-Hispanic Whites	-0.466	0.628	0.153
% senior population	0.017	1.017	0.042*
Trail Use Model (less often/same/more often)			
Perceived trail access: Yes	0.278	1.320	0.023*
Trails within ¼ mile	-0.071	0.932	0.553
61 years or older: Yes	-0.950	0.387	<0.001***
Gender: male	0.042	1.043	0.717
Race/ethnicity: non-Hispanic White	0.037	1.038	0.818
Renter: Yes	0.043	1.044	0.779
Annual income[2]	0.035	1.035	0.008**
Population density (1,000 people/sq.mi.)	0.035	1.036	0.038*
% commercial properties	0.270	1.310	0.383
% 4-way intersections	0.418	1.519	0.243
% low-income households	-1.243	0.288	0.057^
% non-Hispanic Whites	-0.710	0.492	0.035*

[1] ***: p < .001, **: p < .01, *: p < .05, ^: p < .1

[2] Annual income categories were recoded: Under $14,999 = $7,500, $15,000 to $24,999 = $20,000, $25,000 to $49,999 = $37,500, $50,000 to $74,999 = $62,500, $75,000 to $99,999 = $87,500, $100,000 to $149,999 = $125,000, $150,000 or higher = $150,000

2- The importance of parks, forests, and trails during COVID-19

Using focus groups, we analyze how residents felt about their use of urban parks, forests, and trails during the pandemic. A common theme is that these natural areas are essential to decompress mentally. Many specified how parks help them to relax during COVID-19. For example, Vanessa, a Latina, stated, “My husband goes to the canyon to run, and I [go to] walk. It is very important to have … a green area to be able to go out and more in this pandemic … to destress.” Some participants felt safe in parks because there were not a lot of people. Aspen said, “… with COVID, I didn’t feel like there were a lot of people, and I felt safe there.”

Other participants commented how parks have helped their children stay active and entertained during COVID-19. Karla, a Latina mother, commented how her daughter can unplug and be active when they visit parks, “I have an eleven-year-old girl … we go out to the park for a walk … for unplugging them from the cell phone and letting them exercise.” Kenneth, a white male, talked about how his kids have played baseball for the community teams that utilize the parks near them. In response to COVID-19, many community programs were suspended, which has decreased the amount of time they spent at parks. Kelly, a white woman from Central City, said, “The social distancing has been putting a damper on things, like not having yoga in the park, not having every community activity.”

Participants expressed how public lands allow them to build community and stay connected with friends and family. These spaces are vital for individuals that live in apartments or small homes. Gabriela, a Latina, commented, “My mother loves the house, but it has a very small yard...we always tend to go to a park when we want to grill meat or be with family or get together with friends.”

3- Ways to improve parks and trails beyond the pandemic

A quote that essentially sums up what makes a great park comes from Kelly, who said: “Just going to the park area is more healing, and I want to be somewhere where it’s nice and well maintained and has amenities available.” Participants described enjoying parks with amenities like bathrooms, water fountains, playground and exercise equipment, benches, barbecues, pavilions, and picnic tables. The main aspect of concern was safety. A female participant added, “I do have access to the Jordan River trail, but I don’t use it anymore because it’s unsafe. It is extremely polluted and is extremely unsafe at night, especially for women.” Improved lighting was proposed as a solution by some participants.

A community leader shared her efforts to improve parks around clean-up interventions and educational programming around stewardship. Additional programming recommendations included interactive events such as a scavenger hunt that focuses on historical education. Other creative program ideas included sponsoring little libraries in parks to promote passive recreation such as reading in public spaces. In addition, people spoke about sponsoring events at the park like yoga, vendors, music, art, cultural events for everyone, including older adults, youth, and family activities. There was also a discussion of community responsibility and volunteerism as Kelly highlighted, “Resources for the parks are not there. The trees are dying. They’re not maintained. But we have people who can volunteer.” The topic of engaging the community in the stewardship of parks was very prevalent.

Finally, some spoke about improving the accessibility of parks. “And the disabled people don’t have this nice place; they can just roll their motorized chair down and be next to the river,” said Timothy. Karla also mentioned how connecting bike paths to parks would minimize her driving, “there are

many cars, a lot of traffic, but the trails do not always connect. There must be paths for children, for adults too."

Discussion and Conclusions

Key findings from this study identified concepts and ideas that resonated with the community to support the values of promoting equity, livability, and sustainability. Based on the feedback from residents in the survey and the focus groups, the Public Lands Master Plan (https://www.reimaginenatureslc.com/) proposed the transformative idea of "Reimagining Neighborhood Parks." This idea involves engaging neighbors in redesigning and adding fixed activities to parks that reflect their interests. Another concept that promoted stewardship through programming for nature-based education was "Coming soon to a park near you." This idea tries to promote partnerships for programming in parks such as arts, fitness, etc.

Further, based on our findings from this mixed-methods study, we call for special interventions during public health crises such as the pandemic. Temporary design and programming interventions could encourage low-mobility populations and those without private recreational space to have access and use urban parks and trails more often. Specific strategies through planning and transportation agencies include street closure, traffic lane relocation, speed limit reduction, automated walk signals, and shared mobility programs, as well documented in Combs & Pardo (2021).

Also, we suggest that parks and trails in a city should not be closed or restricted during a public health crisis. Those restrictions could rather cause severe physical and mental health issues, especially for those without time and space to relax, exercise, and socialize. This study highlights the value of urban nature as a resilience infrastructure and community asset. Thus, in order to reduce crowding and related health concerns within those urban natural areas, cities can apply temporary design changes for social distancing, such as tactical urbanism interventions (Design for Distancing Ideas Guidebook, 2020; Herman & Drozda, 2021).

While we are hoping to see the end of the COVID-19 pandemic, cities should implement preemptive planning approaches to prepare for the "New Normal" (Gkiotsalitis & Cats, 2021; Salama, 2020). To improve the overall accessibility and usability of parks and trails, this study emphasizes the importance of density, land use mix, street network connectivity, and walkability near parks and trails. We also find the values of promoting equity, livability, and sustainability for long-term planning goals, which can be incorporated into municipal comprehensive plans and regional transportation plans. Cities need transformative ideas around their parks and trails in preparation for the next public health crisis.

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