

Peer Reviewed Research

Parental Preference for Park Attributes Related to Children's Use of Parks in Low-Income, Racial/Ethnic Diverse Neighborhoods

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Abstract

Public parks offer free and easy access to spaces for outdoor recreation, which is essential for children's outdoor play and physical activity in low-income communities. Because parks and playgrounds contribute to children's physical, social, and emotional development, it is critical to understand what makes them attractive and welcoming for families with young children. Parents can be a key determinant to children visiting parks, with their preferences influencing whether or not families visit parks in their neighborhoods. Our study examined attributes associated with parental preferences for parks in low-income diverse communities in New York City, New York, and Raleigh-Durham, North Carolina, USA. Parents' responses were grouped into 10 categories using content analysis, with four key preference themes identified: physical attributes, experiences, social environment, and amenities. Physical attributes (i.e., playgrounds, sports fields, green spaces) were most desired among all groups. A significant difference across race/ethnic groups was found in New York but not in Raleigh-Durham. In New York, Latino parents had a strong preference for experience attributes (i.e. safety, safe facilities, cleanliness), which differed from other groups. Examining only Latino parents across both cities, we found no significant difference in preferences between the two cities. Although there is no one-size-fits-all approach to encourage park use, our finding suggests facilities and park safety are modifiable ways local government agencies could design and maintain parks that would be preferred by parents for their children. Future research should examine how neighborhood context may influence parent preferences related to parks.

Keywords: urban parks, race-ethnicity, low income, children physical activity, parent preference

Physical activity has multiple benefits for children as they develop through their preteen years (Janssen & Leblanc, 2010; World Health Organization, 2010). Improved fitness, reduced weight gain, and reduced risk for chronic diseases later in life are some of the beneficial health outcomes children can gain from regular physical activity (U.S. Department of Health and Human Services, 2018).

Despite the importance to development, children are not getting enough physical activity (Guthold et al., 2020). A decrease in outdoor play is one contributing factor to the rise in childhood obesity (Cleland et al., 2008; Kimbro et al., 2011; Stone & Faulkner, 2014) and children in low-income, racially diverse communities are at an especially higher risk (Krueger & Reither, 2015; Rogers et al., 2015). Race/ethnicity, socioeconomic status, parental involvement and support are all related to children's development and weight (Botchwey et al., 2018; Dentre et al., 2014; Merlo et al., 2020; Taylor & Lou, 2011; US Department of Health and Human Services, 2012). Although adequate evidence suggests physical activity is critical to preventing childhood obesity, how to provide environments that effectively encourage physical activity among low-income, racially

diverse populations remains a challenge (Botchwey et al., 2018; Sallis et al., 2019).

As a setting for active play, urban parks can be an important space for children's physical activity. Public neighborhood parks are easy to access and have no entrance fees, providing open spaces, facilities, and programs for children's outdoor play (Floyd et al., 2011). Among children living in disadvantaged areas, accessible and high-quality parks are one way of encouraging physical activity and combating sedentary lifestyles (Huang et al., 2020; Veitch et al., 2013). As racial/ethnic minority populations continue to grow in the United States, it is important to facilitate park design and management to meet diverse needs, especially in low-income neighborhoods.

Parental preference has a strong influence on physical activity and park visits by children 5–10 years of age (Mitchell et al., 2012). As caregivers, parents play a key role in providing models that encourage active lifestyles (Tucker et al., 2011). Previous research finds that parents prefer safe parks containing facilities for their children (Veitch et al., 2006). Studies show parents are concerned

about both physical and social environment factors regarding their children's outdoor play, such as spaces and facilities for play, crime rates, strangers, traffic conditions (e.g., fast drivers), walkability, aggression by other children, and neighborhood safety in general (Carlson et al., 2010). These preferences are correlated with children's physical activity, with anxiety about neighborhood safety and friendliness leading to less park use and reduced physical activity (Faulkner et al., 2015; Weir et al., 2006).

Although parks are for all populations, park use behavior, perceptions, and preferences could vary across socioeconomic status, race, and ethnicity (Marquet, Hipp, Alberico, Huang, Fry, et al., 2019a). Past studies posit that there are significant differences across racial/ethnic populations in preferred park characteristics (Carlson et al., 2010; Das et al., 2017; Derose et al., 2015; Kaczynski et al., 2014; Vaughan, Colabianchi, et al., 2018). For instance, Derose et al. (2015) found African Americans and English-speaking Latinos were less likely to exercise in parks, while Spanish-speaking Latinos and Asians/Pacific Islanders were more likely to use parks for social interactions, compared to Whites. As for preferred facilities, Kaczynski et al. (2014) found only playgrounds, baseball fields, and basketball courts are associated with park use among African Americans while many more facilities are related to park use among the White population. In New York City, differences were found in children's physical activity and park use between racial/ethnic groups (Huang et al., 2020; Marquet, Hipp, Alberico, Huang, Mazak, et al., 2019). While parents' and children's use and activity receive attention, few have investigated specific park attributes parents from different racial and ethnic groups want for their children (Cerin et al., 2016; Das et al., 2017; O'Connor et al., 2014; Vaughan, Colabianchi, et al., 2018).

As parents play a key role in determining children's use of parks, this study examined parental preferences for park attributes in low-income, racial/ethnic diverse communities in New York City (NYC), New York, and Raleigh-Durham (RDU), North Carolina, USA. We sought to identify common preferences and answer the following research question: *Do parents of different racial and ethnic groups report unique preferences in park attributes for their children? If so, how do these groups differ in their preferences?*

Methods

Data Collection

Data were collected as part of a survey instrument administered to parents of children who themselves were participating in the Physical Activity and Recreation of Children in Low-income Communities of Color (PARC³) project (Botchwey et al., 2018; Marquet, Hipp, Alberico, Huang, Fry, et al., 2019a; Umstadd Meyer et al., 2019). It aimed to investigate patterns of park use and physical activity among children from different racial and ethnic groups in NYC and RDU parks. The survey consisted of 21 questions about park use (e.g., frequency, duration, activities, preferences) and demographic characteristics (e.g., race/ethnicity, age, gender). Parent race/ethnicity was

self-identified through their survey response. Parents' preferred park attributes were measured with the question *"In an ideal park in your neighborhood, what would you want for your children (List three)?"* A total of 314 survey responses were collected between NYC (n = 201) and RDU (n = 113).

Data collection was conducted during spring and summer 2017 in six parks within New York City neighborhoods representing low-income, majority Asian or Latino populations, and a high presence of children aged 0–14 years. The number of Latino and Asian children living in low-income areas within one-quarter mile (400m) of parks in NYC was estimated based on 2014 American Community Survey five-year block group estimates. Three parks serving a larger Latino children population and three parks serving a larger Asian children population were selected as the targeted parks. The target parks were located in the Bronx (2), Manhattan (1), and Brooklyn (3).

Data were obtained from parents or guardians of 260 children between the age of 5 and 10 years old recruited to wear an accelerometer and GPS while visiting one of the six parks between May and August 2017. Parents (n = 201) responded to a 21-question survey offered in English, Spanish, and Mandarin while their children wore activity monitors.

Parks were selected in neighborhoods with larger populations of Asian or Latino children. With the focus on these two groups we encountered small numbers of parents from other races/ethnicities. Due to small counts for other groups we categorized race/ethnicity into Asian, Latino, and Other, with Other comprising all other race/ethnicity groups.

In Raleigh-Durham, data collection occurred in six parks within neighborhoods representing low income, African American and Latino populations, and a high presence of children aged 0-14 years. A total of 113 parents or guardians of 185 children between 5 and 10 years old participated. Parents participated in the survey after being recruited for the larger study where their children wore an accelerometer and GPS while visiting the park. Data were collected between May and August 2018.

For RDU, parks were selected in neighborhoods with larger populations of African American or Latino children. With the focus on these two groups we encountered small numbers of parents from other races/ethnicities. Due to small counts for other groups we categorized race/ethnicity into African American, Latino, and Other, with Other comprising all other race/ethnicity groups.

Analysis

Responses from the open-ended survey question were classified into 10 categories by the researchers. To inclusively understand parents' preferences for park attributes regarding their children's park use, we used content analysis to identify the themes of responses. A conventional content analysis approach was used that

allowed researchers to derive coding categories from the original response text data (Hsieh & Shannon, 2005). Our process included three steps: first, we labeled the exact words from the text that captured a main concept. Second, two or more labeled items emerged into axial codes, or sub-themes, as the process continued. Third, sub-themes were sorted into themes, or codes, based on how the sub-themes related to each other. Last, a tree diagram was created to organize the themes and the associated sub-themes (Figure 1).

Parents were able to indicate multiple preferences in their responses so that the preferences identified were not independent. A test of multiple marginal independence was used to determine if there were differences in preferences across race/ethnic groups with Bonferroni correction for multiple testing applied to adjust p-values (Bilder et al., 2000). Each city was analyzed separately. As both cities included Latino parents, we also examined those responses

to see if there were differences across the two cities for this sample. Where a difference was found between preferences and racial/ethnic groups, we conducted a logistic regression analysis to investigate differences between groups. These models produced odds ratios of parents preferring each of the main themes identified, accounting for the child's gender (male or female), parental age (one of five age groups), and frequency of park visitation (one of five time categories) indicated by the parent.

Results

Descriptive statistics are provided in Table 1 for parental characteristics. Out of the 314 participants, 11.5% provided no response to the question of interest. Examining the nonresponses, we found no significant difference between parents who responded to the question of interest and those who did not. Removing nonresponses resulted in a total final sample of 278 (NYC = 179, RDU = 99).

Table 1. Descriptive Statistics of Survey Participants

Variable	Location	
	NYC	RDU
Parent/Guardian Age		
Total sample	179	99
18-24	4.5% (8)	9.1% (9)
25-34	36.3% (65)	47.5% (47)
35-44	35.8% (64)	29.3% (29)
45-54	8.9% (16)	8.1% (8)
55-60	7.3% (13)	3.0% (3)
61+	7.3% (13)	2.0% (2)
NA	0.0% (0)	1.0% (1)
Parent/Guardian Gender	NYC	RDU
Female	73.7% (132)	75.8% (75)
Male	26.3% (47)	23.2% (23)
Refuse to state/Other	0.0% (0)	1.0% (1)
Parent/Guardian Race/Ethnicity	NYC	RDU
African American	-	55.6% (55)
Asian	33.5% (60)	-
Latino	46.9% (84)	25.3% (25)
Other	19.6% (35)	19.2% (19)
Child Age (in years)	NYC	RDU
5	24.0% (43)	25.3% (25)
6	18.4% (33)	16.2% (16)
7	15.6% (28)	17.2% (17)
8	14.0% (25)	11.1% (11)
9	10.6% (19)	10.1% (10)
10	11.7% (21)	10.1% (10)
Unstated	5.6% (10)	10.1% (10)
Park visit frequency	NYC	RDU
Every day	22.2% (41)	10.3% (8)
More than once a week	36.8% (68)	39.7% (31)

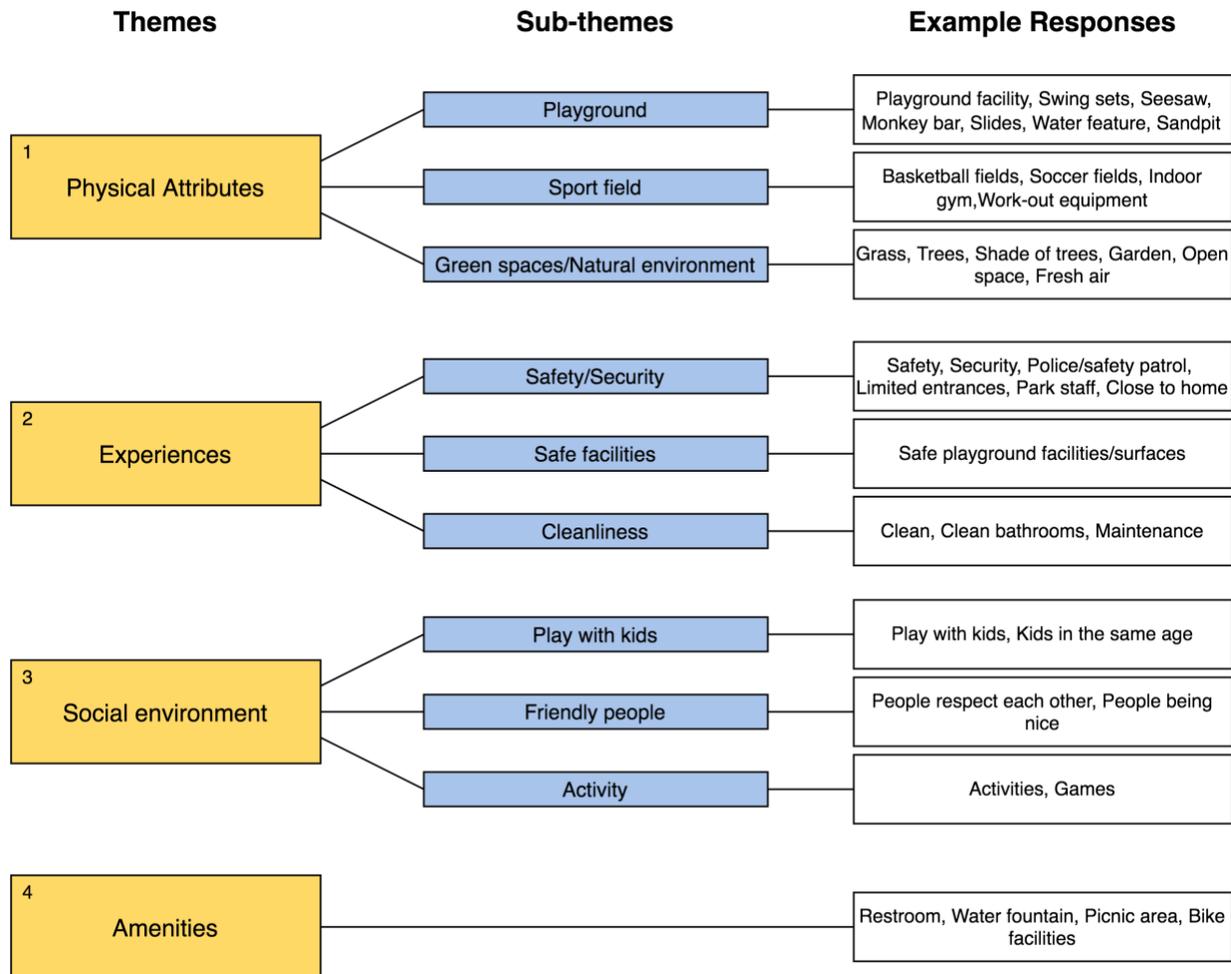
Once a week	16.8% (31)	16.7% (13)
A few times a month	13.5% (25)	21.8% (17)
Less than once a month (occasionally)	10.8% (20)	11.5% (9)

Content Analysis

The coding of responses revealed four key themes parents identified in their ideal park (Figure 1). These

themes were related to nine sub-themes of specific aspects of the park environment. Example responses provided by parents are shown in Figure 1.

Figure 1. Themes and Sub-Themes From Coding of Participant Responses



The four main themes that emerged were *physical attributes*, which included preferences for facilities, equipment, and play space (e.g., “Playground,” “Soccer fields,” “Shade of trees”). The *experience* theme included safety, both personal safety and safe equipment, and cleanliness (e.g., “Police/safety patrol,” “Safe playground

facilities,” “Clean bathrooms”). *Social environment* encompassed interactions with other people in the park, along with opportunities for children’s activities (e.g., “Play with kids,” “People being nice,” “Games”). Last, *amenities* included mentions of specific park amenities

such as water fountains or bike facilities (e.g., “Water fountain,” “Picnic area”).

Preferences From all Parents in Study

Examining all of the parents in the study, across the two cities and regardless of race/ethnicity we found the highest preference for *physical attributes* alone (20.1%), followed by *experience* (18.7%) and *amenities* (9.4%). 6.5% of parents listed no preferences (Table 2).

Table 2. Preferences for All Parents in the Study

Preference Themes	n	Percentage
Physical attributes only	56	20.10%
Experience only	52	18.70%
Amenities only	26	9.40%
Physical attributes and amenities	26	9.40%
Experience and social environment	23	8.30%
Social environment only	19	6.80%
No preferences	18	6.50%
Physical attributes and experience	13	4.70%
Physical attributes, experience, and amenities	12	4.30%
Experience and amenities	9	3.20%
Physical attributes and social environment	9	3.20%
Physical attributes, social environment, and amenities	7	2.50%
Social environment and amenities	5	1.80%
Experience, social environment, and amenities	1	0.40%
Physical attributes, experience, and social environment	1	0.40%
Physical attributes, experience, social environment, and amenities	1	0.40%
Total	278	

Differences Across Racial/Ethnic Groups by City

When examining the difference across racial/ethnic groups there was a significant difference in NYC ($\chi^2 = 38.95, p = 0.001$) but not in RDU ($\chi^2 = 14.21, p = 0.217$). In NYC, Asian parents most preferred *amenities* (24%) or

physical attributes (41%) attributes while Latino and other parents showed a greater preference for *experience* attributes, 49% for Latino and 40% for Other. Asian parents showed lower preference for the *social environment* theme than Latino and Other parents (Asian 4%, Latino 30%, Other 20%) (Table 3).

Table 3. Preference Themes by City and for Latino Parents (Multiple Themes Allowed)

NYC

Theme	Asian (n=70)	% of Asian	Latino (n=86)	% of Latino	Other (n=45)	% of Other	Total (n=179)	% of Total
Physical attributes	29	41%	34	40%	23	51%	86	48%
Experience	11	16%	42	49%	18	40%	71	40%
Social environment	3	4%	26	30%	9	20%	38	21%
Amenities	17	24%	28	33%	13	29%	58	32%
Total	60		130		63		253	

Note. Multiple marginal independence test: $\chi^2 = 38.95, p = 0.001$

RDU

Theme	African-American (n=59)	% of African-American	Latino (n=31)	% of Latino	Other (n=23)	% of Other	Total (n=99)	% of Total
Physical attributes	24	41%	6	19%	9	39%	39	39%
Experience	27	46%	9	29%	5	22%	41	41%
Social environment	16	27%	5	16%	7	30%	28	28%
Amenities	11	19%	9	29%	9	39%	29	29%
Total	78		29		30		137	

Note. Multiple marginal independence test: $\chi^2 = 14.21, p = 0.217$

All Latino Parents

Theme	NYC (n=86)	% of NYC	RDU (n=31)	% of RDU	Total (n=117)	% of Total
Physical attributes	34	40%	6	19%	40	34%
Experience	42	49%	9	29%	51	44%
Social environment	26	30%	5	16%	31	26%
Amenities	28	33%	9	29%	37	32%
Total	130		29		159	

Note. Multiple marginal independence test: $\chi^2 = 4.96, p = 0.534$

We investigated the differences identified in the NYC parents with logistic regression models. Each preference was modeled as a binary variable, and control variables of child gender, parent age, and park visit frequency were included. A significant difference was seen among racial/ethnic groups in the themes of *experience* and *social*

environment (Table 4). Latino and Other parents were significantly more likely to prefer these themes than Asian parents. Predicted probabilities were calculated for the most common control variables, also indicating a lower probability for Asian parents to choose *experience* or *social environment* themes.

Table 4. Results of logistic regression for NYC parents park preferences

Race/Ethnicity	Physical attributes (OR)	Predicted probability ^a	Experience (OR)	Predicted probability ^a	Social environment (OR)	Predicted probability ^a	Amenities (OR)	Predicted probability ^a
Asian	1.00	0.570	1.00	0.202	1.00	0.023	1.00	0.285
Latino	0.654 (0.309, 1.376)	0.464	5.968*** (2.537, 15.180)	0.601	10.515*** (3.047, 51.883)	0.196	1.331 (0.592, 3.059)	0.346
Other	2.609 (1.005, 7.121)	0.776	5.248** (1.863, 15.643)	0.570	7.54** (1.842, 40.326)	0.149	1.247 (0.452, 3.394)	0.332

Note. OR estimate and 95% CI; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^a Predicted probability of choosing preference when frequency = 'More than once a week', child gender = female, and parent age = 35-44

Latino Parents

The sample of parents in both NYC and RDU included those self-identified as Latino ($n = 117$). This sample of parents who identified as Latino provided for a comparison across the two cities to investigate if differences existed based on city context. There was no significant difference found in Latino parental preferences across the cities ($\chi^2 = 4.96, p = 0.534$). For Latino parents the highest preference was for *experience* (NYC: 48.8%; RDU: 29.0%) followed

by *physical attributes* in NYC and *amenities* in RDU (Table 3).

Discussion

Parental preferences play an important role in children's physical activity and park visits (Bringolf-Isler et al., 2010; Tucker et al., 2011). Our study identified parental preferences for park attributes and examined what differences existed across racial/ethnic groups for our sample. Our results reveal that parents from low-income minority populations most often indicated a preference for

attributes represented by the themes of *physical attributes* (playgrounds, sport fields, and green space sub-themes) and *experience* (safety/security, safe facilities, and cleanliness sub-themes). These preferences did vary across different racial and ethnic groups in NYC but not in RDU. There was also no difference in preferences found for Latino parents across both cities.

The overall preferences we identified align with other research findings on parent preferences (Boxberger & Reimers, 2019; Bringolf-Isler et al., 2010; Faulkner et al., 2015), with our results highlighting the preferences of urban, lower-income, minority parents and caregivers. The most common preference, *physical attributes*, captured specific facilities like playgrounds or swings that are typical settings for outdoor play and physical activity. These attributes have a direct link to physical activity among both adults and children (Costigan et al., 2017).

Safety is typically of concern to parents and park users in general (Faulkner et al., 2015). Park safety was incorporated into the theme *experience* in our coding and was the second most mentioned theme across all parents, reinforcing its importance to parents when considering visiting parks with their children. The perception of safe and well-maintained parks can be another factor in parents' decision to take children to parks and allow them to be physically active (Costigan et al., 2017; Esteban-Cornejo et al., 2016).

Past studies find there are statistically significant differences across racial/ethnic populations in preferred activities and park characteristics (Carlson et al., 2010; Floyd et al., 2008; Marquet, Hipp, Alberico, Huang, Fry, et al., 2019a). In contrast to our NYC results, no difference in park attribute preferences were observed among parents from different racial/ethnic groups in RDU. Variation in the built and social environments of the two cities and the neighborhoods where the parks are located could account for the different results (Spengler et al., 2011).

Our analysis of the NYC sample pointed to statistically significant differences between groups on the odds of choosing the themes of *experience* and *social environment*. *Experience* was the most mentioned preference for Latino parents, but not so for Asian or Other parents. Although most neighborhoods in the city have access to parks (The Trust for Public Land, 2020), some parks seem to be less children-friendly than others (Marquet, Hipp, Alberico, Huang, Fry, et al., 2019a). Poor social conditions, such as crime safety concerns, low walkability, and noxious land use, could discourage families from using parks (Marquet et al., 2020; Weiss et al., 2011). As some of these predominantly Latino neighborhoods in NYC have higher crime rates (Marquet, Hipp, Alberico, Huang, Fry, et al., 2019b), fewer pedestrian-friendly streets, less walkable destinations, and lower quality of environment (e.g., lack of benches, drinking fountains, and pedestrian-scale lighting; and having litter or broken glass on the streets) than the predominantly Asian neighborhoods (Huang et al., 2020), our results suggest that these environmental conditions could lead to Latino parents emphasizing the importance of

our *experience* theme (i.e., safety/security, cleanliness, maintenance) in local parks.

Social environment was also a theme parents differed on in NYC, with the odds of Latino and Other parents preferring social attributes much higher than Asian parents. Latino parents in particular had much higher odds of preferring this theme. Social activities have been found to be a common way Latino residents use their local parks (Fernandez et al., 2015; Gobster, 2002; Whiting et al., 2017). This affinity for social interaction provides one explanation for such a strong preference for our *social environment* theme among Latino parents as compared to other groups.

Unlike we observed in NYC, in RDU we did not see a difference between the racial/ethnic groups. Differences in the racial and ethnic composition of the NYC and RDU sample could account for this result. In the RDU sample, 55% of the respondents were African American; while in NYC African Americans were included in Other due to low numbers surveyed. In RDU, only 2 parents identifying as Asian were surveyed.

Prior research regarding the role of race and ethnicity in shaping park use behavior is mixed across various spatial contexts (Payne et al., 2002). In addition to individual sociodemographic characteristics, Byrne and Wolch (2009) suggest researchers should examine the broader context individuals are within, such as the historical and cultural landscapes, the political ecology, and amenities of the parks. Floyd et al. (2008) noted that differences in the design and facilities of parks and playgrounds in different park systems can influence park use and physical activity.

To our knowledge, limited research has investigated park preference among parents from diverse race and ethnic groups (Greer et al., 2017). Our study found no significant difference in preference across cities for Latino parents. This result aligns with the findings from previous studies where various racial/ethnic groups appear to exhibit distinct preferences for park settings (Byrne & Wolch, 2009). For example, both a national study and a study in Los Angeles found Latino groups are more likely to use parks for social interaction, compared to other groups (Derose et al., 2015; Vaughan, Cohen, et al., 2018). Our results suggest park preferences for Latino parents are more consistent across city contexts, possibly pointing to common concerns among Latino parents or similar lived experiences for this population within NYC and RDU.

Limitations of our study include how we selected parents. The families that participated in our study were not randomly selected since we only surveyed parents whose children participated in our larger data collection effort (i.e., agreed to wear an accelerometer and GPS while playing in the parks). We targeted parks in neighborhoods with higher percentages of African American, Asian, and Latino children, so the sample size of other racial groups was small. Our study is also subject to self-selection bias since an open-ended question in the questionnaire was used to measure parental preferences. Our study did not control

for availability of features in parks and neighborhood environment surrounding parks, which may be a determinant of the frequent users' preferences for park attributes. The themes that emerged from this sample may reflect neighborhood, social, and park factors we did not measure, but can play a part in the decision to visit parks. Finally, our results represent two cases, NYC and RDU. The finding may represent unique conditions in these cities due to social and environmental factors that have shaped the neighborhoods around the parks we studied. Generalizing the findings to other cities will require additional future research.

Strengths of this study were in identifying park attributes that could inform planning, design, and management of parks for families in low-income diverse communities. Few studies have looked at park attributes that are important to Asian and Latino parents when considering park use for their children. To fill this gap, our work begins to investigate the differences parents have in park preferences for their children. We found racial/ethnic groups value different park attributes that could influence children's use of parks for physical activity, particularly in NYC.

Future research could seek to understand how parents' decisions influence children's outdoor play and physical activity by examining whether parental preferences for park attributes are associated with children's park-based physical activity. As we found the neighborhood environment factors such as safety seem to play a critical role in parents' preferences regarding their children's park visit, future work can investigate how objective measures of the neighborhood environment are associated with park physical activity. Our results show Asian and Latino groups favor different park attributes, it would be important to further explore the social, cultural, and environmental factors underlying these differences and their role in park use decisions.

Conclusion

Parents are key decision makers concerning their children's park use for physical activity. Play facilities, safety and security, and park amenities were the most preferred park attributes parents from different ethnic groups desired for their children. Our study identified preferences for park attributes among lower-income minority parents, with some differences found by racial/ethnic group. Because parks and playgrounds

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contribute to children's physical, social, and emotional development, it is critical to understand what makes them attractive and welcoming for parents and children.

In NYC, where we did identify differences among racial/ethnic groups, strategies are needed to increase the sense of security in and around parks, such as ensuring adequate lighting, reducing incivilities such as litter or graffiti, or providing staff supervision. These environmental changes would address perceptions of park safety that may be leading to differences among groups. Focusing on the most common preferences among local parents can be one way park services are responsive to residents' needs and reduce obstacles to park use.

The differences in parental preferences for park attributes suggest there is no one-size-fits-all approach to encourage park use. Facilities and park safety are modifiable ways local government agencies could design and maintain parks that would be preferred by parents for their children. For children who lack access to other locations for physical activity (i.e. semi-private or private areas for play), reducing barriers to the use of public urban parks and playgrounds can be one way to improve children's health and well being.

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References

- Bilder, C. R., Loughin, T. M., & Nettleton, D. (2000). Multiple marginal independence testing for pick any/c variables. *Communications in Statistics - Simulation and Computation*, 29(4), 1285–1316.
- Botchwey, N., Floyd, M. F., Pollack Porter, K., Cutter, C. L., Spoon, C., Schmid, T. L., Conway, T. L., Hipp, J. A., Kim, A. J., Umstaddt Meyer, M. R., Walker, A. L., Kauh, T. J., & Sallis, J. F. (2018). Policy and practice-relevant youth physical activity research center agenda. *Journal of Physical Activity & Health*, 15(8), 626–634.

- Boxberger, K., & Reimers, A. K. (2019). Parental correlates of outdoor play in boys and girls aged 0 to 12—A systematic review. *International Journal of Environmental Research and Public Health*, *16*(2), 190.
- Bringolf-Isler, B., Grize, L., Mäder, U., Ruch, N., Sennhauser, F. H., Braun-Fahrlander, C., & SCARPOL team. (2010). Built environment, parents' perception, and children's vigorous outdoor play. *Preventive Medicine*, *50*(5-6), 251–256.
- Byrne, J., & Wolch, J. (2009). Nature, race, and parks: past research and future directions for geographic research. *Progress in Human Geography*, *33*(6), 743–765.
- Carlson, S. A., Brooks, J. D., Brown, D. R., & Buchner, D. M. (2010). Racial/ethnic differences in perceived access, environmental barriers to use, and use of community parks. *Preventing Chronic Disease*, *7*(3), A49.
- Cerin, E., Baranowski, T., Barnett, A., Butte, N., Hughes, S., Lee, R. E., Mendoza, J. A., Thompson, D., & O'Connor, T. M. (2016). Places where preschoolers are (in)active: an observational study on Latino preschoolers and their parents using objective measures. In *International Journal of Behavioral Nutrition and Physical Activity* (Vol. 13, Issue 1).
- Cleland, V., Crawford, D., Baur, L. A., Hume, C., Timperio, A., & Salmon, J. (2008). A prospective examination of children's time spent outdoors, objectively measured physical activity and overweight. *International Journal of Obesity*, *32*(11), 1685–1693.
- Costigan, S. A., Veitch, J., Crawford, D., Carver, A., & Timperio, A. (2017). A Cross-sectional investigation of the importance of park features for promoting regular physical activity in parks. *International Journal of Environmental Research and Public Health*, *14*(11). <https://doi.org/10.3390/ijerph14111335>
- Das, K. V., Fan, Y., & French, S. A. (2017). Park-use behavior and perceptions by race, Hispanic origin, and immigrant status in Minneapolis, MN: Implications on park strategies for addressing health disparities. *Journal of Immigrant and Minority Health / Center for Minority Public Health*, *19*(2), 318–327.
- Dentro, K. N., Beals, K., Crouter, S. E., Eisenmann, J. C., McKenzie, T. L., Pate, R. R., Saelens, B. E., Sisson, S. B., Spruijmetz, D., Sothorn, M. S., & Katzmarzyk, P. T. (2014). Results from the United states' 2014 report card on physical activity for children and youth. *Journal of Physical Activity & Health*, *11* Suppl 1, S105–S112.
- Derose, K. P., Han, B., Williamson, S., & Cohen, D. A. (2015). racial-ethnic variation in park use and physical activity in the city of Los Angeles. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *92*(6), 1011–1023.
- Esteban-Cornejo, I., Carlson, J. A., Conway, T. L., Cain, K. L., Saelens, B. E., Frank, L. D., Glanz, K., Roman, C. G., & Sallis, J. F. (2016). Parental and adolescent perceptions of neighborhood safety related to adolescents' physical activity in their neighborhood. *Research Quarterly for Exercise and Sport*, *87*(2), 191–199.
- Faulkner, G., Mitra, R., Buliung, R., Fusco, C., & Stone, M. (2015). Children's outdoor playtime, physical activity, and parental perceptions of the neighbourhood environment. *International Journal of Play*, *4*(1), 84–97.
- Fernandez, M., Shinew, K. J., & Stodolska, M. (2015). Effects of acculturation and access on recreation participation among Latinos. *Leisure Sciences*, *37*(3), 210–231.
- Floyd, M. F., Bocarro, J. N., Smith, W. R., Baran, P. K., Moore, R. C., Cosco, N. G., Edwards, M. B., Suau, L. J., & Fang, K. (2011). Park-based physical activity among children and adolescents. *American Journal of Preventive Medicine*, *41*(3), 258–265.
- Floyd, M. F., Spengler, J. O., Maddock, J. E., Gobster, P. H., & Suau, L. J. (2008). Park-based physical activity in diverse communities of two U.S. cities. An observational study. *American Journal of Preventive Medicine*, *34*(4), 299–305.
- Gobster, P. H. (2002). Managing urban parks for a racially and ethnically diverse clientele. *Leisure Sciences*, *24*(2), 143–159.
- Greer, A. E., Castrogiovanni, B., & Marcello, R. (2017). Park use and physical activity among mostly low-to-middle income, minority parents and their children. *Journal of Physical Activity & Health*, *14*(2), 83–87.
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2020). Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants. *The Lancet. Child & Adolescent Health*, *4*(1), 23–35.
- Hsieh, H., & Shannon, S. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288.
- Huang, J.-H., Hipp, J. A., Marquet, O., Alberico, C., Fry, D., Mazak, E., Lovasi, G. S., Robinson, W. R., & Floyd, M. F. (2020). Neighborhood characteristics associated with park use and park-based physical activity among children in low-income diverse neighborhoods in New York City. *Preventive Medicine*, *131*, 105948.
- Janssen, I., & Leblanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *The International Journal of Behavioral Nutrition and Physical Activity*, *7*, 40.
- Kaczynski, A. T., Besenyi, G. M., Stanis, S. A. W., Koohsari, M. J., Oestman, K. B., Bergstrom, R., Potwarka, L. R., & Reis, R. S. (2014). Are park proximity and park features related to park use and park-based physical activity among adults? Variations by multiple socio-demographic characteristics. *The International Journal of Behavioral Nutrition and Physical Activity*, *11*, 146.
- Kimbro, R. T., Brooks-Gunn, J., & McLanahan, S. (2011). Young children in urban areas: links among neighborhood characteristics, weight status, outdoor play, and television watching. *Social Science & Medicine*, *72*(5), 668–676.
- Krueger, P. M., & Reither, E. N. (2015). Mind the gap: race/ethnic and socioeconomic disparities in obesity. *Current Diabetes Reports*, *15*(11), 95.
- Marquet, O., Hipp, J. A., Alberico, C., Huang, J.-H., Fry, D., Mazak, E., Lovasi, G. S., & Floyd, M. F. (2019a). Park use preferences and physical activity among ethnic minority children in low-income neighborhoods in New York City. *Urban Forestry & Urban Greening*, *38*, 346–353.
- Marquet, O., Hipp, J. A., Alberico, C., Huang, J.-H., Fry, D., Mazak, E., Lovasi, G. S., & Floyd, M. F. (2019b). Short-term

- associations between objective crime, park-use, and park-based physical activity in low-income neighborhoods. *Preventive Medicine*, 126, 105735.
- Marquet, O., Hipp, J. A., Alberico, C., Huang, J.-H., Mazak, E., Fry, D., Lovasi, G. S., & Floyd, M. F. (2019). How does park use and physical activity differ between childhood and adolescence? A focus on gender and race-ethnicity. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 96(5), 692–702.
- Marquet, O., Ogletree, S. S., Hipp, J. A., Suau, L. J., Horvath, C. B., Sinykin, A., & Floyd, M. F. (2020). Effects of crime type and location on park use behavior. *Preventing Chronic Disease*, 17, E73.
- Merlo, C. L., Jones, S. E., Michael, S. L., Chen, T. J., Sliwa, S. A., Lee, S. H., Brener, N. D., Lee, S. M., & Park, S. (2020). Dietary and physical activity behaviors among high school students—Youth Risk Behavior Survey, United States, 2019. *MMWR Supplements*, 69(1), 64–76.
- Mitchell, J., Skouteris, H., McCabe, M., Ricciardelli, L. A., Milgrom, J., Baur, L. A., Fuller-Tyszkiewicz, M., & Dwyer, G. (2012). Physical activity in young children: a systematic review of parental influences. *Early Child Development and Care*, 182(11), 1411–1437.
- O’Connor, T. M., Cerin, E., Lee, R. E., Parker, N., Chen, T., Hughes, S. O., Mendoza, J. A., & Baranowski, T. (2014). Environmental and cultural correlates of physical activity parenting practices among Latino parents with preschool-aged children: Niños activos. *BMC Public Health*, 14, 707.
- Payne, L. L., Mowen, A. J., & Orsega-Smith, E. (2002). An examination of park preferences and behaviors among urban residents: The role of residential location, race, and age. *Leisure Sciences*, 24(2), 181–198.
- Rogers, R., Eagle, T. F., Sheetz, A., Woodward, A., Leibowitz, R., Song, M., Sylvester, R., Corriveau, N., Kline-Rogers, E., Jiang, Q., Jackson, E. A., & Eagle, K. A. (2015). The relationship between childhood obesity, low socioeconomic status, and race/ethnicity: Lessons from Massachusetts. *Childhood Obesity*, 11(6), 691–695.
- Sallis, J. F., Botchwey, N., Floyd, M. F., Pollack Porter, K. M., Umstadd Meyer, M. R., Hipp, J. A., Kim, A., & Conway, T. L. (2019). Building evidence to reduce inequities in youth physical activity and obesity: Introduction to the Physical Activity Research Center (PARC) Special Section. *Preventive Medicine*, 129, 105767.
- Spengler, J. O., Floyd, M. F., Maddock, J. E., Gobster, P. H., Suau, L. J., & Norman, G. J. (2011). Correlates of park-based physical activity among children in diverse communities: results from an observational study in two cities. *American Journal of Health Promotion: AJHP*, 25(5), e1–e9.
- Stone, M. R., & Faulkner, G. E. J. (2014). Outdoor play in children: associations with objectively-measured physical activity, sedentary behavior and weight status. *Preventive Medicine*, 65, 122–127.
- Taylor, W., & Lou, D. (2011). *Do all children have places to be active? Disparities in access to physical activity environments in racial and ethnic minority and lower-income communities* [research synthesis]. Active Living Research. https://www.activelivingresearch.org/sites/activelivingresearch.org/files/Synthesis_Taylor-Lou_Disparities_Nov2011_0.pdf
- The Trust for Public Land. (2020). *ParkScore index*. <https://www.tpl.org/parkscore>
- Tucker, P., van Zandvoort, M. M., Burke, S. M., & Irwin, J. D. (2011). The influence of parents and the home environment on preschoolers’ physical activity behaviours: A qualitative investigation of childcare providers’ perspectives. *BMC Public Health*, 11, 168.
- Umstadd Meyer, M. R., Hipp, J. A., Botchwey, N., Floyd, M. F., Kim, A. J., Pollack Porter, K., & Sallis, J. F. (2019). How to improve physical activity and health for all children and families. *Stanford Social Innovation Review*. https://ssir.org/articles/entry/how_to_improve_physical_activity_and_health_for_all_children_and_families
- U.S. Department of Health and Human Services. (2012). *Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity Among Youth*. <https://health.gov/sites/default/files/2019-09/pag-mid-course-report-final.pdf>
- U.S. Department of Health and Human Services. (2018). *Physical Activity Guidelines for Americans, 2nd edition*. https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf
- Vaughan, C. A., Cohen, D. A., & Han, B. (2018). How do racial/ethnic groups differ in their use of neighborhood parks? Findings from the National Study of Neighborhood Parks. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 95(5), 739–749.
- Vaughan, C. A., Colabianchi, N., Hunter, G. P., Beckman, R., & Dubowitz, T. (2018). Park use in low-income urban neighborhoods: Who uses the parks and why? *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 95(2), 222–231.
- Veitch, J., Arundell, L., Hume, C., & Ball, K. (2013). Children’s perceptions of the factors helping them to be “resilient” to sedentary lifestyles. *Health Education Research*, 28(4), 692–703.
- Veitch, J., Bagley, S., Ball, K., & Salmon, J. (2006). Where do children usually play? A qualitative study of parents’ perceptions of influences on children’s active free-play. In *Health & Place* (Vol. 12, Issue 4, pp. 383–393).
- Weir, L. A., Etelson, D., & Brand, D. A. (2006). Parents’ perceptions of neighborhood safety and children’s physical activity. In *Preventive Medicine* (Vol. 43, Issue 3, pp. 212–217).
- Weiss, C. C., Purciel, M., Bader, M., Quinn, J. W., Lovasi, G., Neckerman, K. M., & Rundle, A. G. (2011). Reconsidering access: Park facilities and neighborhood disamenities in New York City. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 88(2), 297–310.
- Whiting, J. W., Larson, L. R., Green, G. T., & Kralowec, C. (2017). Outdoor recreation motivation and site preferences across diverse racial/ethnic groups: A case study of Georgia state parks. *Journal of Outdoor Recreation and Tourism*, 18, 10–21.

World Health Organization. (2010). *Global recommendations on physical activity for health.*