

Peer Reviewed Research

Differences in Child Physical Activity Levels at Rural Play Streets Due to Activity Type and Sex

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Abstract

Children are significantly less active during summer months, and rural children may face unique barriers to engaging in physical activity. Play Streets is a low-cost way communities can provide safe play opportunities by activating public spaces. Four low-income rural communities received mini-grants to implement four three-hour Play Streets throughout summer 2017 for a total of 16 Play Streets. System for Observing Play and Recreation in Communities (SOPARC) and iSOPARC were used to assess physical activity. Chi-square tests of homogeneity determined significant differences in the proportion of children observed as active based on sex and target area type. Binomial logistic regression was used to determine if target area characteristics (i.e., type, equipped, supervised, organized) and presence of other active children or adults increased the odds of observing a child as active. In total, 1,750 children were observed across all 16 Play Streets; roughly half of all children (48.6% of boys, 48.7% of girls) were observed as active. There was no significant difference in proportion of children observed as active based on sex of the child ($OR = 0.99$, 95% CI:0.82-1.20). Significant differences in the proportion of active children were found between target area categories. Boys were significantly more likely to be observed as active in areas which were equipped or organized. All children were significantly more likely to be active if there was another active child present in the same area. These results add to the growing literature surrounding successful implementation of Play Streets in rural settings, social influence, and active play.

Keywords: *youth, concurrent activity, temporary activations, systematic observation*

While childhood obesity is a prevalent public health issue across the United States (Kranjac & Wagmiller, 2019), rural children are more likely to be overweight or obese compared to urban children (Probst et al., 2018). A meta-analysis indicated that odds of obesity are 26% higher for rural children compared to urban children (Johnson & Johnson, 2015). This disparity is widened when considering rural children of color (Davis et al., 2011; Kenney et al., 2014). In a recent survey, rural health stakeholders identified weight status as one of the top concerns within their communities (Bolin et al., 2015). Stakeholders were also concerned about physical activity opportunities and resources available to their communities (Bolin et al., 2015). Children who attain more moderate-to-vigorous physical activity are significantly less likely to be

overweight or obese (Daly et al., 2017; Eimear et al., 2017). Children are recommended to be active at a moderate-to-vigorous intensity for at least 60 minutes each day (Piercy et al., 2018); however, as few as 26.1% of children meet this recommendation (Kann et al., 2018).

Physical activity among children is associated with other significant social, cognitive, and physical health benefits (Reiner et al., 2013; Warburton & Bredin, 2017). Recent literature reviews suggest that physical activity improves cognition scores in school-age children (Donnelly et al., 2016; Martin et al., 2018). Physical activity is associated with social connection and social development in children (Prochnow, Delgado, et al., 2020; Reiner et al., 2013). Child physical activity is also linked to a reduced

risk for diabetes and chronic disease while increasing quality of life and improving mental health (Reiner et al., 2013; Warburton & Bredin, 2017).

Some studies have suggested that rural children are less active than urban children, but results have been mixed (McCormack & Meendering, 2016). Geographic dispersion and lack of access to physical activity resources such as parks and recreation centers are barriers that impact rural residents more than urban (Hansen et al., 2015; Umstaddt Meyer et al., 2016). These barriers may be even more evident in low-income areas and communities of color, as they have fewer quality physical activity resources (Powell et al., 2006). Researchers have also noted a need for creative policies and programming to activate these resources and other natural play spaces in order to promote and support active play for children in rural communities (Perrin et al., 2016).

Summer is a particularly challenging time for children to remain active. Researchers have noted that children are significantly less active in the summer as compared to the school year (Sallis et al., 2019). Weight gain and cardiorespiratory fitness loss is also accelerated during this time (Baranowski et al., 2014; Fu et al., 2017). Screen time may be replacing activity, since reported screen time is significantly higher during summer months (Sallis et al., 2019). Some researchers have hypothesized this decline in physical activity may be due to a lack of structured physical activity opportunities and supports that are present during school but are absent in summer (Brazendale et al., 2017; Weaver et al., 2019). Another study reported significantly lower physical activity enjoyment in summer, which may help explain this disparity as well (Sallis et al., 2019). In certain climates, summer may also bring elevated temperatures that limits outdoor physical activity (Hesketh et al., 2017; Umstaddt Meyer et al., 2014).

Rural communities can address this decline in physical activity and promote physical activity opportunities during the summer by implementing Play Streets. Play Streets, typically occurring during summer months, involve the temporary activation of a public space (e.g., street, parking lot, park) to provide a safe place for active play. Play Streets are relatively low-cost and can be adapted to specific community needs and preferences (Zieff et al., 2016). Play Streets have been promoted throughout urban communities (Bridges et al., 2020; Umstaddt Meyer, Bridges et al., 2019), but they have not been implemented in rural communities until recently (Pollack Porter et al., 2020). Results from our previously published research suggest that rural Play Streets encourage active play for both boys and girls (Umstaddt Meyer, Bridges Hamilton, et al., 2019). This result is significant: girls are often less active than boys (Cooper et al., 2015). However, authors reported that the types of activity areas these children were observed in at the Play Streets may differ based on sex. Specifically, boys were significantly more likely to be observed in sport courts and fields when compared to girls (Umstaddt Meyer, Bridges Hamilton, et al., 2019). Hence, a more in-depth analysis of the proportion of children observed as active by sex and type of activity is needed to

further understand Play Streets implementation and other temporary play opportunities.

Play Streets foster a sense of social cohesion (Zieff et al., 2016) and encourage concurrent activity or active play within the same area (Prochnow, Umstaddt Meyer, et al., 2020). Concurrent activity, or two individuals who are active in the same area at the same time, can promote more activity and has been noted in urban Play Streets (Prochnow, Umstaddt Meyer, et al., 2020). This study also noted active adults (specifically active male adults) significantly increased the odds of children being observed as active in the same area (Prochnow, Umstaddt Meyer, et al., 2020). The social environment, including social context and peer influence, are significantly associated with child physical activity (Prochnow, Delgado, et al., 2020; Schulz et al., 2013; Suglia et al., 2016; Veitch et al., 2012). Specifically, social support, both from family members and friends, is positively associated with child physical activity (Beets et al., 2010; Loucaides & Tsangaridou, 2017). Co-participation, individuals actively engaging in the same activity with one another, is positively associated with physical activity engagement in children (Mâsse et al., 2017). Similarly, children are more likely to be active when in the presence of a friend than when alone (Salvy et al., 2009). This analysis aims to add to the understanding of social context through the lens of concurrent activity at rural Play Streets.

This article further examines differences in the proportion of children observed as active at Play Streets by sex and type of activity. We assess the influence of concurrent activity and elements of the activity (i.e., whether there is equipment, supervision, or organized activities) on the odds of observing children as active at Play Streets. By examining the influence of activity type and concurrent activity, this article aims to develop a better understanding of how rural communities may promote play for all children at Play Streets.

Methods

This article is part of a much larger study on the implementation of Play Streets in rural communities involving low-income diverse populations. Complete formative and assessment procedures can be found elsewhere (Pollack Porter et al., 2020; Umstaddt Meyer, Bridges Hamilton, et al., 2019). During 2017, four organizations located in low-income, rural communities (rural-urban commuting area code greater than or equal to 4.0 (Economic Research Service, n.d.) across the United States were recruited based on their experience implementing community events and readiness and willingness to implement Play Streets. Each community received a mini-grant of \$6,000 to implement four three-hour Play Streets throughout the summer (June–September 2017) for a total of 16 Play Streets for the entire study. Community organizers could determine how, when, and where the Play Streets were implemented to best fit their community; however, they were required to focus on school-aged children, be open to the public at no cost, and spend at least \$1,000 of their grant on reusable materials or equipment such as hula hoops, frisbees, balls, etc. Due to

this adapted focus on community needs, each Play Street looked slightly different. Several of them took place in open fields, school yards, and existing parks, as streets were not always feasible for the communities. For more information about Play Streets including pictures, guides, and descriptions please see the *Guide to Implementing Play Streets in Rural Communities* (Pollack Porter & Umstadd Meyer, 2019).

Measures

The System for Observing Play and Recreation in Communities (SOPARC) (McKenzie et al., 2006) using the iSOPARC iPad application (Santos et al., 2016) was employed to collect physical activity data in this study. SOPARC has been used extensively in parks and other community play environments (Evenson et al., 2016; Marquet et al., 2019). In-depth explanation of methods as well as specific adaption of traditional SOPARC methods to fit temporary space activations like Play Streets have been discussed at length elsewhere (Umstadd Meyer, Prochnow, et al., 2019). Briefly, SOPARC is a reliable method and tool for assessing physical activity through observation of a space. For this study, trained researchers arrived at the Play Street ahead of time to divide the space into target areas. Target areas were designated to encompass a given activity and be quickly scanned from one vantage point. Due to this focus on the activities present, target areas would change between each Play Street as the activities and locations may change. Target areas were not limited or uniform in size as they were mapped in an attempt to encompass and represent the activities present at the Play Street.

Next, researchers observed each target area in sequential order and recorded the age (child, teen, adult, older adult), sex (female, male), and activity level (sedentary, walking, vigorous) of each person inside the target area. Observations occurred every 30 minutes starting 15 minutes after the scheduled start of the Play Street for a total of six observations of every target area per Play Street.

During each observation, researchers also recorded whether there was equipment in the target area, whether it was supervised, and whether the activities were organized. In this manner, the researcher would make a determination for each observation as this characteristic may have changed between observations. The target area was deemed equipped if equipment (e.g., balls, jump ropes) was present during the scan; however, an area was not equipped if the only equipment available was permanent (e.g., basketball hoops and inflatable) (McKenzie et al., 2006). A target area was deemed supervised if the area was monitored by an adult or teen volunteer designated by the Play Street implementation team. The supervisor needed to be in or adjacent to the specific area but did not have to be instructing, officiating, or organizing activities (McKenzie et al., 2006). Subsequently, an area was deemed organized if an organized physical activity was occurring in the scan area (e.g. organized exercises sack races, or exercise class) (McKenzie et al., 2006).

To assist in comparisons across Play Streets, target areas were categorized afterward by type of activities present. (Umstadd Meyer, Bridges Hamilton, et al., 2019). Categories were inflatables, general activities, sport courts or fields, permanent play structures, open fields, and food and sedentary activity areas. Any inflatable play space, no matter the shape, size, was included in the “inflatables” category. This also incorporated the area immediately surrounding the inflatable to include individuals running around the inflatable or supervising it. General activities included any games that were not sports-specific, or where loose equipment was provided (e.g., hula hoops, jump ropes, Frisbee, bubbles, etc.). Sport courts or fields were categorized largely for the built environment characteristics such as a basketball hoop, volleyball net, or soccer goal present within the area. Climbing structures, slides, and swings, were categorized as permanent play structures. Several Play Streets incorporated large open fields which could be used for organic play but did not have loose equipment laid out during set-up; however, throughout the Play Street these target areas could become equipped if loose equipment was brought into the area. Food and sedentary activity areas were defined as anywhere designated for food or water consumption (e.g., picnic tables) or planned sedentary activities (e.g., arts and crafts, board games). In prior studies that we have published, food and sedentary activity areas were analyzed separately; however, for this analysis they were combined. Combining these areas for the present study is appropriate because these areas represented a handful of activity areas where individuals were largely sedentary ($n = 3$ sedentary activity areas observed) and could rest or engage with other attendees outside of physical activity (Umstadd Meyer, Bridges Hamilton, et al., 2019). Notably, all activities and target areas were selected, organized, and set up by the community organization, not the evaluation team.

Data Analysis

Activity data were first dichotomized from sedentary, walking, and vigorous to sedentary and active, which is consistent with previous analyses (Evenson et al., 2016; Umstadd Meyer, Bridges Hamilton, et al., 2019). Likewise, the senior age category was combined with the adult category. The proportion of active and sedentary children was calculated and stratified by observed sex and target area type. To determine significant differences in the proportion of children observed as active based on sex and target area type, chi-square tests of homogeneity with post-hoc comparisons with Bonferroni corrections were used. Post-hoc analysis involved pairwise comparisons using the z -test of two proportions with a Bonferroni correction. These comparisons were calculated in two main ways: (a) proportion of active children was compared across target area type while stratified by sex to determine specific target area types that may encourage more activity; (b) proportion of active children was compared across sex while stratifying by target area type to determine whether certain target area types encourage more activity between sexes.

Binomial logistic regression was used to determine significant factors that increased the odds of observing a child as active. The researchers isolated data for each child

and recorded whether they were observed as active or sedentary. Separate models were created for boys and girls. Independent variables in this model were target area type, target area characteristics (i.e., whether it was equipped, supervised, or organized), and elements of concurrent activity in the target area (i.e., presence of an active child of the opposite sex, presence of an active child of the same sex, presence of an active adult). Target areas with general activities were used as the reference category since these areas represent basic activation of space by the Play Streets implementation teams using equipment (e.g., balls, hula hoops, or jump ropes) or simple activities (e.g., bubbles, sack races, or yard games).

Frequencies, proportions, chi-square tests of homogeneity, and binomial logistic regression models were conducted using SPSS v. 25.

Results

In total, 1,750 children were observed across all 16 Play Streets: 1,007 boys (57.5%) and 743 girls (42.5%). Roughly half of all children (48.6% of boys, 48.7% of

girls) were observed as active at Play Streets. Overall, there was no significant difference in proportion of children observed as active based on sex of the child ($OR = 0.99$, 95% CI [0.82-1.20]). There were a total of 187 target areas assessed in this analysis across all 16 Play Streets divided into the six categories: inflatables ($n = 38$), general activities ($n = 35$), sport courts or fields ($n = 31$), permanent play structures ($n = 28$), open fields ($n = 26$), and food and sedentary activity areas ($n = 29$). Out of all 1,097 target area observation scans, 36.1% of target area observations were deemed equipped ($n = 396$), 97.0% supervised ($n = 1,064$), and only 3.4% were organized ($n = 37$). Inflatable target areas had the highest percent active for both boys (64.9%) and girls (69.2%). The difference between activity rates in target areas was statistically significant for boys ($p < .05$); however, for girls both inflatables and sport courts or fields (64.0%) were significantly higher than all other target areas ($p < .05$). Figure 1 displays the percentage of children observed as active for each target area type stratified by sex. Table 1 provides the number of active and sedentary children observed as stratified by sex and target area type.

Figure 1. Percentage of Children Observed as Active for Each Target Area Type Stratified by Sex

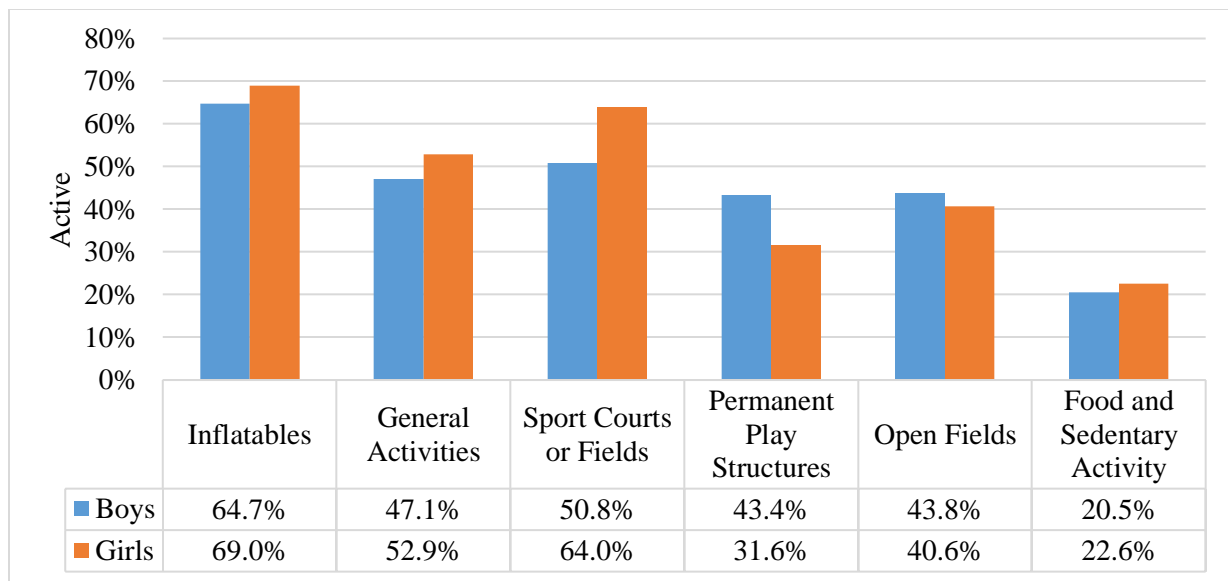


Table 1. Number of Active and Sedentary Children Observed Separated by Sex and Target Area

Type of Activity	Number of Target Areas	Boys		Girls	
		Active	Sedentary	Active	Sedentary
Inflatables	38	242	132	171	77
General Activities	35	80	90	83	74
Sport Courts or Fields	31	64	62	32	18

Permanent Play Structures	28	36	47	18	39
Open Fields	26	28	36	13	19
Food and Sedentary Activity	29	39	151	45	154

Target Area Differences

Separate analysis was conducted for each sex when assessing differences in proportions of active children observed by target area. There was a statistically significant difference in the proportion of active girls by target area type $\chi^2(5) = 106.90, p < 0.01$. The proportion of girls observed as active while in inflatable and sport courts or fields was statistically significantly higher than all other target areas, $p < 0.05$. Statistically, there was no significant difference in the proportion of active girls observed in food and sedentary activity areas, permanent play structures, and open fields.

Similarly, there was a statistically significant difference in the proportion of active boys by target area type $\chi^2(5) = 101.14, p < 0.01$. The proportion of boys observed as active while in an inflatable target area (either in the inflatable or the immediate surrounding area) was statistically significantly higher than all other target areas, $p < 0.05$. There were no significant differences between the proportions of boys observed as active in open fields, general activities, sport courts or fields, and permanent play structures; however, all were significantly higher than food and sedentary activity areas, $p < 0.05$.

Differences by Sex

A separate analysis was conducted for each target area category when assessing differences in proportions of active children observed by sex. There were no statistically significant differences based on sex in the proportion of active children observed in any of the target area categories; inflatables ($\chi^2(1) = 1.27, p = 0.15$), open fields ($\chi^2(1) = 0.09, p = 0.47$), general activities ($\chi^2(1) = 1.10, p = 0.17$), food and sedentary activity areas ($\chi^2(1) = 0.68, p = 0.24$), sport courts or fields ($\chi^2(1) = 2.52, p = 0.08$), and permanent play structures ($\chi^2(1) = 1.98, p = 0.11$).

Binomial Logistic Regression

The logistic regression model for boys was statistically significant, $\chi^2(26) = 213.84, p < 0.001$. The model explained 27.7% (Nagelkerke R^2) of the variance and correctly classified 70.3% of cases. Boys were significantly less likely to be observed as active in food and sedentary activity areas ($OR = 0.22, 95\% CI [0.12-0.40]$) when compared to general activity areas. However, boys were statistically no more or less likely to be observed as active in inflatable target areas, sport courts or fields, permanent play structures, or open fields when compared to general activity target areas. Boys were 1.49 times more likely to be observed as active if the area was equipped and 1.99 times more likely to be observed as active if the activities were organized. Boys were significantly more likely to be observed as active if there was another active boy (2.15 times) or active girl (1.66 times) in the same target area.

The logistic regression model for girls was statistically significant, $\chi^2(26) = 197.11, p < 0.001$. The model explained 31.7% (Nagelkerke R^2) of the variance and correctly classified 71.4% of cases. Girls were significantly less likely to be observed as active in food and sedentary activity areas ($OR = 0.21, 95\% CI [0.12-0.37]$) and permanent play structures ($OR = 0.33, 95\% CI [0.15-0.74]$) when compared to general activity areas. However, girls were statistically no more or less likely to be observed as active in inflatable target areas, sport courts or fields, or open fields when compared to general activity target areas. Girls were not significantly more or less active in target areas that were equipped, organized, or supervised. Further, girls were significantly more likely to be observed as active if there was another active girl (2.68 times) or active boy (1.71 times) in the same target area. However, the presence of an active adult did not significantly increase the odds of observing active boy ($OR = 0.84, 95\% CI [0.57-1.23]$) or girl ($OR = 1.11, 95\% CI [0.74-1.67]$). Complete models and statistics can be found in Table 2.

Table 2. Binomial Logistic Regression Predicting Likelihood of Children Being Observed as Active

Boys (Nagelkerke $R^2 = .28$)	β	SE	Wald	p	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Type [†]			50.71	<0.01*			
Inflatables	0.12	0.25	0.23	0.63	1.13	0.69	1.83
Sport Court or Field	0.57	0.30	3.54	0.06	1.77	0.98	3.21
Permanent Play Structure	-0.46	0.32	2.07	0.15	0.63	0.34	1.18
Open Field	-0.07	0.38	0.03	0.86	0.94	0.44	1.98

Food and Sedentary Activities	-1.51	0.30	25.92	<0.01*	0.22	0.12	0.40
Characteristics							
Equipped	0.39	0.19	4.23	0.04*	1.49	1.02	2.16
Organized	0.69	0.27	6.43	0.01*	1.99	1.17	3.40
Supervised	-	-	-	-	-	-	-
Concurrent Activity							
Same Sex Child	0.76	0.17	19.86	<0.01*	2.15	1.53	3.02
Opposite Sex Child	0.51	0.17	8.75	<0.01*	1.66	1.18	2.33
Adult	-0.17	0.19	0.77	0.37	0.84	0.57	1.23
Girls (Nagelkerke $R^2 = .32$)	β	SE	Wald	P	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Type [†]			46.07	<0.01*			
Inflatables	-0.16	0.29	0.32	0.57	0.85	0.48	1.50
Sport Court or Field	0.37	0.45	0.70	0.40	1.45	0.61	3.48
Permanent Play Structure	-1.10	0.41	7.21	0.01*	0.33	0.15	0.74
Open Field	-0.58	0.47	1.48	0.22	0.56	0.22	1.42
Food and Sedentary Activities	-1.56	0.29	28.52	<0.01*	0.21	0.12	0.37
Characteristics							
Equipped	0.22	0.23	0.87	0.35	1.25	0.78	1.99
Organized	0.38	0.33	1.31	0.25	1.47	0.76	2.84
Supervised	0.77	0.83	0.87	0.35	0.46	0.09	2.35
Concurrent Activity							
Same Sex Child	0.98	0.19	26.02	<0.01*	2.68	1.83	3.92
Opposite Sex Child	0.54	0.21	6.33	0.01*	1.71	1.12	2.61
Adult	0.11	0.20	0.29	0.58	1.11	0.74	1.67
Note: * $p < 0.05$, Both models controlled for site. [†] As compared to general activities areas. Supervision in the boys model did not exhibit enough variability to include.							

Discussion

This article examined implications of activities offered at Play Streets and social influences on child physical activity at Play Streets. Differences were found in the proportion of children observed as active at Play Streets by sex and type of activity area. Elements of the areas at the Play Streets (i.e., whether there is equipment, supervision, or organized activities) impacted the odds of observing active children within the area. Active individuals displayed evidence of the social influence of concurrent

activity, encouraging more activity simply by being active themselves. These results add to the growing literature surrounding the successful implementation of Play Streets in rural settings, as well as the broader literature regarding social influence and active play.

In general, children were observed as active at Play Streets, suggesting that Play Streets met the objective of bringing active play opportunities to children in rural communities during summer. This result is important, as youth are less active during the summer months (Sallis et

al., 2019). Further, results here suggest that boys and girls were observed as active at similar frequencies, which contrasts with research showing that girls are often less active than boys (Cooper et al., 2015; Shervey & DiPerna, 2017). Play Streets provide active play opportunities for all children regardless of sex, as shown in results of the chi-square tests of homogeneity to determine differences in proportions of active children based on sex for each target area category. The lack of statistical differences between the sexes for all target area categories suggest that these areas were equally used by boys and girls.

Despite no differences based on sex, there were significant differences in the proportion of children observed as active based on target area category. Inflatable target areas had a statistically higher proportion of active boys than any other target area category in bivariate analysis. Similarly, inflatable target areas, sport courts, and fields had statistically higher proportions of active girls than other target area categories in bivariate analysis. The higher activity in inflatable target areas could be attributed to the novelty or excitement of these play elements. Children who report greater enjoyment of physical activity are active longer and at greater intensity (Elbe et al., 2017; Moore et al., 2009). Sallis et al. (2019) reported a significant decline in physical activity enjoyment between school-year to summer. Increased enjoyment of physical activity may be a key concept in promotion of play during summer for children. Play Streets implementers would do well to include inflatables; however, it should be noted that inflatables do require additional planning, supervision, and often funding in order to provide a safe play experience (Corominas et al., 2018; Thompson et al., 2012).

While there were significant differences between target area categories in bivariate analysis, regression analysis suggested that many of the target area types promoted activity at a statistically similar level. In other words, children were still observed as active in all target area categories. This further underlines the nature of active play established at Play Streets. Play Streets implementers should be prepared to offer a variety of activity types and different activity areas to further encourage active play throughout Play Streets.

Food and sedentary activity target areas had the lowest percentage of active children, which was statistically significant in both boy and girl regression models. Despite lower rates of activity in these areas, it should be noted that these areas represent vital places for children to rest, rehydrate, and get food, as well as promote other types of activities that foster social connections. Many of the Play Streets provided meal services or other types of snacks. Including sedentary activities such as arts and crafts would provide alternative activities to make Play Streets more inclusive for children who may need accessibility accommodations. The incorporation of these activities builds the case that Play Streets not only promote physical activity, but also help build social cohesion, as seen in other studies (Zieff et al., 2016).

Boys were significantly more likely to be observed as active if the target area was equipped and organized. On the

other hand, these characteristics did not significantly increase the odds of observing girls as active. The association between active play and organized activities has also been reported in park settings (Marquet et al., 2019). As noted, children have less access to play opportunities in summer (Brazendale et al., 2017; Weaver et al., 2019). This absence may also be more prevalent within low-income rural communities (Bolin et al., 2015; Umstadd Meyer et al., 2016; Powell et al., 2006). Play Streets is one way communities can provide physical activity equipment and safe play opportunities to children who may not have access to these during the summer time. While only 3.4% of target areas were designated as organized, the use of these organized activities (sparingly) may help initiate active play. Future implementations of Play Streets should consider how to focus organized activities and/or equipment purchases to further encourage activity for girls. This focus should be guided by active communication and input from children within the community in order to fully build a community focused play environment. On the other hand, this result also may suggest that many of the girls who were observed as active were active regardless of whether there was equipment or organized activities present. This organic active play is promising for sustaining active play in the absence of organized activities or funding for equipment.

Both boys and girls exhibited the social influence of concurrent activity. Specifically, both were significantly more likely to be observed as active in the presence of another active child (of the same sex or the opposite sex) in the same target area. This positive social influence has been noted in urban Play Streets (Pollack Porter et al., 2019; Prochnow, Umstadd Meyer, et al., 2020). In this manner, the presence of active children facilitates or encourages other children to be active as well. The presence of concurrent activity or play may be important to creating a culture or social norm of play that might be absent without Play Streets (Perrin et al., 2016). Despite the beneficial effects of another active child, active adults did not impact the odds of children being observed as active. In other research, active male adults increased the odds children were observed as active in urban Play Streets (Prochnow, Umstadd Meyer, et al., 2020). Future implementations of Play Streets in rural settings should consider the role of active adults to invite or initiate play.

Limitations

The limitations of the iSOPARC and SOPARC methods during Play Streets have been documented elsewhere (Umstadd Meyer, Prochnow, et al., 2019). In short, the dynamic nature of Play Streets (activities shifting places, appearing, or disappearing) can make observations difficult. Dichotomizing activity level, while suggested in the literature (Evenson et al., 2016), limits the differentiation between light physical activity and moderate-to-vigorous intensity physical activity. This analysis focused on promoting any physical activity above sedentary behavior. It should be noted that no comparison observations were made to detail the level of activity in other communities or in the same communities on days without Play Streets. Further, this study was not able to

collect individual level race/ethnicity data. However, these considerations were captured at the community level by purposefully selecting locations that had a majority of children representing a given racial or ethnic group based on Census data (Pollack Porter et al., 2020). Nevertheless, this study cannot delineate activity level by race/ethnicity. It should be noted that while they were grouped in this analysis based on frequency and alignment with the goals of the study, food and sedentary activity areas provide distinctly different opportunities for organizers to engage Play Street participants and encourage social connections in different ways. Inclusion of these areas should be considered essential for well-rounded Play Street implementations. Finally, the event or programmatic aspects of each Play Street in this study were planned and implemented by separate community partners and may introduce inconsistency across sites. However, this variability provides an opportunity for community partners to respond to specific needs of the community. Along these lines, while larger elements such as inflatables may not be continuously and sustainably provided in all locations (due to cost, size, or availability of rental services), other

equipment such as yard games, balls, and hula hoops could also provide the families attending ideas to activate similar spaces to promote physical activity after the Play Street.

Conclusion

While differences were found in the proportion of children observed as active at Play Streets by type of activity area, boys and girls were equally active in each category. Play Streets may offer a play environment for children to be active regardless of their sex. Further, equipment and organized activities significantly increased odds of observing boys as active, which may indicate a need for more equipment and organized activities directed for girls. The social influence of concurrent activity was significantly related to child physical activity, which indicates a development of a social norm of activity or the unintended positive implications of active children encouraging more activity.

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