Quantitative Research: Health Promoting Community Design

Urban Form Relationships With Walk Trip Frequency and Distance Among Youth

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Abstract

1 ***Purpose.*** *To assess the relationship among objectively measured urban form variables, age, and walking in youth.*

Design. *Cross-sectional analyses of travel diary data mapped against urban form characteristics within a 1-km buffer of participant's place of residence.*

Setting. *Youth in the Atlanta, Georgia region with selection stratified by income, household size, and residential density.*

Subjects. *A total of 3161 5- to 20-year-olds who completed 2-day travel diaries. Diaries of those under 15 years were completed by a parent or legal guardian.*

Measures. *Walking distances were calculated from a 2-day travel diary. Residential density, intersection density, land use mix, and commercial and recreation space were assessed within a 1-km network distance around residences.*

Analysis. *Logistic regression analyses were performed for each urban form variable by age groups controlling for the demographic variables. All variables were then entered simultaneously into an analysis of the whole sample.*

Results. *All five urban form variables tested were related to walking. Recreation space was the only variables associated with walking across the four different age groups. All the urban form variables were related to walking in the 12 to 15 years age cohort. For this group, the odds of walking were 3.7 times greater for those in highest- versus lowest-density tertile and 2.6 times greater for those with at least one commercial and 2.5 times greater for those with at least one recreational destination within 1 km from home. In the analysis of the full sample, number of cars, recreation space, and residential density were most strongly related to walking.*

Conclusions. *Access to recreation or open space was the most important urban form variable related to walking for all age groups. Children aged 12 to 15 years old may be particularly influenced by urban form. (Am J Health Promot 2007;21[000]:000–000.)*

Key Words: Physical Activity, Built Environment, Walking, Children, Prevention Research; Format: research; Research purpose: relationship testing; Study design: nonexperimental; Outcome measure: behavioral; Setting: local community; Health focus: physical activity; Strategy: built environment; Target population: youth; Target population circumstances: income level, geographic location, ethnicity

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PURPOSE

There have been many studies of the relationship between active transportation and urban form in adults,[1–3] but the associated factors for adults may differ from those for children.[4] For example, walking to school is a key activity for children, but mixed land use (i.e., having commercial destinations within walking distance) may not be relevant for this behavior.[5] Few studies have investigated urban form–physical activity associations in children, and results are mixed, with some indicating a relationship[6–10] and others finding no associations between walkability-related urban form variables and activity levels.[5,11–13] In two studies, street connectivity was inversely related to physical activity,[4,10] raising the possibility that children may play on cul-de-sac streets.

Active commuting to school contributes to total physical activity levels in children.[4,14] Encouraging walking, particularly in teenagers who are new drivers, may improve safety, reduce costs, and increase independence in this group.[7] In younger children, regular walking for transport may increase traffic safety awareness, trust, and social engagement, as well as decrease traffic volume.[15] Some studies have found significant age and gender differences in active commuting to school[7,8] and walking or cycling generally.[16,17] Low income also appears to be positively related with walking to school[7] and children's walking and cycling in general.[17,18] One study reported ethnic differences but no income differences in active transportation.[19]

There is a need to determine whether the positive relationships between land use density, mix, and street connectivity and levels of active transportation[20–23] and physical activity[2,24] seen in adults also apply to children and adolescents. The present study examined the relationship between objectively measured urban form variables and walking for transportation in a sample of 5- to 20-year-olds. This is the first study to investigate multiple urban form characteristics in a large sample of children across a wide age range.

METHODS

Design

This study was cross-sectional. Data from 3161 youth collected by the Strategies for Metropolitan Atlanta's Regional Transportation and Air Quality (SMARTRAQ) household travel survey in the Atlanta, Georgia region in 2001 to 2002 were analyzed. The overall SMARTRAQ program was developed and led by the authors of this article and also included a regional land use information system, physical activity and residential preference surveys, and a major outreach program.[25] Data collection was stratified across four ranges of income and household size and five levels of residential density to ensure variation in sociodemographics and urban form across participants. A representative sample was achieved through focused recruitment in predominantly ethnic minority and lower-income neighborhoods of the Atlanta region.

Sample

Self-reported travel data were captured in a diary over a 2-day period for youth between 5 and 20 years of age. Sociodemographic and attitudinal information was provided by a head of household in a recruitment call through the use of a computer-aided telephone interview (CATI) protocol. A legal guardian filled out surveys for those 14 years and younger. The study was approved by the appropriate ethics committee, and informed consent or assent was provided by all participants. The recruitment rate was 44.8%, and the data retrieval success rate was 67.8%. The percent of eligible, contacted households completing the survey was found by multiplying these rates together, resulting in a 30.4% participation rate. Ages ranged from 5 to 20 years old, with numbers ranging from 632 to 867 across the four age
2 groups. Half of the sample was female, 38% were nonwhite, 20% had a household income less than $30,000, 36% were in a household with fewer than four inhabitants, and 4.8% of the households had no car. Fourteen percent of the sample made at least one walking trip over the 2 days, and 6% walked at least 0.5 mile per day.

Measures

A disaggregate approach to the measurement of built environment predictors was taken using Network Analyst, which is an extension to ARCVIEW, the GIS software product developed by the ESRI Corporation. This approach enabled a 1-km road network buffer to be developed around each respondent's place of residence. A combination of county-level tax assessors' parcel data and census data was used to measure land use density and mixing of uses, and street network files were used to measure street connectivity within the 1-km buffer. These are the same methods already published in two separate papers linking built environment measures with physical activity and obesity in a sample of adults from the SMARTRAQ travel survey.[21,24] A paper travel diary was filled out to record destinations visited, travel mode and purpose, and time of day across 2 days. Household travel diaries are a standard tool used within the transportation industry to capture and assess the movement between and time spent at habitual (home and work) and other locations. These data were collected from each participant (or a proxy if the person's diary was complete) through the CATI protocol.

Two dichotomous dependent variables were created: (1) made at least one walking trip over the 2 days vs. did not record walking at all and (2) distance walked of 0.5 mile or more per day vs. walked less than 0.5 mile. The daily average was calculated by dividing the total distance across the 2 days by two. Demographic factors of age, gender, ethnicity, income, household size, and car ownership were collected through the CATI protocol. Age categories were defined as 5 to 8, 9 to 11, 12 to 15 and 16 to 20 years old. Age categories reflect developmental stages relevant to walking and having a driver's license. There were similar sample sizes in each age group. Ethnicity was coded as white or nonwhite; it was not possible to analyze racial subgroups due to the available sample size in these groups. Annual household income was categorized into three groups: less than $30,000, $30,000 to $59,000, and $60,000 or greater. Household size was spilt into two groups, three or fewer residents and four or more residents. Number of cars was coded in four groups: no car, one car, two cars, and three or more cars.

Analysis

The dependent variables for all analyses were ''made at least one walk trip over the 2 days'' or ''walked 0.5 mile or more per day.'' Logistic regression analyses were employed with odds ratios and 95% confidence intervals provided for each variable. The odds ratios are the probability that a participant walked. The first analyses explored the relationship between walking and the demographic variables, with each variable entered into separate univariate analyses. In the analyses, the referent groups for the sociodemographic variables were as follows: males for gender, white for race/ethnicity, 5 to 8 years for age, over $60,000 for income, four or more for household size, and three or more for number of cars. These choices were designed to show where positive associations with walking occurred, and therefore when odds ratios were greater than one. The second logistic regression analyses explored the relationship between five urban form variables and walking, controlling for all the demographic variables. Each urban form variable was explored in a separate model. Intersection density and household density scores were categorized into tertiles. It was expected that higher scores would reflect more activity-supporting environments and would be positively related to walking. The lowest tertile was therefore used as the referent. Land use mix (the evenness of distribution of square footage of development across residential, commercial, and employment uses), presence of commercial sites, and recreation and open spaces were

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Table 1

Participant Demographics and Univariate Logistic Regression Analyses for Each Demographic Variable With the Two Self-reported Walking Behavior Outcomes for Youth Aged 5 to 20 Years (N = 3161)

Variable	n	%	Walked At Least Once Over 2 Days OR (95% CI)	Walked ≥0.5 Miles Per Day OR (95% CI)
Gender				
Male	1591	50.3	Referent	Referent
Female	1570	49.7	1.0 (0.8–1.3)	1.1 (0.8–1.5)
Age (years)				
5–8	847	26.8	Referent	Referent
9–11	632	20.0	1.4 (1.0–1.8)*	1.3 (0.8–2.1)
12–15	867	27.4	1.5 (1.1–1.9)**	1.8 (1.2–2.8)**
16–20	815	25.8	1.0 (0.7–1.3)	1.8 (1.2–2.8)**
Ethnicity				
White	1961	62.0	Referent	Referent
Nonwhite	1200	38.0	1.6 (1.3–1.9)***	1.9 (1.4–2.6)***
Income ($)				
≥60,000	1505	47.6	Referent	Referent
30,000–59,000	1010	32.0	1.0 (0.8–1.3)	1.0 (0.7–1.6)
<30,000	646	20.4	2.7 (2.1–3.4)***	3.0 (2.1–4.2)***
Household size				
≥4 residents	2022	64.0	Referent	Referent
≤3 residents	1139	36.0	1.3 (1.1–1.6)**	1.7 (1.3–2.4)***
Number of cars per household				
≥3 cars	990	31.3	Referent	Referent
2 cars	1464	46.3	1.4 (1.1–1.9)**	1.3 (0.9–2.0)
1 car	556	17.6	2.6 (1.9–3.5)***	2.2 (1.4–3.5)***
No car	151	4.8	7.7 (5.2–11.4)***	6.8 (4.0–11.4)***

CI indicates confidence intervals; and OR, odds ratio.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

all dichotomized, with homogeneity or single use and the absence of commercial, recreation, and open space as the referent. The relationship between urban form and walking in youth was further explored by stratifying the analyses by the four age groups. Finally, all variables were entered into the model simultaneously to assess the relative importance of each, adjusting for all others.

RESULTS

Table 1 shows the demographic characteristics of the sample and the odds ratios for walking for each variable. There were no significant differences by gender for either walking outcome. Ethnicity, income, and household size odds ratios were stronger for the outcome of walking 0.5 mile or more on average daily. Those with a household income under $30,000 were more likely to report a walk trip. The fewer the number of cars in a household, the more likely participants reported walking. Children aged 9 to 15 years were more likely to walk at least once over the 2-day period than children aged 5 to 8 years. Youth aged 12 to 20 years were more likely to walk 0.5 mile or more per day than the youngest children.

Table 2 presents the result for each urban form variable, after adjustment for the demographic variables. The top tertiles for residential density and street connectivity were significantly related to both walking outcomes, with the odds ratio for density greater for the walking 0.5 mile or more outcome. Land use mix, commercial destinations, and recreation destinations within 1 km were all significantly related to walking.

Analyses were also performed for each age group separately, and the results are shown in Table 3. For simplicity, only the results for the top tertile are shown. In 5- to 8-year-olds, living near recreation or open space had the only significant association with both walking outcomes. For the 9- to 11-year-olds, residential density and living near recreation or open space were related to any walking, but there were no significant findings for walking 0.5 mile or more. For 12- to 15-year-olds, all urban form variables were significant for both walking outcomes. For 16- to 20-year-olds, significant associations were intersection density, mixed use, and recreation land use for any walking, and significant variables for walking 0.5 mile were intersection density, residential density, and recreation land use.

Since recreation and open space was consistently related to walking in all age groups, the acreage and number of spaces were explored in more detail. Acreage was split into three groups: none (the referent), 1 to 5 acres, and 6 or more acres. Number of recreation land uses was coded as none (the referent), one to three, and four or more. Table 4 presents the results of the detailed recreation analyses for each age group for the any walking outcome. Having up to 5 acres of recreation space in a 1-km buffer was significantly related to walking in three of the age groups, but a larger acreage of recreation or open space did not appear to be related to walking. Two to three recreation or open space land uses was most consistently related to walking behavior across three of the age groups. In the 9- to 11-year-olds, only four or more recreation spaces were associated with an increased likelihood of walking, and size of park was not related to their walking behavior.

In the multivariate analyses in which all variables were entered into the model simultaneously, having no car, access to recreation and open spaces, and greater residential density were the variables with the highest odds ratios related to walking. Age, income,

Table 2

Logistic Regression Analyses for Each Environmental Variable and the Two Self-reported Walking Behavior Outcomes for Youth Aged 5 to 20 Years, Controlling for Sociodemographics (n = 3161)

	Walked At Least Once Over 2 Days OR (95% CI)	Walked ≥0.5 Miles Per Day OR (95% CI)
Street connectivity		
Intersection 1st tertile	Referent	Referent
Intersection 2nd tertile	1.3 (1.0–1.7)	1.3 (0.9–2.1)
Intersection 3rd tertile	1.7 (1.3–2.2)***	1.8 (1.2–2.7)**
Residential density		
Density 1st tertile	Referent	Referent
Density 2nd tertile	1.4 (1.0–1.9)*	1.6 (1.0–2.7)
Density 3rd tertile	2.4 (1.8–3.2)***	2.7 (1.7–4.4)***
Land use		
No mixed land use	Referent	Referent
Mixed land use	1.8 (1.4–2.3)***	1.9 (1.3–2.9)***
No commercial land use	Referent	Referent
Commercial land use	1.8 (1.4–2.3)***	1.8 (1.2–2.7)**
No recreation and open space land use	Referent	Referent
Recreation and open space land use	2.1 (1.7–2.6)***	2.1 (1.5–2.9)***

CI indicates confidence intervals; and OR, odds ratio.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

and ethnicity were also significant. The walking once daily outcome was related to more variables, and the highest odds ratio was for no car in the household for both outcomes. Intersection density, land use mix, commercial land usage, gender, and household size were not significant in the multivariate model. These results are shown in table 5.

DISCUSSION

Only 14% of children and adolescents in the present study walked at least once a day. These results are comparable with other national activity surveys in children.[7,8,19,26,27] Only 6% of participants walked 0.5 mile or more. Other studies have also found that distance to destinations is an important barrier to active transport in youth.[4,5,28,29]

All urban form variables were significantly related in the expected direction to both walking outcomes after adjusting for sociodemographic variables. Thus, present findings strongly confirm that many of the same components of walkability that explain active transportation for adults [2,20,21] also apply to children and adolescents. For the entire sample, the significant odds ratios ranged from 1.7 to 2.7, suggesting that each urban form variable approximately doubles the odds that children walk over 2 days and walk at least 0.5 mile per day. The present study extended results from the previous adult studies by including access to recreation or open space, which was the most consistent correlate of walking across all age groups and outcomes, and it remained significant in the final model. Two recent studies found that proximity to recreation facilities was related to adolescents' physical activity,[10,30] as did a review of physical activity correlates.[31] This convergence of results confirms the importance of nearby recreation facilities for youth because they may stimulate walking to the recreation facility and being active there. Further analyses in the present study indicate higher odds ratios for the number of recreation spaces within 1 km than the odds ratios for acreage and that having a park larger than 5 acres was not related to increased walking. Giles-Corti et al.[32] reported that size of open space was important in adults. In children, it may be more important to have a choice of destinations near their homes.

For children younger than 12 years, proximity to recreation and open space was the dominant urban form correlate of walking for transport. It is likely that caretakers accompany younger children to nearby play areas but do not allow them to walk to other destinations in the neighborhood. For adolescents 12 years and older, a much broader range of neighborhood urban form variables were related to walking, particularly for the 12- to 15-year-olds. For this group, the odds of reporting a walk trip were 3.7 times greater for those in the highest versus lowest density tertile, 2.5 times greater for those within versus not within a mixed use neighborhood, and 2.6 times greater for those with at least one commercial and 2.5 times greater for those with at least one recreational destination within 1 km from their homes. Children 12 years and older may be allowed to independently transport themselves to nearby destinations, and analyses of bicycle use for this age group could be informative. Walking for transport appeared to drop off at age 16 years and older, and fewer urban form variables were related to walking, likely reflecting the impact of obtaining a driver's license and relying more on driving. However, at no age was there any evidence that the walkability of neighborhoods was associated with less walking for transport. Thus, the finding by Norman et al.[10] that intersection density was negatively associated with girls' physical activity was not replicated in the present study. However, other studies have found that street connectivity was not related to youth activity levels.[4,9,33,34] This may be due to differences in sample size or environmental variability. Youth of driving age (16–20 years) are less likely to make a walk trip. However, when they walk, it is of a longer distance than younger age groups.

In the final model with all variables entered simultaneously, residential density and recreation space were the only urban form variables significantly related to any walking and walking 0.5 mile. As discussed above, evidence

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Table 3

Logistic Regression Analyses for Each Environmental Variable Separately, Controlling for Sociodemographics and Stratified by Age Group

Age	5–8 Years OR (95% CI) n = 847	9–11 Years OR (95% CI) n = 632	12–15 Years OR (95% CI) n = 867	16–20 Years OR (95% CI) n = 815
Walked at least once over 2 days				
Intersection highest tertile (vs. lowest)	1.7 (1.0–2.9)	1.3 (0.8–2.3)	1.7 (1.1–2.8)*	2.0 (1.1–3.6)*
Density highest tertile (vs. lowest)	1.8 (1.0–3.1)	2.3 (1.2–4.3)**	3.7 (2.2–6.4)***	2.0 (1.0–4.1)
Mixed land use (vs. no mix)	1.5 (0.9–2.4)	1.5 (0.9–2.5)	2.5 (1.6–3.8)***	1.9 (1.0–3.2)*
At least one commercial land use (vs. none)	1.5 (0.9–2.4)	1.6 (1.0–2.5)	2.6 (1.7–4.0)***	1.7 (1.0–3.1)
At least 1 recreation/open space land use (vs. none)	2.1 (1.3–3.4)***	1.8 (1.1–2.9)*	2.5 (1.7–3.6)***	1.8 (1.1–2.9)**
Walked $\geq$0.5 mile per day				
Intersection highest tertile (vs. lowest)	1.2 (0.5–2.7)	1.0 (0.4–2.7)	2.4 (1.1–5.1)*	3.1 (1.3–7.4)**
Density highest tertile (vs. lowest)	1.3 (0.5–3.5)	2.7 (0.8–9.2)	4.9 (2.1–11.4)***	3.2 (1.1–9.1)*
Mixed land use (vs. no mix)	1.9 (0.8–5.0)	1.3 (0.5–3.0)	2.7 (1.4–5.3)**	1.8 (0.9–3.9)
At least one commercial land use (vs. none)	2.0 (0.8–5.1)	1.1 (0.5–2.5)	2.7 (1.4–5.4)**	1.6 (0.8–3.4)
At least one recreation/open space land use (vs. none)	2.4 (1.2–5.1)*	1.7 (0.7–3.7)	2.4 (1.3–4.2)**	2.1 (1.1–3.7)*

CI indicates confidence intervals; and OR, odds ratio.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

is accumulating that young people's access to places of recreation is related to several types of physical activity, not just walking. Residential density may be important for children as it may reflect a feeling of safety in number or eyes on the street.[35] Density was found to be related to physical activity in one other study in children,[33] but it was not related to walking to school.[5] However, the current study assesses all trip purposes and does not differentiate across specific destinations. Having no car in the household had the strongest association with both walking outcomes in the multivariate model, but having one car rather than three also was significant. Owning three cars may reflect that the child is also driving, or it may simply indicate greater availability of cars for transportation. Regarding sociodemographic correlates, girls and boys walked a similar amount, 12- to 15-year-olds walked most frequently and furthest, low-income children were significantly more likely to walk, those in smaller households were more likely to walk, and those with no or fewer cars were significantly more likely to walk. Ethnicity and number of

Table 4

Logistic Regression Analyses for Acreage and Number of Recreation and Open Spaces, Controlling for Sociodemographics and Stratified by Age Group for the Outcome Walked At Least Once Over 2 Days

Recreation and Open Space	All Age Groups n = 3,161	5–8 Years OR (95% CI) n = 847	9–11 Years OR (95% CI) n = 632	12–15 Years OR (95% CI) n = 867	16–20 Years OR (95% CI) n = 815
Acreage					
No space	Referent	Referent	Referent	Referent	Referent
1–5 acres recreation/open space	2.2 (1.6–2.9)***	2.2 (1.2–4.1)**	1.4 (0.8–2.6)	2.2 (1.3–3.7)**	2.6 (1.5–4.6)***
$\geq$6 acres recreation/open space	1.1 (0.7–1.6)	1.4 (0.6–3.1)	1.6 (0.7–3.9)	1.0 (0.5–2.1)	0.9 (0.4–1.9)
Number					
No space	Referent	Referent	Referent	Referent	Referent
1 recreation/open space	1.7 (1.3–2.4)***	2.2 (1.2–4.0)**	1.3 (0.6–2.5)	2.1 (1.2–3.6)**	1.4 (0.7–3.0)
2–3 recreation/open spaces	2.5 (1.8–3.5)***	2.6 (1.3–5.3)**	2.0 (0.9–4.2)	3.2 (1.8–5.7)***	2.1 (1.1–3.9)*
$\geq$4 recreation/open spaces	2.1 (1.5–2.9)***	1.4 (0.6–3.5)	2.6 (1.3–5.4)**	2.3 (1.2–4.3)**	1.9 (1.0–3.8)

CI indicates confidence intervals; and OR, odds ratio.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

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Table 5

Significant Variables for the Two Walking Outcomes Using a Multivariate Model With Density, Connectivity, Land Use Mix, and Recreation Space All Entered Simultaneously Along With All Sociodemographic Variables

	Walked At Least Once Over 2 Days OR (95% CI)	Walked $\geq$0.5 Miles Per Day OR (95% CI)
No car (vs. $\geq$3)	3.7 (2.3–6.0)***	2.6 (1.3–4.9)**
At least one recreation/open space (vs. none)	1.9 (1.3–2.3)***	1.7 (1.2–2.4)**
1 car (vs. $\geq$3)	1.7 (1.2–2.4)**	NS
Residential density 3rd tertile (vs. 1st)	1.7 (1.1–2.3)**	1.8 (1.0–3.1)*
9–11 years (vs. 5–8)	1.5 (1.1–2.1)**	NS
12–15 years (vs. 5–8)	1.5 (1.1–2.0)**	1.8 (1.2–2.9)**
$30,000 income (vs. $\geq$$60,000)	1.5 (1.1–2.1)*	NS
Nonwhite (vs. white)	1.4 (1.0–1.8)*	NS

CI indicates confidence intervals; NS, nonsignificant; and OR, odds ratio.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

cars may be proxies for income. Other studies have found age and income to be related to active transportation in youth.[7,8,16–18,36]

The limitations of the present study include the cross-sectional design, restriction to one geographic region that is known to be primarily a low-walkable development pattern, and the likelihood of parental selection bias. The sample may not be fully representative of the levels of walkability that exist in other regions. However, the stratified sample ensured variability across income, household size, and residential density in the Atlanta region. Although the urban form variables were assessed objectively using geographic information software and the methods have worked well in other studies,[21,24] there are limitations in the completeness and accuracy of all land use databases. The walking variables were all self-reported; therefore, some bias and inaccuracy can be expected. There was the additional complication that parents completed travel diaries for younger children, and so the data may not be fully comparable across age groups. The study did not include measures of the pedestrian environment, including the presence of sidewalks and crosswalks.

A primary finding of this large study is that the same indicators of walkability that are related to active transportation and physical activity in adults (i.e., street connectivity, residential density, and mixed land use[2,20]) are related in similar ways to walking for transportation in children and especially adolescents. The urban form–walking associations were strongest in 12- to 15-year-olds who were old enough to walk on their own in their neighborhoods but not old enough to drive. Present findings suggest that policies designed to promote more walkable developments can be expected to have beneficial effects on the physical activity of adults, children, and adolescents. Other policies geared toward increasing the cost of driving (i.e., availability and cost of parking at school) and taxes on additional household vehicles may also be effective agents at promoting physical activity in youth. These policies, coupled with investing in a safe and secure walking environment (i.e., sidewalks and designated crosswalks at intersections), could increase the attractiveness of walking to school and other destinations.

Of the urban form variables measured, the most consistent correlate of young people's walking for transportation at all ages was having multiple recreation uses or open spaces within 1 km of their homes. These findings add to mounting evidence of the importance of proximal recreation facilities for young people's physical activity,[31] but present results showed the number of recreation uses was more important than their size. Evidence presented suggests that significant health benefits can be achieved through the provision of recreational facilities and commercial destinations within a walkable distance from where youth and adolescents live.

SO WHAT? Implications for Practitioners and Researchers

This study seems to indicate that urban form is related to walking in children, particularly 12- to 15-year-olds. Having recreation space within 1 km of home was the strongest urban form predictor of walking in this sample.

Implications for Practitioners: If recreation space is related to walking in children, practitioners should consider ways of promoting the use of existing spaces and identifying spaces that could be converted to recreation use.

Implications for Researchers: Researchers should investigate the attributes of parks and recreation spaces that may encourage greater use.

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