Published in final edited form as:
Am J Prev Med. 2013 August ; 45(2): 158–166. doi:10.1016/j.amepre.2013.03.018.

Walk Score® and Transit Score® and Walking in the Multi-Ethnic Study of Atherosclerosis

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Abstract

Background—Walk Score® and Transit Score® are open-source measures of the neighborhood built environment to support walking ("walkability") and access to transportation.

Purpose—To investigate associations of Street Smart Walk Score and Transit Score with self-reported transport and leisure walking using data from a large multi-city and diverse population-based sample of adults.

Methods—Data from a sample of 4552 residents of Baltimore MD; Chicago IL; Forsyth County NC; Los Angeles CA; New York NY; and St. Paul MN from the Multi-Ethnic Study of Atherosclerosis (2010–2012) were linked to Walk Score and Transit Score (collected in 2012). Logistic and linear regression models estimated ORs of not walking and mean differences in minutes walked, respectively, associated with continuous and categoric Walk Score and Transit Score. All analyses were conducted in 2012.

Results—After adjustment for site, key sociodemographic, and health variables, a higher Walk Score was associated with lower odds of not walking for transport and more minutes/week of transport walking. Compared to those in a "walker's paradise," lower categories of Walk Score were associated with a linear increase in odds of not transport walking and a decline in minutes of leisure walking. An increase in Transit Score was associated with lower odds of not transport walking or leisure walking, and additional minutes/week of leisure walking.

Conclusions—Walk Score and Transit Score appear to be useful as measures of walkability in analyses of neighborhood effects.

Introduction

Efforts to address low levels of physical activity, high levels of sedentary behavior, and obesity have more recently focused on community-level characteristics. The built environment, "comprised of urban design, land use patterns, and the transportation system and encompassing patterns of human activity within the physical environment,"[1] has

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No financial disclosures have been reported by the authors of this paper.

become a prominent characteristic of interest. Numerous studies have reported associations between various built environment elements and certain types of physical activity, such as transport and leisure walking.[2-6]

Most objective built environment measures require the use of GIS. However, obtaining, cleaning, managing, and analyzing GIS-based data require trained personnel and time.[2] Additionally, since no standardized method of cataloging GIS data or creating measures exists,[7] data often vary across locales, limiting comparability. These difficulties hinder the use of these measures by researchers, nonprofit organizations, community activism groups, or government entities. Due to these practical limitations, Internet products making use of available data may be faster and more efficient.[8]

Walk Score measures the built environment’s ability to support walking (“walkability”) for a given location. Walk Score is open-sourced and available to the public. It combines information on distance to destinations accessible from that location weighted based on the street’s characteristics around the location. The three inputs to Walk Score, destinations, intersection density, and block length, have been associated with walking in several studies.[2,9-14] Transit Score is a separate measure created by Front Seat Management indicating how well a specific address is served by public transportation. It combines distance to the nearest stop on a transportation route, frequency of the route, and type of route.[15]

Several studies have shown positive correlations between Walk Score and street connectivity, residential density, population density, highway density, intersection density, average speed limit, and access to public transport.[16-18] Higher levels of Walk Score are also associated with self-reports of more favorable physical activity environments,[17] including access to public recreation facilities and pleasantness of the neighborhood.[19] In addition, significant positive correlations were found between Walk Score and proximity to destinations including retail, service, cultural/educational, parks, grocery stores, coffee shops, restaurants, and libraries.[16,20] Significant positive correlations have been shown between Transit Score and density of bus and subway stops.[21] However, correlations between Walk Score and GIS measures have not always been consistent across spatial scales and geographic regions.[16,21] Additionally, several studies[16-18,20] had small sample sizes (733, 296, 429, and 730, respectively), and only one study investigated more than one geographic location.[16]

Few studies have investigated associations of the Walk Score with walking, physical activity,[20,22,23] or BMI.[24] Although one study showed associations between Walk Score and physical activity,[23] others failed to find associations,[20,22] despite positive correlations with a GIS-derived walkability index.[20] Limitations of these studies include dichotomization of walking[22] and failure to account for nontravel walking.[23] Participants were sometimes limited to single gender[20,24] or limited age-range,[20,22] restricting generalizability. The current study builds evidence regarding the association of Walk Score and Transit Score with walking behaviors in a large and diverse population sample by investigating associations of Walk Score and Transit Score with self-reported transport and leisure walking in the Multi-Ethnic Study of Atherosclerosis (MESA) cohort, a large multi-city and multi-ethnic sample of adults.

Methods

Sample

The sample consisted of participants from MESA, a study of 6814 U.S. adults aged 45–84 years without clinical cardiovascular disease at baseline.[25] Participants were recruited between 2000 and 2002 from six study sites (Baltimore MD; Chicago IL; Forsyth County NC; Los Angeles CA; New York NY; and St. Paul MN). After a baseline examination, participants attended four additional follow-up examinations. Of the 6814 in the MESA study, 4716 completed Exam 5 (April 2010– February 2012), with 4638 having complete information on self-reported walking. Those who did not give consent to participate in the Neighborhood Ancillary Study (*n*=72) or whose address could not be geocoded (*n*=14) were excluded, resulting in a final sample of 4552. The study was approved by IRBs at each site, and all participants gave written informed consent.

Exposures

Walk Score—The Walk Score algorithm produced scores from 0 to 100, based on distance to various categories of amenities (e.g., restaurants, shopping, schools, parks, and entertainment) that were weighted based on importance to walkability and then summed. Scores were then adjusted for street-network characteristics such that areas with low intersection density and high block length received lower scores.[26] Traditional Walk Score used Euclidean ("straight-line") distances, whereas Street Smart (SS) Walk Score uses network distances by following the streets to amenities. SS-Walk Score also allows multiple amenities within each category to count toward the Walk Score, allowing it to reflect the depth of choice.[26]

The current study investigated traditional and SS-Walk Score collected in May 2012 for each participant's street address. The measures were examined continuously and using categories designated by Front Seat Management: 0–24, "very car-dependent" (almost all errands require a car); 25–49, "car-dependent" (a few amenities within walking distance); 50–69, "somewhat walkable" (some amenities within walking distance); 70–89, "very walkable" (most errands can be accomplished on foot); and 90–100, "walker's paradise" (daily errands do not require a car).[27] Since results were similar and the two measures were highly correlated (Pearson r=0.93, 95% CI=0.93, 0.94), only SS-Walk Score is reported.

Transit Score—Transit Score provides a 0–100 rating indicating how well a specific address is served by public transportation (e.g., bus, subway, or light rail). It is based on distance to the nearest stop on a transit route, frequency of the route, and type of route.[15] Transit Score is currently only available in 40 U.S. cities, including all of the MESA sites except Forsyth County. Transit Score, from May 2012 for participants' addresses, was investigated continuously and using categories designated by Front Seat Management: 0–24, "minimal transit" (it is possible to get on a bus); 25–49, "some transit" (a few nearby public transportation options); 50–69, "good transit" (many nearby public transportation options); 70–89 "excellent transit" (transit is convenient for most trips); and 90–100, "rider's paradise" (world-class public transportation).[28]

Outcome Measures

An interviewer-administered questionnaire adapted from the Cross-Cultural Activity Participation Study[29,30] was used to assess physical activity. The questionnaire was developed using extensive qualitative research[31] and has acceptable evidence for test–retest reliability and validity among a sample of women.[32] Walking was assessed as transport walking (e.g., walking to get to places such as a bus, car, workplace, or store) and leisure walking (e.g., walking for leisure, pleasure, social reasons, during work breaks, and with the dog). For each type of walking activity, participants were asked whether they had engaged in that activity during a typical week in the past month, how many days per week, and the number of hours/minutes per day they did that activity.

Transport walking and leisure walking were examined as separate outcomes. Each outcome was investigated by being dichotomized into not walking (0 minutes/week); and any walking (minutes/week >0). Other analyses investigated minutes/week of walking as a continuous variable among people who reported any walking.

Covariates

Information on age, race/ethnicity, education, income, and working status was obtained by interviewer-administered questionnaire. Race/ethnicity was classified as Hispanic, non-Hispanic white, non-Hispanic Chinese, and non-Hispanic black. Participants selected their education from eight categories that were collapsed into three categories: less than high school, high school diploma/General Educational Development test but less than college, and college degree or higher. Results did not change in sensitivity analyses using the original eight education categories. Participants selected total combined family income from 14 categories, and continuous income in U.S. dollars was assigned as the midpoint of the selected category.

Working status was categorized as working at least part time or not. Participants were asked to rate their health compared to others their age as better, same, or worse. BMI was calculated as measured weight in kilograms divided by measured height in meters squared. Season was classified as winter (January–March); spring (April–June); summer (July–September); and fall (October–December). At Exam 5, a total of 434 participants (9.5%) had moved outside the study sites to other locations around the U.S. and have been grouped together in these analyses as “other,” in addition to the six original study sites.

Data Analysis

Chi-square tests or ANOVA were used to test for differences in covariates and outcome measures across the five categories of SS-Walk Score and to test for differences in SS-Walk Score and Transit Score across study sites. Generalized estimating equations (GEE) logistic regression models were used to estimate adjusted OR (AOR) of not walking (vs walking) associated with categories of SS-Walk Score and Transit Score. Linear regression GEE models were used to estimate adjusted mean differences in minutes walked associated with score categories.

All models were adjusted for age, gender, race/ethnicity, education, income, working status, self-reported health, BMI, season, and study site. Clustering by U.S. census tract (as proxy for neighborhood) was accounted for using an exchangeable correlation structure. SS-Walk Score and Transit Score were assessed separately and also in joint models with interaction terms between the two scores (variance inflation factor 2.56). All analyses were conducted in 2012.

Results

Age of the participants ranged from 53 to 94 years, with an overall mean of 69.8 years (SD 9.4) and did not differ by SS-Walk Score category (Table 1). More than half (53.2%) of the sample were women, with a higher percentage of those in “walker’s paradise” being female (58.0%) than in “very car-dependent” neighborhoods (50.3%). Hispanics and participants with lower education levels were disproportionately located in areas with higher SS-Walk Scores ($p<0.0001$). Non-Hispanic whites and individuals with higher education and income levels, were more likely to be located in “very car-dependent” and “walker’s paradise” areas ($p<0.0001$).

Body mass index generally decreased as the neighborhood became more walkable. Self-rated health was higher among those who resided in “very car-dependent” and “walker’s paradise” areas. One quarter of participants (22.3%) reported no walking for transport, whereas 36.1% reported no leisure walking. New York had the highest mean SS-Walk Score (92.4) followed by Chicago (73.7); Los Angeles (57.9); St. Paul (51.0); Baltimore (43.2); and Forsyth County (17.3) (Table 2). SS-Walk Score and Transit Score were correlated (Pearson r =0.78, 95% CI=0.76, 0.79).

Every 10-point increase in SS-Walk Score® (indicating higher walkability) was associated with 12% lower odds of not walking (AOR 0.88, 95% CI=0.85, 0.92; Table 3). Compared to those in “walker’s paradise,” the odds of not walking for transport increased in a linear fashion with decreasing walkability. Among walkers, a 10-point higher SS-Walk Score was associated with 9.01 (95% CI=1.45, 16.61) minute/week greater transport walking after adjustment. Categoric analyses of SS-Walk Score with transport walking followed a linear pattern with decreasing walkability associated with less walking, compared to “walker’s paradise.”

Every 10-point increase in Transit Score (indicating higher access to transportation) was associated with 17% lower odds of not walking for transport (AOR 0.83, 95% CI=0.76, 0.91) but was not associated with minutes/week of transport walking among walkers (Table 3). However, only some Transit Score categories were associated with increased odds of not walking and decreased minutes/week of walking.

Adjusting for covariates, there was evidence of statistical interaction between SS-Walk Score and Transit Score for odds of not walking (p=0.0004) but not for amount of transport walking (p=0.13). Higher Transit Score was more strongly associated with greater transport walking at higher levels of SS-Walk Score than at lower levels of SS-Walk Score (AOR of not walking 0.96, 95% CI=0.62, 1.50; and 0.44, 95% CI=0.28, 0.68 at the 25th and 75th percentiles of SS-Walk Score, respectively).

After adjustment, there was no association between a 10-point increase in SS-Walk Score and either higher odds of not walking for leisure or more minutes/week of leisure walking among walkers (Table 4). Categories of SS-Walk Score were not associated with the odds of leisure walking. Compared to those in “walker’s paradise,” lower categories of SS-Walk Score were associated with a linear decline in leisure walking minutes.

A 10-point increase in Transit Score was associated with 8% lower odds of not walking for leisure (AOR 0.92, 95% CI=0.86, 0.98); and 18.43 (95% CI=3.04, 33.83) additional minutes/week of leisure walking among walkers (Table 4). Compared to those in “rider’s paradise,” those with “good transit” and “some transit” had higher odds of not walking for leisure. Differences in minutes/week of walking across Transit Score categories suggest less walking at lower Transit Score, but most differences failed to reach significance.

There was some evidence of statistical interaction between SS-Walk Score and Transit Score (p-value for interaction 0.07 for odds of not walking, 0.02 for amount of leisure walking). Higher Transit Score was more strongly associated with greater leisure walking at higher levels of SS-Walk Score than at lower levels of SS-Walk Score (AOR of not walking 0.78, 95% CI=0.50, 1.21; and 0.55, 95% CI=0.38, 0.80 at the 25th and 75th percentiles of SS-Walk Score, respectively; mean minute/week difference 9.34, 95% CI= −79.15, 97.82; and 97.99, 95% CI=4.97, 191.01 at the 25th and 75th percentiles of SS-Walk Score, respectively).

Discussion

Higher SS-Walk Score and Transit Score were associated with lower odds and higher amount of transport and leisure walking in a large, multi-city, and multi-ethnicity sample.

Associations were stronger for transport than leisure walking and for SS-Walk Score than Transit Score. Results using SS-Walk Score were strong and persisted after control for potential confounders. This research supports the use of Walk Score and the development of comprehensive composite measures for retrospective analyses.

Stronger associations observed with transport compared to leisure walking were consistent with the methods used to create Walk Score. Walk Score's focus on destinations is meant to capture distance to places, rather than how easy or pleasant it is to walk. SS-Walk Score was not associated with odds of not walking for leisure but was associated with how much leisure walking per week participants performed. High Walk Scores seem to represent engaging environments with activities or destinations that encourage more walking among those who already walk for leisure, but may not change the decision of whether to walk.

Results for Transit Score were weaker and less consistent than they were for SS-Walk Score. However, results showing that higher transit score was associated with lower odds of not walking support prior research suggesting that access to transportation increases walking to the bus or train.[33-35] The lack of association between Transit Score and minutes/week of transport walking may reflect that as access to transportation increases, individuals have more options for traveling between two locations.

Although the interaction between Transit Score and Walk Score is difficult to investigate because of the high correlation (Pearson r =0.78) between the two measures, results suggest that effects of Transit Score may be stronger at higher SS-Walk Score. This underscores how environmental supports for public transportation may affect the influence of public transportation on walking. Although speculative, these results may represent the preference of those in low-walkable neighborhoods to use their cars for transport out of habit, regardless of transit access. Results comparing SS-Walk Score and Transit Score may have been affected by lack of Transit Score in Forsyth County NC, possibly creating limited variability in this measure.

Compared to past research on the built environment and walking, the associations reported for SS-Walk Score in this study were quite strong.[13,14,36] Although SS-Walk Score does not take into account the presence of sidewalks or infrastructure that helps pedestrians cross busy streets, the strength of the measure compared to traditional measures may result from its combination of multiple built environment attributes. In previous research, composite measures show stronger associations with walking than single-component measures.[8,37-39] By combining access to destinations while incorporating street-network features, Walk Score may better measure "walkability" of neighborhoods than land uses, street networks, or transit alone.

For planners, the importance of representing walkability more comprehensively presents both an opportunity and a challenge. A complex rendering of walkability aligns with what planners and urban designers consider walkability.[40] Thus, Walk Score can be useful in communicating future visions of neighborhoods with the public. However, the use of a combined measure makes it challenging to interpret policy implications because elements of the score are influenced by various processes and stakeholders, including public agencies and private landowners, often resulting in incremental changes.

Although analyses adjusted for site, it is possible that the strong associations between Walk Score and walking were driven by large differences across extreme sites in terms of Walk Score and Transit Score. Additional analyses were conducted excluding New York and Forsyth County since both of these sites have extreme scores with limited variation. Results were similar to those reported for all six sites (data not shown).

Limitations

This work is limited by the self-reported measure of walking and the cross-sectional design that prevents causal conclusions. Participants were middle-aged and older adults, limiting the generalizability of this sample. Additionally, Walk Score uses open-source data from various sources: business listings from Google and Localeze, road networks and parks from Open Street Map, schools from Education.com, and public transportation from over 200 transit agencies.[26] These sources change, with the scores being updated, limiting retrospective data collection and possibly resulting in varying data accuracies by location. Although little research compares these "Google-based" databases to commercial data typically used, a recent study concluded that free data may be as effective in predicting walking as measures created with local, government, and commercial sources.[8] The correlation between SS-Walk Score and Transit Score made it difficult to isolate their effects.

Conclusion

The SS-Walk Score, and to a lesser extent, Transit Score, were consistent predictors of walking, particularly for transport. Walk Score may have utility for planners, public health advocates, or community organizations seeking to characterize the built environment without the time, money, or skills necessary to create GIS-based measures. Walk Score may be useful as a global measure of "walkability" in analyses of various other neighborhood effects. Future research should examine if changes in Walk Score are related to changes in walking over time as well as the role of Walk Score in other locations.

Acknowledgments

The MESA cohort was supported by contracts N01-HC-95159 through N01-HC-95169 with the NIH, and the National Heart, Lung, and Blood Institute. Ongoing research was supported by NIH 2R01 HL071759; and by the Robert Wood Johnson Foundation (RWJF), Active Living Research Program (#52319). The Walk Score was developed using financial support from the Rockefeller Foundation and the RWJF (#12115 and #12116). The content of this paper is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the RWJF.

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Table 1

Participant characteristics, Multi-Ethnic Study of Atherosclerosis, Exam 5 (April 2010– February 2012, M (SD) or %

	Overall (N=4552)	Very Car-Dependent (*n*=1136)	Car-Dependent (*n*=786)	Somewhat Walkable (*n*=884)	Very Walkable (*n*=856)	Walker's Paradise (*n*=890)	*p*-value[a]
Age (years)	69.8 (9.4)	69.9 (8.8)	70.1 (9.6)	69.0 (9.6)	69.9 (9.6)	70.1 (9.6)	0.0914
Female	53.2	50.3	52.2	53.3	52.9	58.0	0.0142
Race/ethnicity							<0.0001
Non-Hispanic white	41.1	54.3	38.2	34.1	33.5	40.9	
Non-Hispanic Chinese	11.6	5.7	14.5	16.7	19.3	4.3	
Non-Hispanic black	26.3	29.9	27.7	25.3	23.6	24.2	
Hispanic	21.0	10.0	19.6	23.9	23.6	30.7	
Education							<0.0001
Less than high school	13.9	6.4	12.9	17.0	18.0	17.2	
High school but less than college	46.6	48.0	52.6	52.5	41.2	38.8	
College or higher	39.6	45.7	34.5	30.5	40.8	44.0	
Income (in thousands of $)	58.5 (44.6)	69.4 (45.1)	55.5 (40.6)	48.6 (38.0)	53.2 (44.3)	62.8 (50.0)	<0.0001
Study Site							
Los Angeles CA	15.2	4.9	20.5	28.1	24.0	2.3	<0.0001
Chicago IL	17.1	4.6	7.3	15.6	32.7	28.3	
Baltimore MD	13.0	14.8	24.3	14.6	8.3	3.7	
St Paul MN	14.5	9.1	19.9	30.9	13.8	1.0	
New York NY	15.5	0.0	0.8	1.0	15.3	62.7	
Forsyth County NC	15.3	45.3	15.8	4.5	1.8	0.0	
Other[c]	9.5	21.3	11.6	5.3	4.2	2.0	
Currently working	43.8	45.2	45.5	43.5	42.7	41.7	0.4202
BMI	28.5 (5.7)	28.9 (5.6)	28.7 (5.5)	28.6 (5.8)	27.8 (5.7)	28.2 (5.7)	0.0004
Health Compared to Others							
Better	59.4	62.0	59.2	54.4	58.1	62.7	0.0014
Same	35.3	33.9	36.0	39.6	34.7	32.7	
Worse	5.3	4.1	4.9	6.1	7.3	4.6	
Transport Walking (minutes/week)							
Report 0	22.3	30.4	27.1	28.5	17.9	5.8	<0.0001
M[b]	390.1 (451.1)	356.1 (431.9)	339.6 (436.7)	367.6 (452.3)	359.1 (443.1)	499.8 (467.1)	<0.0001
Leisure Walking (minutes/week)							
Report 0	36.1	31.9	38.9	38.6	39.4	33.6	0.0004

	Overall (N=4552)	Very Car-Dependent (*n*=1136)	Car-Dependent (*n*=786)	Somewhat Walkable (*n*=884)	Very Walkable (*n*=856)	Walker's Paradise (*n*=890)	*p*-value[a]
M [b]	361.0 (400.8)	333.3 (384.4)	325.9 (360.5)	326.6 (374.3)	346.2 (378.2)	470.6 (471.6)	<0.0001

Note: Table is for participants included in analyses for the full sample and by Street Smart Walk Score® category.

[a] *p*-value from Chi-square test for categoric variables and one-way ANOVA for continuous variables

[b] Minutes of walking per week among participants who report any walking

[c] Other=moved outside MESA study sites.

Table 2

Street Smart Walk Score® and Transit Score,® Multi-Ethnic Study of Atherosclerosis, Exam 5 (April 2010–February 2012, M (SD) or %

Exposure Variable	Overall	Los Angeles CA	Chicago IL	Baltimore MD	St. Paul MN	New York NY	Forsyth County NC	Other[a]	*p*-value[b]
SS Walk Score, M	54.1 (32.4)	57.9 (21.0)	73.7 (24.5)	43.2 (26.3)	51.0 (21.9)	92.4 (8.3)	17.3 (19.0)	29.0 (28.4)	<0.0001
SS Walk Score									
Very Car-Dependent	25.0	8.1	6.7	28.4	15.6	0.0	74.2	55.8	<0.0001
Car-Dependent	17.3	23.3	7.3	32.3	23.7	0.9	17.9	21.0	
Somewhat Walkable	19.4	35.9	17.7	21.8	41.4	1.3	5.8	10.8	
Very Walkable	18.8	29.7	35.9	12.0	17.9	18.6	2.2	8.3	
Walker's Paradise	19.6	2.9	32.4	5.6	1.4	79.3	0.0	4.2	
Transit Score, M	69.0 (23.4)	57.6 (18.7)	73.9 (13.2)	58.1 (16.7)	46.0 (11.3)	94.2 (8.7)	NA	39.2 (25.3)	<0.0001
Transit Score									
Minimal Transit	1.7	3.5	0.0	2.9	2.0	0.0	—	21.5	<0.0001
Some Transit	23.0	21.8	2.7	19.9	68.2	0.3	—	49.4	
Good Transit	30.4	60.6	50.5	52.7	26.7	2.6	—	15.2	
Excellent Transit	15.9	7.7	30.2	24.5	2.1	14.8	—	11.4	
Rider's Paradise	29.0	6.5	16.6	0.0	1.0	82.4	—	2.5	

[a] Other=moved outside MESA study sites

[b] *p*-value from Chi-square test for categoric variables and one-way ANOVA for continuous variables

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Table 3

ORs of not walking for transport and mean differences in transport walking (among those who walk), Multi-Ethnic Study of Atherosclerosis, Exam 5 (April 2010–February 2012

	Unadjusted		Adjusted[a]	
Measure	**OR**	**Minutes/week (95% CI)**	**AOR**	**Minutes/week (95% CI)**
SS Walk Score (10-unit increase)	**0.87 (0.85, 0.89)** **	**13.08 (7.75, 18.40)** **	**0.88 (0.85, 0.92)** **	**9.01 (1.42, 16.61)** *
SS Walk Score Category				
Very Car Dependent (0–24)	**6.36 (4.73, 8.55)** **	**−144.59 (−193.48, −95.69)** **	**5.31 (3.58, 7.87)** **	**−99.77 (−167.06, −32.47)** *
Car Dependent (25–49)	**5.47 (3.98, 7.51)** **	**−158.35 (−208.35, −108.35)** **	**3.85 (2.58, 5.73)** **	**−83.16 (−145.53, −20.79)** *
Somewhat Walkable (50–69)	**5.85 (4.30, 7.96)** **	**−128.45 (−178.55, −78.35)** **	**3.96 (2.74, 5.73)** **	−40.16 (−103.51, 23.20)
Very Walkable (70–89)	**3.24 (2.34, 4.49)** **	**−136.80 (−189.20, −84.40)** **	**2.44 (1.73, 3.45)** **	**−62.81 (−119.22, −6.40)** *
Walker's Paradise (90–100)	ref	ref	ref	ref
Transit Score (10-unit increase)	**0.75 (0.71, 0.79)** **	**24.40 (13.30, 35.51)** **	**0.83 (0.76, 0.91)** **	11.33 (−6.32, 28.99)
Transit Score Category				
Minimal Transit (0–24)	**5.07 (2.51, 10.25)** **	−28.91 (−301.36, 243.54)	1.84 (0.76, 4.47)	33.15 (−213.25, 279.56)
Some Transit (25–49)	**5.90 (4.02, 8.65)** **	**−158.45 (−221.69, −95.21)** **	**3.58 (2.05, 6.24)** **	−90.03 (−196.42, 16.35)
Good Transit (50–69)	**3.99 (2.74, 5.81)** **	**−124.37 (−183.45, −65.29)** **	**2.79 (1.68, 4.62)** **	−54.02 (−133.98, 25.94)
Excellent Transit (70–89)	1.46 (0.90, 2.35)	**−82.01 (−144.74, −19.29)** *	1.49 (0.88, 2.52)	−43.11 (−107.98, 21.77)
Rider's Paradise (90–100)	ref	ref	ref	ref

Note: Boldface indicates significance. Both SS-Walk Score and Transit Score have been centered around the median (SS-Walk Score median=58, Transit Score median=67).

[a] Models adjusted for age, gender, race/ethnicity, education, income, health compared to others, working status, BMI, season, and study site

* $p<0.05$,

** $p<0.001$

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Table 4

ORs of not walking for leisure and mean differences in leisure walking (among those who walk), Multi-Ethnic Study of Atherosclerosis, Exam 5 (April 2010−February 2012

	Unadjusted		Adjusted[a]	
Measure	**OR**	**Minutes/week**	**AOR**	**Minutes/week**
SS Walk Score (10-unit increase)	**1.02 (1.00, 1.04)** *	**10.70 (5.85, 15.55)** **	1.02 (0.99, 1.05)	3.64 (−3.23, 10.51)
SS Walk Score Category				
Very Car−Dependent (0–24)	0.87 (0.71, 1.06)	**−137.33 (−185.6, −89.06)** **	1.02 (0.76, 1.36)	**−82.09 (−146.92, −17.27)** *
Car–Dependent (25–49)	1.18 (0.94, 1.48)	**−144.93 (−194.64, −95.23)** **	1.28 (0.95, 1.71)	**−93.62 (−153.75, −33.49)** *
Somewhat Walkable (50–69)	1.17 (0.94, 1.46)	**−144.05 (−195.02, −93.07)** **	1.26 (0.96, 1.67)	**−85.71 (−147.42, −24.00)** *
Very Walkable (70–89)	1.21 (0.98, 1.49)	**−124.56 (−175.63, −73.5)** **	**1.35 (1.06, 1.72)** *	**−74.97 (−129.98, −19.95)** *
Walker's Paradise (90–100)	ref	ref	ref	ref
Transit Score (10-unit increase)	0.97 (0.93, 1.01)	**25.31 (15.37, 35.24)** **	**0.92 (0.86, 0.98)** *	**18.43 (3.04, 33.83)** *
Transit Score Category				
Minimal Transit (0–24)	0.74 (0.36, 1.54)	**−191.17 (−289.55, −92.79)** **	1.08 (0.48, 2.44)	**−125.76 (−251.23, −0.29)** *
Some Transit (25–49)	1.17 (0.88, 1.56)	**−143.23 (−210.56, −75.90)** **	**1.77 (1.13, 2.77)** *	−88.30 (−186.32, 9.72)
Good Transit (50–69)	1.20 (0.95, 1.52)	**−147.80 (−207.58, −88.02)** **	**1.56 (1.10, 2.23)** *	**−111.55 (−198.98, −24.12)** *
Excellent Transit (70–89)	0.83 (0.61, 1.13)	**−86.39 (−147.70, −25.08)** *	0.96 (0.65, 1.41)	−50.21 (−119.19, 18.77)
Rider's Paradise (90–100)	ref	ref	ref	ref

Note: Boldface indicates significance. Both SS-Walk Score and Transit Score have been centered around the median (SS-Walk Score median=58, Transit Score median=67).

[a] Models adjusted for age, gender, race/ethnicity, education, income, health compared to others, working status, BMI, season, and study site

* $p<0.05$,

** $p<0.001$

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