

Use and Nonuse of a Rail Trail Conversion for Physical Activity: Implications for Promoting Trail Use

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Background: There is limited research examining both use and nonuse of trails for physical activity. **Purpose:** Such research might enable health educators to better promote physical activity on trails. **Methods:** We used random digit dialing methods to survey 726 respondents in 2012. **Results:** The majority (75.1%) of respondents reported not using the trail in the previous 6 months. The odds of using the trail were greater among adults compared to older adults and those with a high school degree or college degree compared to those with less than a high school degree. Fifteen percent of trail users reported using the trail regularly (i.e., at least 30 minutes, 3 days/week). Trail characteristics preferred by trail users and reasons for not using the trail among nonusers were also examined. **Discussion:** These findings might be useful for health educators promoting physical activity on trails. **Translation to Health Education Practice:** Persons promoting physical activity on trails should highlight those trail characteristics preferred by trail users, including the trails' convenient location, beauty, and design. There is an opportunity to promote trail use among older adults and those with low education levels; promoting active transportation on trails might be especially useful among those with low education levels.

BACKGROUND

The benefits of regular physical activity have been well documented.^{1,2} Regular physical activity has been associated with improved outcomes with regards to cardiovascular disease, diabetes, cancer, weight control, cognitive function, mental health problems such as anxiety and depression, and all-cause mortality.^{1,2} Promoting physical activity can be challenging, however, because physical activity is a complex behavior influenced by multiple factors.^{3,4} Efforts to promote physical activity are most effective when they are based on a social–ecological model,⁵ targeting multiple levels of influence. Previous research findings highlight the need to use environmental approaches to promote physical activity that can complement tradition behavior modifi-

cation strategies.^{6–8} Built environment supports, such as no-cost recreational facilities, transportation greenways, and parks and trails, have might enable physical activity in communities and should be further examined.^{9–11}

The Task Force on Community Preventive Services recommends the creation and promotion of places to engage in physical activity, including trails.¹² Previous research demonstrates positive associations between trail use and frequency and duration of physical activity among persons living near trails^{13,14} and that the creation of trails might have the largest positive impact on new users.¹⁵ Librett and colleagues¹⁶ found that trail users were more likely to meet physical activity recommendations than non-trail users. In addition, trails are cost effective and can produce significant economic benefits for the areas surrounding trails.¹⁷ Efforts to promote trail use, however, should be based on knowledge about patterns of both trail use and nonuse.

Several studies have examined trail use, and the research suggests that trail users are most often white adults.^{14,18–20} There is mixed research regarding which sex most often uses trails^{14,16,18,20,21} and whether or not proximity to trails

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is linked to trail use.^{13,14,18} The research examining characteristics of those who do not use trails is limited.^{13,14}

PURPOSE

The purpose of this study was to examine use of a Southeastern rail trail along with factors contributing to nonuse. Rail trails are multipurpose paths created from corridors previously used by as railroads.²² Rail trail conversions provide opportunities for active recreation and transportation and have been linked to wildlife conservation, historical preservation, increased tourism, and benefits for local businesses.²² To date, researchers examining trail use have focused on trail users only.^{21,23-28} This study adds to the literature by examining both rail trail use and nonuse. Such information might help those promoting trail use to identify strategies to encourage trail use among both trail users and nonusers. Though these data were collected to better inform trail promotion efforts in Greenville County, other health educators promoting active living might find the study findings useful.

METHODS

Trail Description

We examined use and nonuse of a paved greenway trail located in Greenville, South Carolina. This segment of the trail is 10 miles long and 10 feet wide and connects residential areas in Travelers Rest, South Carolina, to a university campus as well as to the commercial downtown area of the City of Greenville, which includes shops and restaurants and a large downtown park. The trail intersects

several neighborhoods that include individuals with diverse socioeconomic and demographic characteristics. There are 6 designated access points along the trail; 4 are supported with adjacent parking lots.

Data Collection

The study sample was selected using random digit dialing methods in March and April 2012. A marketing company was hired to call respondents. The sampling frame used to select participants was a database the marketing company purchased from Marketing Systems Group to obtain phone numbers of persons living in Greenville County (see characteristics of Greenville County residents in Table 1). The database includes working bank information at the two-digit level. Each of the 100 banks (i.e., first two digits of the 4-digit suffix) in each exchange was defined as “working” if it contained one or more listed telephone households. On a national basis, this definition covers an estimated 96.40% of all residential telephone numbers and 99.96% of listed residential numbers. This database is updated on a quarterly basis. Cell phone numbers were not included in the sample. Following specification of the geographic area, the system selected all exchanges and associated working banks that met those criteria. Using random digit dialing, 2461 persons were contacted. Up to 6 attempts were made to reach households. Calls were made from 6:00 to 9:00 PM Monday–Friday evenings, 10:00 AM to 6:00 PM on Saturdays, and 1:00 to 9:00 PM on Sundays. Respondents were eligible if they were 18 years of age or over and were currently living in Greenville County. Once a household was contacted, the next-birthday method²⁹ was used to randomly select a respondent age of 18 years or over from all of the adults living in the household. The addresses of respondents were confirmed by the interviewer to ensure

TABLE 1
Demographic Characteristics of Interview Respondents Overall and by Trail Users and Nonusers ($n = 726$) With Comparison to Greenville County Residents ($n = 461\ 299$)

	Total n = 726 n (%)	Trail Users n = 181 n (%)	Nonusers n = 545 n (%)	Greenville County ^a n = 461 299 n (%)
Sex				
Male	278 (38.3)	6 (5.0)	212 (38.9)	224 191 (48.6)
Female	448 (61.7)	115 (95.0)	333 (61.1)	237 108 (51.4)
Race				
White	572 (84.6)	154 (86.5)	418 (83.9)	356 123 (77.2)
Other	104 (15.4)	24 (13.5)	80 (16.1)	105 176 (22.8)
Age category				
Adult	436 (63.3)	152 (84.9)	284 (55.7)	401 330 (87.0)
Older adult	253 (36.7)	27 (15.1)	226 (44.3)	59 969 (13.0)
Highest education				
< High school degree	50 (7.6)	8 (4.5)	42 (8.8)	69 195 (15.0)
High school degree	286 (34.6)	59 (33.3)	227 (47.4)	252 331 (54.7)
College degree	320 (48.8)	110 (62.2)	210 (43.8)	139 773 (30.3)

^a Based on 2011 US Census Bureau data.¹⁶

that the respondents lived in Greenville County. Seven hundred twenty-six respondents completed the survey (30% response rate). The response rate is similar to the response rates obtained in previous survey research using phones as the mode of contact and delivery.³⁰ The interviews were completed in 5 minutes or less. Random digit dialing methods were chosen because probability sampling allows researchers to estimate the distribution of the entire study population's responses with statistical confidence.³¹ Furman University's Institutional Review Board approval was received for the present study.

Survey Instrument

The questionnaire used in this study was developed by Troped and colleagues³² with a test-retest reliability ranging from $\kappa = 0.65$ to 0.96 for categorical items and $r = 0.62$ to 0.93 for continuous items. The questionnaire was originally developed as an intercept survey to be used on trails; we used the questionnaire over the phone. We did not have to change any of the questions for phone use. The questionnaire is composed of 17 items to collect information on personal demographics, trail use, trail proximity, and trail perceptions. The variables examined in this study are described in the following section.

Study Variables

Demographic characteristics

The demographic characteristics examined in this study include age category (adult = 18-64 years, older adult = 65 + years), education level (< high school graduate, high school graduate, college graduate), sex (male, female), and race (white, other). Race was dichotomized because the proportion of black (10.6%), Latino (0.8%), Asian (1.7%), and other (2.3%) persons was too small to include in analyses.

Trail use and perceptions

All respondents were also asked whether or not they had used the trail in the previous 6 months. Those who said they had used the trail were asked the purpose for their trail use (recreation, transportation, both recreation and transportation), how many days each week they use the trail, how much total time they spend on the trail when they use it (<30 minutes, 30-59 minutes, 60 minutes or more), and what they like most about the trail (free, distances marked, convenient location, trail design, scenic, good surface, lighting, others exercising on the trail, or safe).¹⁹ A variable called "regular trail use" was created from the variables measured. In this study, respondents were considered regular trail users if they reported using the trail at least 30 minutes 3 times per week.

Trail nonuse

Those who reported not using the trail were asked why they do not use the trail (too far away, does not have wanted features, poor maintenance, too crowded, unsafe, not aware of the trail, or other). Respondents who chose "other" as a reason for not using the trail were asked to specify what the other reason was in an open-ended format. This was the only open-ended format question in the questionnaire.

Trail proximity

All questionnaire respondents were asked to indicate the intersection nearest their home. Using ESRI's geographic information systems (GIS), this information was used to calculate the distance in miles from the respondents' homes to the nearest trail access point.

Data Analysis

Data were analyzed using SPSS (SPSS Inc, Chicago, IL, V21.0) statistical software. Based on a Shapiro-Wilk test ($P < .001$), respondents' distance from the trail to their home (miles) was not normally distributed. Mann-Whitney U tests were used to examine the difference in distance (miles) from respondents' homes to the trail and whether or not respondents reported using the trail as well as whether or not they reported the trail being too far away as a reason for not using the trail. Chi-square tests were used to examine associations between regular trail use (yes-no) and demographic characteristics (age category, education, sex, race). Logistic regression was used to examine age category, education, sex, and race as predictors of using the trail or not. All variables were entered at once and then insignificant variables were removed from the model one at a time with the predictor variable with the highest P value being removed at each step until only significant variables remained in the model. Significance for all statistical tests was set at $P < .05$.

Chi-square goodness of fit tests were used to compare the demographic characteristics of the study sample (proportions of females/males, white/other, adult/older adult, < high school education/high school degree/college degree) to the demographic characteristics of Greenville County. Demographic characteristics of Greenville County residents was obtained from the US Census Bureau.³³

Respondents' other reasons for not using the trail were analyzed qualitatively because this question had an open-ended format. All open ended responses were entered into Atlas.ti (ATLAS.ti Scientific Software, Germany) and labeled with codes identifying the reason why respondents did not use the trail. The common codes were taken to represent common reasons why Greenville residents had not used the trail. These reasons are reported in the results section.

RESULTS

As shown in Table 1, the majority of the 726 survey respondents were college educated, white, adult females. The majority (75.1%) of respondents also reported not using the trail in the previous 6 months. The study sample had a significantly greater proportion of females ($\chi^2 = 49.935$, $df = 1$, $P = .000$), whites ($\chi^2 = 21.118$, $df = 1$, $P = .000$), older adults ($\chi^2 = 342.753$, $df = 1$, $P = .000$), and those with a college degree ($\chi^2 = 112.53$, $df = 1$, $P = .000$) than the proportions of females, whites, older adults, and those with a college degree in Greenville County (Table 1).

Survey respondents lived a median distance of 7.59 (IQR = 8.05) miles from the trail. There was no significant difference in distance (miles) from the trail and whether respondents reported using the trail (median = 7.15, interquartile range [IQR] = 7.74) or not using the trail (median = 7.69, IQR = 8.11; $U = 46016.00$, $P = .176$).

Demographic Predictors of Trail Use in the Previous 6 Months

As shown in Table 2, a full model including sex, race, age category, and education level to predict trail use in the previous 6 months was examined. Sex and race were not significant predictors of using the trail within the previous 6 months. Thus, they were removed from the model one at a time, first sex ($P = .492$) and then race ($P = .239$). As shown in the final reduced model in Table 2, age category and education level did significantly predict trail use in the previous 6 months. Specifically, the odds of using the trail in

TABLE 2
Full and Reduced Logistic Regression Models for Predicting Trail Use in the Previous 6 Months ($n = 461\ 299$)^a

	Full Model ^b		Reduced Model ^c	
	OR	95% CI	OR	95% CI
Sex			—	
Male	0.90	(0.62, 1.32)		
[Female]	1.00			
Race			—	
White	1.33	(0.77, 2.30)		
[Other]	1.00			
Age category				
Adult	4.08	(2.56, 6.48)	4.01	(2.53, 6.35)
[Older adult]	1.00		1.00	
Highest education				
College degree	2.21	(0.93, 5.26)	2.29	(0.97, 5.41)
High school degree	1.35	(0.56, 3.26)	1.40	(0.58, 3.36)
[< High school degree]	1.00		1.00	

^aOR indicates odds ratio; CI, confidence interval; —, not included in the model. Reference categories are in brackets.

^bFull model includes significant and nonsignificant variables.

^cReduced model includes only those variables that significantly predicted trail use in the previous 6 months.

the previous 6 months were greater among adults compared to older adults and greater among those with a high school degree or college degree than those with less than a high school degree.

Trail Use Among Trail Users

Almost all trail users reported using the trail for recreation purposes (89.5%) rather than for transportation (2.2%) or both recreation and transportation (8.3%). Therefore, trail use among the 177 respondents who reported that they have used the trail for recreational purposes was further examined. When using the trail for recreation, 2.8% of respondents used the trail for less than 30 minutes, 29.4% used the trail for 30-59 minutes, and 67.8% used the trail for 60 minutes or more. On average, respondents used the trail for recreational purposes for 1.04 (SD = 1.71) days each week with 15.3% using the trail for at least 3 days per week.

Associations Between Regular Trail Use and Demographic Characteristics of Trail Users

As shown in Table 3, 15% of trail users reported using the trail regularly for recreation (i.e., at least 30 minutes 3 days each week). There were no significant associations between regular trail use and age category, sex, or race (Table 3). There was a significant association between education and regular trail use, with a greater proportion of high school graduates and college graduates reporting regular trail use than those without a high school education (Table 3).

Perceptions of the Trail Among Trail Users

Those who reported using the trail were asked to rate both the safety and maintenance of the trail and report what they liked most about the trail. Figure 1 shows the trail characteristics trail users most often reported liking. With regards to trail safety, the majority (89.8%) of trail users rated trail safety positively as excellent (34.1%) or good (55.7%) and 10.2% of trail users rated the trail's safety as fair (7.4%) or poor (2.8%). With regards to trail maintenance, 98.3% of trail users rated trail maintenance positively as excellent or (63.9%) good (34.4%) or fair (1.1%) and 1.7% of trail users rated the trail's maintenance as poor (0.6%).

Reasons for Not Using the Trail

Only 36.3% of the 545 non-trail users chose one of the reasons listed as a reason why they do not use the trail. Among these persons, 53% reported that they do not use the trail because it is too far away or inconveniently located, 38.9% said they were unaware of the trail, 7.6% said the trail does not have the features that they desire, and one

TABLE 3
Associations Between Respondents' Self-Report of Regular Trail Use and Demographic Characteristics (n = 461 299)

Demographic Characteristics	Regular Use		χ^2	df	P
	Yes (n) f (%)	No (n) f (%)			
Sex			.948	1	.330
Male	12 (44.4)	52 (34.7)			
Female	15 (55.6)	98 (65.3)			
Race			1.953	1	.162
White	21 (77.8)	130 (87.8)			
Other	6 (22.2)	18 (12.2)			
Age category			.354	1	.552
Adult	24 (88.9)	125 (84.5)			
Older adult	3 (11.1)	23 (15.5)			
Highest education			7.098	2	.029
College degree	10 (38.5)	97 (4.1)			
High school degree	14 (53.8)	44 (29.9)			
< High school degree	2 (7.7)	6 (66.0)			

person (0.5%) said the trail is located in an unsafe area. Among those who said that the trail was too far away, the median distance from these respondents' homes to the trail was 9.55 (IQR = 8.90) miles. This distance was significantly different than that for respondents who did not report the trail being too far away as a reason for not using the trail (median = 7.38, IQR = 7.85; $U = 19\ 543.00$, $P = .014$). The remainder of persons (63.7%) who reported not using the trail reported some other reason why they do not use the trail.

Qualitative responses to other reasons for nonuse

When respondents' chose other, they were requested to specify their other reason. The most common reasons for not using the trail included being too busy (e.g., "just too busy to add it into the weekly schedule"), having a physical

limitation (e.g., "can't walk well enough," "having back problems," "in a wheelchair"), being too old (e.g., "76 years old ... and if I was I young person I would enjoy it"), or "not interested." Many of the persons who reported being too old simply reported their age (e.g., 75, 80, 88, 90, etc.) as the reason for not using the trail without mentioning any physical limitations associated with age.

DISCUSSION

The majority of survey respondents reported not using the trail. The more common reasons for not using the trail included the trail being too far away from respondents' homes and not being aware of the trail.³⁴ In this study, respondents living a median distance of 9.5 miles from the

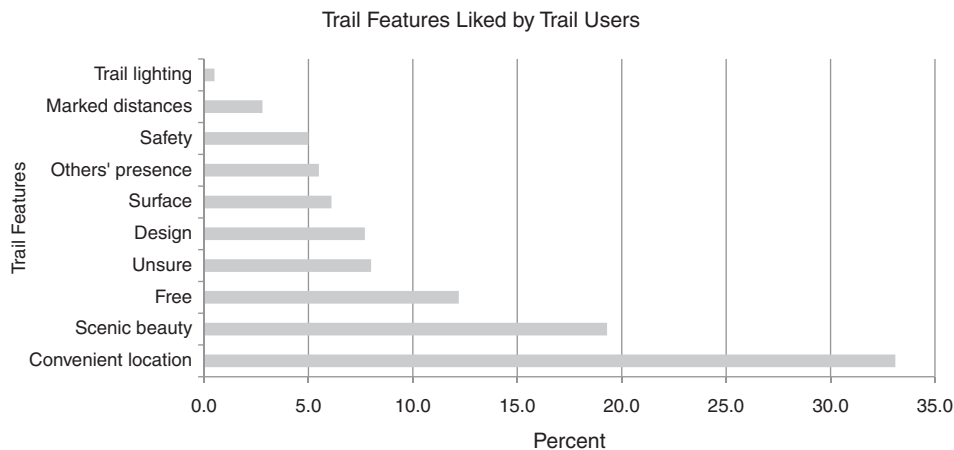


FIGURE 1 Trail features liked by trail users.

trail reported proximity as a barrier to trail use, whereas those living a median distance 7.4 miles from the trail did not. Though proximity to trails has been related to greater likelihood of trail use,¹⁴ other studies^{13,18} suggest that proximity does not greatly influence trail use. Gordon and colleagues¹⁵ found that new trail users traveled shorter distances to trails than habitual trail users and identified convenient location as an enabler for using the trail. Future research could examine why distance to the trail is an issue for some but not others.

The Task Force on Community Preventive Services recommends that the creation of trails be paired with health education efforts to increase awareness and use of the trail for physical activity.¹² Health educators might consider highlighting some of the trail features liked by trail users in this study and previous studies,^{15,20} such as the trail's convenient location, beauty, and design. In regards to barriers to trail use, trail users frequently mentioned being too old, too busy, not interested, and having physical limitations. Those managing and promoting trails might consider providing environmental supports²⁵ to enable older adults and those with physical limitations to use trails, such as smooth trail surfaces for wheelchairs and benches and shaded areas for resting.

Lack of facilities and unsafe conditions have been cited as important barriers for new exercisers using trails, and lack of facilities and maintenance issues were important barriers for habitual exercisers using trails.¹⁵ Another study found that persons living in neighborhoods not conducive to physical activity (lack of sidewalks, safety, etc.) perceived inconvenient travel to trails as a barrier to trail use.³⁵ The presence of litter and noise, dense vegetation areas, and drainage areas and tunnels has also been associated with less trail use.³⁶ Additional research is needed to examine barriers to trail use as well as strategies for overcoming perceived barriers to trail use.

When demographic predictors of trail use were examined, only education and age category were significant predictors. The odds of adults using the trail were greater than the odds of older adults. This is similar to findings from a previous study that found that adults were more likely than older adults to visit parks.³⁷ Efforts to promote physical activity among older adults are needed as older adults are less likely to meet the national physical activity recommendations than adults.³⁸ Promoting physical activity on trails might be an effective avenue to increase physical activity among older adults.

Those with higher education levels compared to lower education levels were also more likely to use the trail at all and more likely to regularly use the trail. Several studies have identified a positive association between education level and trail use.^{17,39} However, findings from one study showed that persons with lower education levels are more likely to use trails for transportation purposes and actively travel to trails than those with higher education levels.²³

Almost all of the respondents in this study used the trail for recreational purposes. Promoting active transportation on trails might increase trail use and physical activity among those with lower education levels.¹⁴

As mentioned previously, the majority of respondents who used the trail did so for recreational purposes. This is similar to findings from previous studies^{18,20,24} and highlights an opportunity to promote additional trail use for transportation purposes. Though most participants reporting using the trail for at least 30 minutes when they used it, on average, respondents reported using the trail only one day per week. In a study examining trail use among college students, the students also typically used the trail one day per week.⁴⁰ In this study, only one quarter of respondents reported using the trail for at least 30 minutes 3 days each week. It is possible that trail users are engaging in physical activity elsewhere, such as at home or commercial gyms, because previous research suggests that trail users are more likely to meet physical activity recommendations than non-trail users.¹⁶ Gordon and colleagues¹⁵ found that new exercisers who used a walking trail were more likely to exercise only on trails compared to habitual exercisers who were active on the trail and in many other settings. Thus, it is likely that some trail users are not engaging in sufficient physical activity. Those promoting trail use could use the health communication opportunity to highlight the national physical activity recommendations⁴¹ as well as the myriad benefits for engaging in regular physical activity.²

The study has several limitations. First, the majority of the 726 survey respondents were college-educated, white, adult females limiting the generalizability of the study. We were not able to collect any information about nonrespondents; however, we compared the demographic characteristics of survey respondents and Greenville County residents to provide readers with a better indication of the findings generalizability. The self-reported physical activity data collected in this study could overestimate physical activity. In addition, causal inferences cannot be made due to the cross-sectional nature of this study. The season (spring) could have influenced respondents' physical activity patterns.^{24,25} Participants were not asked about physical activity unrelated to trail use. Finally, cell phones were not included in the sample because it is illegal to call cell phones from the dialer that was used for the study. This excludes persons from the study who do not use landline phones. It is possible that the exclusion of cell phones, often the only phone of younger adults,⁴² might have skewed the data by underrepresenting younger adults compared to their older counterparts. One additional limitation is that the range of adults is wide, 18-64 years. This range restricts us from examining potential differences within the adulthood spectrum of age groups. However, this study uses a reliable questionnaire to examine both trail use and nonuse.

TRANSLATION TO HEALTH EDUCATION PRACTICE

This study provides several implications for research and practice. Future research could examine why trail proximity is an issue for some but not others and, more important, how distance to the trail can be addressed among those for whom it is a barrier. Researchers could also examine additional barriers to trail use and strategies for helping persons overcoming these barriers. Persons promoting physical activity on trails should highlight those trail characteristics preferred by trail users including the trails' convenient location, beauty, and design. In addition, there is an opportunity to promote trail use among older adults and those with low education levels because these groups used the trail less often than other groups in this study. Research suggests that promoting active transportation on trails might be especially useful among those with low education levels. Finally, persons promoting trail use should highlight the national physical activity recommendations and the benefits of regular physical activity to promote regular use of trails for physical activity.

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