

Trail User Demographics, Physical Activity Behaviors, and Perceptions of a Newly Constructed Greenway Trail

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Abstract To better understand and promote physical activity on a newly constructed trail, the present study examined the demographic characteristics and physical activity behaviors of trail users; the demographic characteristics of trail users compared to the demographic profile Greenville County, South Carolina residents; trail users' purpose for using the trail; the distance trail users traveled to access the trail from their homes; channels through which trail users learned about the trail; and trail characteristics liked by trail users. Using a valid and reliable intercept survey, 1,148 trail users were interviewed. Trail users were mostly white (93.1%), male (59.1%) adults (84.2%) who reported using the trail for exercise (91%). Significant associations were identified between trail user demographic characteristics and how trail users learned about the trail and trail characteristics liked by trail users. The findings may contribute to the development of targeted health promotion efforts to promote physical activity on this and similar trails.

Keywords Trail · Physical activity · Intercept survey · Exercise · Built environment

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Introduction

Physical inactivity is a significant public health issue. Currently, the majority (51%) of Americans do not meet national physical activity recommendations [1]. Successful efforts to promote participation in regular physical activity are needed as physical inactivity has been linked to a variety of health problems including cardiovascular disease, diabetes, cancer, excess weight, and mental health problems, such as anxiety and depression [2].

Public health professionals have recognized the importance of ecological approaches to promote behavior change. Ecological approaches extend beyond frequently used behavior change strategies targeting individuals to address additional influences such as public policy and physical environments [3–5]. One such example is the creation of greenway trails [6–10]. The Task Force on Community Preventive Services [11] has recommended the creation of places to engage in physical activity, such as trails, an effective method for increasing physical activity. Research shows that trails are a preferred activity setting [12], and that persons who use trails for physical activity are more likely to meet the national physical activity recommendations than those who rarely or never use trails for physical activity [13].

While the creation of places for physical activity has been recommended as a strategy for increasing physical activity in communities, the Community Services Preventive Task Force [11] also recommends such changes to the built environment be paired with efforts to promote trail use. Before efforts to promote physical activity on newly developed trails can be developed, it is important to understand current usage of these trails. Bedimo-Rung and colleagues [14] advocate the importance of assessing physical activity in 'open spaces' such as trails as there is

limited data available quantifying physical activity in these areas.

Several studies have objectively examined the demographic characteristics of trail users as well as trail user physical activity behaviors while on trails. Studies have consistently demonstrated that a greater percentage of trail users are adults rather than older adults and whites compared to racial minorities [8, 15, 16]. Studies examining older adult trail use have demonstrated that older adults prefer walking rather than vigorous activity [17]. Both adults and older adults more often use trails when the weather is sunny and temperature is moderate [17, 18]. Studies have also shown that females more often walk on trails with others, while males more often engage in vigorous activity alone [16]. Reed and colleagues [15] found that trail users live, on average, 2.89 miles from the trail they use. Maslow and colleagues [16] found the majority of trail users live 15 min or less from the trail they use; although, Maslow found no significant association between proximity to the trail and frequency of trail use.

While these studies provide useful information about trail user characteristics and physical activity behaviors, additional information may better enable health professionals and parks and recreation officials to develop relevant, targeted communication promoting trail use. Communication to promote physical activity on trails should include specific message strategies (e.g., highlighting positive aspects of trail use) and use the appropriate channels to deliver the communication [19]. The present study builds on previous research which examined the demographic and physical activity behaviors of trail users by also examining how trail users learned about the trail and what they like most about the trail being examined in this study. The findings from this study may allow professionals to enhance the relevance of programs and communication promoting trail use and maximize reach by disseminating promotion efforts through appropriate channels [19].

The purpose of the present study was to examine trail use on a newly constructed trail in Greenville, South Carolina. Specifically, we examined: (1) the demographic characteristics and physical activity behaviors on the trail; (2) the demographic characteristics of trail users compared to the demographic profile of Greenville County, SC residents; (3) trail users' purpose for using the trail; (4) the distance trail users traveled to access the trail from their homes; (5) channels through which trail users learned about the trail; and (6) trail characteristics liked by trail users. The findings from the present study may contribute to the development of health promotion efforts to promote physical activity on this and similar greenway trails.

Methods

Greenville Hospital System Swamp Rabbit Trail

The Greenville Hospital System (GHS) Swamp Rabbit Trail (SRT) was developed to promote active living and was completed in May, 2010 in Greenville, South Carolina (SC). The SRT is a paved greenway, 10 miles long, and approximately 10 feet wide. The SRT connects residential areas in Travelers Rest, SC to a university campus as well as the commercial downtown area of the City of Greenville, which includes shops and restaurants and a large downtown park. There are six designated access points along the trail. Four of the access points are supported with adjacent parking lots. A map of the greenway trail is shown in Fig. 1.

Data Collection Procedures

Adults using the GHS SRT were recruited when using the trail. Intercept surveys were conducted quarterly from June 30th, 2010 to July 1, 2011; a total of 1,148 intercept surveys were administered. Interviewers were undergraduate students who were trained by the lead investigator to deliver the intercept survey. Interviewers positioned themselves at access points along the trail to collect data over 4 days (i.e., Tuesday, Thursday, Saturday, and Sunday) each season (i.e., winter, spring, summer, and fall) for a total of 16 days, 4 times per day (7:30 a.m., 12 p.m., 3:30 pm and 6 pm). Interviewers approached each trail user passing at the intercept location and asked if they were willing to respond. Once the survey was completed, the interviewer approached the next trail user passing the location. The interviewers verbally confirmed all respondents were at least 18 years of age before administering the survey. Before answering any questions, the interviewers explained the purpose of the study, informed the trail users of their rights as research participants, and explained the confidential nature of the research. Verbal informed consent was obtained from all participants. The study procedures were reviewed and approved by the Furman University Institutional Review Board (IRB).

Intercept Survey Variables

The trail intercept survey is a valid and reliable [20] 17-item instrument taking 5–10 min to complete. The survey was used to capture information about the trail user demographic characteristics such as age category (adults ages 18–59 years versus older adults ages 60 years and over), gender (male/female), and ethnicity (white versus other races/ethnicities). Interviewers also asked participants what activity type they typically engage in while

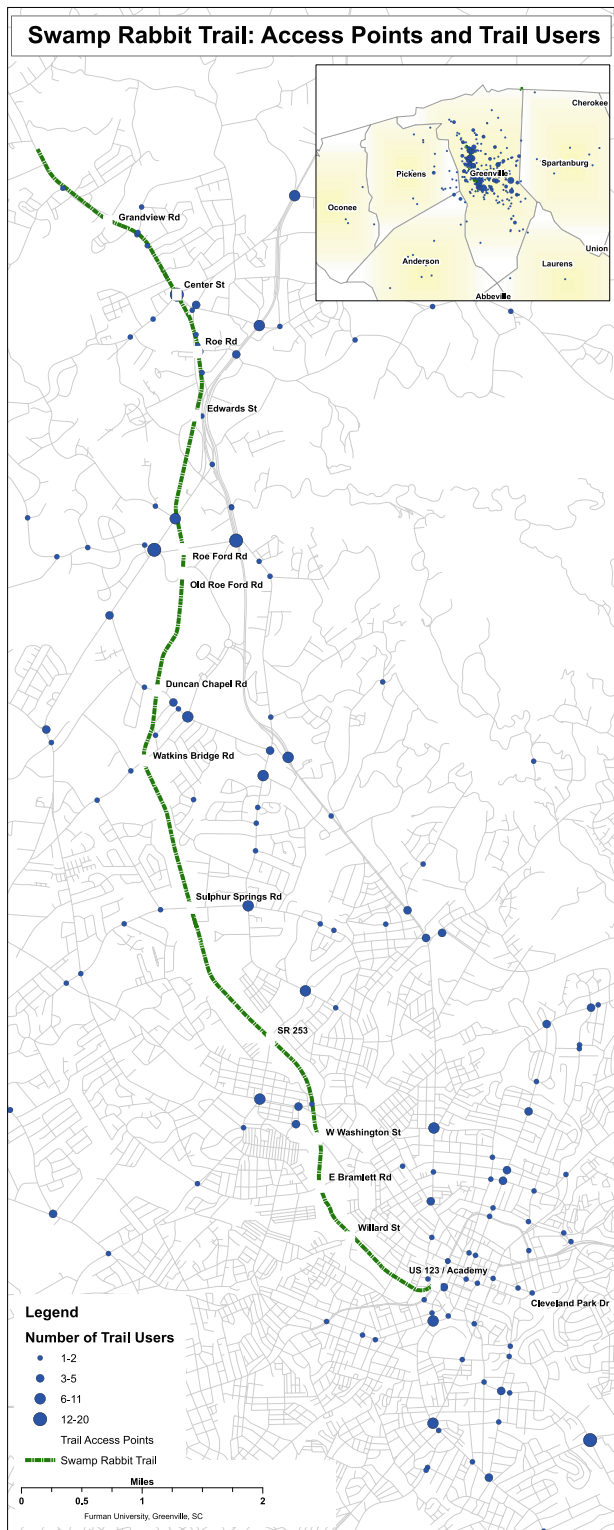


Fig. 1 Swamp Rabbit Trail, Greenville County, South Carolina: access points and trail users

using the trail (jogging, cycling, walking, skating, or other). Due to the small number of individuals who chose skating ($n = 7$) or other activity type ($n = 5$) as their response,

only individuals who were jogging, cycling, or walking on the trail were included in the analysis ($n = 1,148$). The interviewers also asked trail users to specify their purpose for using the trail (exercise, travel, or both exercise and travel). The interviewers asked trail users to identify how they learned out about the trail from a list of possible options (i.e., word of mouth, roadside signage, driving past, newspaper, bike shop, park department, internet website, brochure, convention bureau, other). Respondents were asked to respond with yes or no to all of the options listed by the interviewer. Respondents were allowed to answer yes to more than one option. Using the same question–answer format, respondents were asked to respond with yes or no to a list of options regarding what they like most about the trail (i.e., free place to exercise, distances are marked, location/convenience, trail design, scenic beauty, good surface, lighting, other people are exercising on the trail, it’s safe, other). Respondents were allowed to answer yes to more than one option. Finally, trail users were asked to report their zip code and the nearest two cross-streets of their primary residence.

Only the 793 of the 1,148 respondents provided the location of their primary residence. No identifiable information was solicited, and the IRB procedures protecting human subject confidentiality were strictly followed. Global positioning system (GPS) coordinates pertaining to the residence of each respondent were registered to a common datum, converted into a spatial map, and imported into ArcView GIS (software for working with maps and geographic information) to be used as a base for examining proximal relationships and determining a mileage distance from place of residence to the SRT.

Once park user demographics were examined, they were compared to the demographic profile of Greenville County residents based on 2010 Greenville County census data [21].

Data Management and Analysis

Surveys were conducted in the field using a paper form. All data were entered in SPSS for analysis. Descriptive Statistics were used to summarize the data. Chi square tests were used to examine the associations between trail user demographics and physical activity type, purpose for using the trail, characteristics trail users liked most about the trail, and how trail users learned about the trail. One-way ANOVAs were used to examine mean differences in the number of miles traveled to access the trail by demographic characteristics. Chi-square goodness-of-fit tests were used to examine whether the observed proportions for gender, ethnicity, and age groups observed using the trail differed from the actual proportions for gender, ethnicity, and age groups in Greenville County, SC.

Results

Overall, 1,148 trail users completed intercept interviews. Under half (40.9%) were female, 93.1% were white, and 84.2% were adults. When asked why they were using the trail, the majority (91%) of trail users reported they were using the trail for exercise. Two percent said they were using the trail for commuting and 7% said they were using the trail for both exercise and commuting. On average, trail users traveled 9.2 miles (SD = 7.6) to get to the trail with a range of 0 miles to 87 miles.

Comparison of Trail User Demographics to Greenville County demographics

The Chi square goodness of fit tests showed a significant difference in the observed and expected number of persons observed using the trail for gender ($\chi^2 = 21.327$, $df = 1$, $P < .001$), ethnicity ($\chi^2 = 239.928$, $df = 1$, $P < .001$), and age group ($\chi^2 = 58.686$, $df = 1$, $P < .001$). Specifically, a greater number of adults ($n = 967$), whites ($n = 1,078$) and males ($n = 678$) were observed using the trail than the number of adults ($n = 857$), whites ($n = 847$) and males ($n = 599$) expected to be using the trail based on 2010 Greenville County census data. There was also a smaller number of older adults ($n = 162$), persons of other ethnicities ($n = 70$), and females ($n = 469$) observed using the trail than the number of older adults ($n = 272$), persons of other ethnicities ($n = 301$), and females ($n = 547$) expected to be using the trail based on 2010 Greenville County census data.

Associations Between Demographic Characteristics and Physical Activity Type

Table 1 shows the demographic characteristics of trail users by physical activity type. There were significant associations between physical activity type and gender ($\chi^2 = 64.569$, $df = 1$, $P < .001$) as well as physical activity type and age category ($\chi^2 = 17.699$, $df = 1$, $P < .001$). Specifically a greater percentage of those walking on the trail were female rather than male; whereas, a greater percentage of those cycling on the trail were male rather than female. In addition, a much smaller proportion of older adults were observed jogging compared to adults. Older adults were most often reported walking on the trail. There was not a significant association between physical activity type and ethnicity.

Distance Traveled to Access the Trail by Demographic Characteristics

Table 2 shows the mean number of miles traveled by age category, ethnicity, and gender. There was a significant

Table 1 Associations between trail user demographic characteristics and physical activity type, ($n = 1,148$)

| Variable | Walking n = 235 n (%) | Jogging n = 132 n (%) | Cycling n = 781 n (%) | χ^2 | P |
|-------------------------|-----------------------------|-----------------------------|-----------------------------|----------|--------|
| Gender, n = 1,147 | | | | 64.569 | <.001* |
| Female | 142 (60.4) | 69 (52.7) | 258 (33.0) | | |
| Male | 93 (39.6) | 62 (47.3) | 523 (67.0) | | |
| Ethnicity | | | | 4.618 | .09 |
| White | 215 (91.5) | 128 (97.0) | 735 (94.1) | | |
| Other | 20 (8.5) | 4 (3.0) | 46 (5.9) | | |
| Age group, n = 1,129 | | | | 17.699 | <.001* |
| Adults | 184 (81.1) | 127 (96.9) | 656 (85.1) | | |
| Older adults | 43 (18.9) | 4 (3.1) | 115 (14.9) | | |

* $P < .05$

Table 2 Miles traveled to get to the trail by demographic characteristics, ($n = 79$)

| Variable | M | SD | F | df | P |
|--------------|------|------|-------|----|-------|
| Gender | | | 5.359 | 1 | .021* |
| Female | 8.48 | 7.24 | | | |
| Male | 9.74 | 7.83 | | | |
| Ethnicity | | | 3.711 | 1 | .054 |
| White | 9.35 | 7.69 | | | |
| Other | 7.17 | 5.82 | | | |
| Age group | | | 0.722 | 1 | .396 |
| Adults | 9.53 | 8.69 | | | |
| Older adults | 8.80 | 6.54 | | | |

* $P < .05$

difference in the mean number of miles traveled by males and females with males traveling a greater mean distance ($M = 9.74$ miles, $SD = 7.83$) to get to the trail compared to females ($M = 8.48$, $SD = 7.24$; $P = .021$). There was no significant difference between whites and other ethnicities or adults and older adults for the mean number of miles traveled to get to the trail. Figure 1 shows the proximity of trail users' homes to the trail.

Associations Between Demographic Characteristics and Purpose for Using the Trail

There were no significant associations between purpose for using the trail and any of the demographic characteristics. These results are shown in Table 3.

Trail Characteristics Liked by Trail Users

Table 4 shows the trail characteristics which trail users reported liking overall and by gender, ethnicity, and age category. Trail users most often reported liking that the trail was free (54.2%) followed by distance being marked on the trail (13.8%), the trail design (10.8%), the trail location (10.8%), and that the trail is scenic (10.5%). When significant associations between demographic characteristics and trail characteristics respondents liked were examined, significant associations were only identified between ethnicity and the distances being marked on the trail ($\chi^2 = 17.764$, $df = 1$, $P < .001$) and ethnicity and location of the trail

Table 3 Associations between trail user demographic characteristics and purpose for using the trail (n = 1,124)

| Variable | Exercise n = 1,027 n (%) | Travel n = 17 n (%) | Both n = 80 n (%) | χ^2 | P |
|--------------|--------------------------------|---------------------------|-------------------------|----------|------|
| Gender | | | | 2.791 | .248 |
| Female | 434 (41.6) | 7 (41.2) | 26 (32.1) | | |
| Male | 610 (58.4) | 10 (58.8) | 55 (67.9) | | |
| Ethnicity | | | | 2.890 | .236 |
| White | 979 (93.7) | 15 (88.2) | 79 (97.5) | | |
| Other | 66 (6.3) | 2 (11.8) | 2 (2.5) | | |
| Age group | | | | 3.288 | .193 |
| Adults | 874 (85.1) | 16 (94.1) | 73 (91.2) | | |
| Older adults | 153 (14.9) | 1 (5.9) | 7 (8.8) | | |

* $P < .05$

($\chi^2 = 8.529$, $df = 1$, $p = .003$). Specifically, a greater proportion of whites compared to others reported liking that distances were marked and liking the location of the trail.

How Did Trail Users Learn About the Trail?

Table 5 identifies how trail users learned about the trail overall and by age category, ethnicity, and gender. Trail users most often learned about the trail through word of mouth (54.2%) followed by the newspaper (13.8%), some other channel not listed (10.5%), or driving by the trail (10.5%). There were several significant associations between demographic characteristics and the channels through which trail users learned about the trail. There were significant associations between age category and learning about the trail through the convention bureau ($\chi_2 = 5.896$, $df = 1$, $P = .015$); gender and learning about the trail through word of mouth ($\chi_2 = 16.665$, $df = 1$, $P < .001$), signs for the trail ($\chi_2 = 5.258$, $df = 1$, $P = .022$), and other channels ($\chi_2 = 5.161$, $df = 1$, $P = .023$); and ethnicity and hearing about the trail through word of mouth ($\chi_2 = 4.921$, $df = 1$, $P = .027$), driving by the trail ($\chi_2 = 25.660$, $df = 1$, $P < .001$), and the newspaper ($\chi_2 = 17.764$, $df = 1$, $P = .043$). Specifically, a greater proportion of older adults than adults reported learning about the trail through the convention bureau. In addition a greater proportion of whites than persons of other ethnic groups reported learning about the trail through word of mouth and the newspaper; whereas, a greater proportion of those of other racial/ethnic groups compared to whites reported learning about the trail when they drive by it. Finally, a greater proportion of females than males learned about the trail through word of mouth and signs for the trail; whereas a greater

Table 4 Trail characteristics by trail users overall and by demographic characteristics, (n = 1,148)

| Trail characteristics | Total (n = 1,148) n (%) | Age group | | Gender | | Ethnicity | |
|------------------------------|-------------------------------|------------------------------|-----------------------------------|------------------------------|---------------------------|-----------------------------|----------------------------|
| | | Adults (n = 184) n (%) | Older adults (n = 43) n (%) | Female (n = 142) n (%) | Male (n = 93) n (%) | White (n = 979) n (%) | Other (n = 66) n (%) |
| Free | 500 (54.2) | 418 (43.3) | 73 (46.2) | 219 (46.8) | 280 (41.7) | 466 (43.5) | 34 (48.6) |
| Distance marked ^a | 326 (13.8) | 286 (29.6) | 35 (21.5) | 141 (30.1) | 185 (27.5) | 312 (29.1) | 14 (20.0) |
| Trail design | 200 (10.8) | 179 (18.5) | 19 (12.0) | 94 (20.1) | 105 (15.6) | 189 (17.6) | 11 (15.7) |
| Location ^a | 170 (10.8) | 143 (14.8) | 24 (15.2) | 71 (15.2) | 99 (14.7) | 168 (15.7) | 2 (2.9) |
| Scenic | 157 (10.5) | 128 (13.3) | 28 (17.7) | 60 (12.8) | 97 (14.4) | 150 (14.0) | 7 (10.0) |
| Lighting | 156 (6.9) | 133 (13.8) | 21 (13.3) | 61 (13.0) | 95 (14.1) | 148 (13.8) | 8 (11.4) |
| Good surface | 153 (5.7) | 131 (13.6) | 21 (13.3) | 73 (15.6) | 80 (11.9) | 143 (13.4) | 10 (14.3) |
| Safe | 118 (4.4) | 103 (10.4) | 13 (10.0) | 46 (9.8) | 72 (10.7) | 111 (9.2) | 7 (9.5) |
| Other | 107 (4.4) | 93 (9.6) | 10 (6.3) | 43 (9.2) | 64 (9.5) | 97 (9.1) | 10 (14.3) |
| People present | 75 (3.7) | 65 (6.7) | 10 (6.3) | 36 (6.7) | 39 (6.3) | 69 (6.4) | 6 (8.6) |

The numbers in each column are not supposed to add up to the total n, and the percentages in each column are not supposed to add up to 100% because trail users were told they could report liking as many trail features as they wanted

^a Significant association with ethnicity ($P < .05$)

Table 5 How trail users learned about the trail overall and by demographic characteristic, (n = 1,148)

| Channel | Total (n = 1,148) n (%) | Age group | | Gender | | Ethnicity | |
|--------------------------------|----------------------------|------------------------------|-----------------------------------|------------------------------|---------------------------|-----------------------------|----------------------------|
| | | Adults (n = 184) n (%) | Older adults (n = 43) n (%) | Female (n = 142) n (%) | Male (n = 93) n (%) | White (n = 979) n (%) | Other (n = 66) n (%) |
| Word of Mouth ^{b, c} | 622 (54.2) | 537 (55.6) | 77 (47.5) | 288 (61.4) | 333 (49.2) | 593 (55.1) | 29 (41.4) |
| Newspaper ^c | 158 (13.8) | 127 (13.1) | 30 (18.5) | 53 (11.3) | 105 (15.5) | 154 (14.3) | 4 (5.7) |
| Other ^b | 124 (10.8) | 105 (10.9) | 17 (10.5) | 120 (11.1) | 4 (5.7) | 39 (8.3) | 85 (12.6) |
| Drive-by ^c | 121 (10.5) | 95 (9.8) | 19 (11.7) | 48 (10.2) | 73 (10.8) | 101 (9.4) | 20 (28.6) |
| Trail signs ^b | 79 (6.9) | 67 (6.9) | 10 (6.2) | 42 (9.0) | 37 (5.5) | 73 (6.8) | 6 (8.6) |
| Convention bureau ^a | 66 (5.7) | 49 (5.1) | 16 (9.9) | 26 (5.5) | 40 (5.9) | 62 (5.8) | 4 (5.7) |
| Park department | 51 (4.4) | 40 (4.1) | 11 (6.8) | 27 (5.8) | 24 (3.5) | 47 (4.4) | 4 (5.7) |
| Website | 51 (4.4) | 43 (4.5) | 7 (4.3) | 20 (4.3) | 31 (4.6) | 46 (4.3) | 5 (7.1) |
| Bike shop | 46 (4.0) | 37 (3.8) | 8 (4.9) | 16 (3.4) | 30 (4.4) | 40 (3.7) | 6 (8.6) |
| Brochure | 42 (3.7) | 34 (3.5) | 7 (4.3) | 19 (4.1) | 23 (3.4) | 42 (3.9) | 0 (0) |

The numbers in each column are not supposed to add up to the total n, and the percentages in each column are not supposed to add up to 100% because trail users were told they could report more than one channel through which they learned about the trail

^a Significant association with age category ($P < .05$)

^b Significant association with gender ($P < .05$)

^c Significant association with ethnicity ($P < .05$)

proportion of males than females learned about the trail through the newspaper and other channels.

Discussion

The majority of adults in the U.S. are not meeting physical activity recommendations [1]. The creation and promotion of built environmental supports for physical activity have been recommended to increase physical activity in communities [11]. The findings from this study may be useful for health professionals and parks and recreation professionals planning efforts to promote this and similar trails.

Across all age, gender, and ethnicity categories, trail users often reported using the trail for exercise. Trail users in this study were mostly white, male adults. This is consistent with findings from previous studies which have examined trail user demographic characteristics [15–17]. The comparison of demographic characteristics of trail users against Greenville County census data confirms that fewer females, persons of other ethnicities, and older adults were observed using the trail less than would be expected given the demographic profile of Greenville County. The present, and previous studies [15, 17, 18], highlight an opportunity for efforts to promote trail use among females, racial minorities, and older adults.

Physical Activity Behaviors on the Trail

With regards to physical activity type, this study supports findings from previous studies that a greater percentage of

those who walk on trails are females rather than males, and older adults rather than adults [15–17]. Adults were observed jogging more than older adults, and males were observed cycling more often than females.

Trail Characteristics Liked by Trail Users

Respondents most frequently reported liking that the trail was free. This characteristic may be especially appealing given the economic climate at the time of the study. Research suggests access to free locations for physical activity is an important enabler for physical activity [22]. However, research also suggests the creation of free places for physical activity should be paired with effort to promote trail use [11]. The other characteristics frequently liked were that distances are marked on the trail, the convenience of the trail location, and the trail design and scenery. Distances being marked and the convenient location were especially important for white persons compared to persons from other ethnicities. These trail characteristics could be highlighted in future communication promoting trail use.

How Did Trail Users Learn About the Trail

Overall, trail users learned about the trail most often through word of mouth, followed by the newspaper, other methods of communication, and driving-by the trail. Older adults learned about the trail through the convention bureau more often than adults. Whites learned about the trail more

often through word of mouth and newspaper compared to other ethnic groups that more often learned about the trail by driving by it. Females more often learned about the trail through word of mouth and trail signs compared to males who more often learned about the trail through the newspaper and other channels. These findings highlight the importance of both selecting a variety of message channels to increase reach [23, 24], and making sure those channels preferred by specific gender, ethnic, and age groups are considered to enhance the relevance of targeted communication promoting trail use [19].

Implications for Future Research and Practice

This study provides several implications to guide future research and practice. First, it is clear from the present study findings that older adults and ethnic minorities use trails less often than younger age groups and whites. It may be that older adults and minorities are using other locations for physical activity. Research shows that persons who use trails for physical activity are more likely to meet the national physical activity recommendations than those who rarely or never use trails for physical activity [13]. Further, there are documented benefits to spending time in the natural environment [25]. Examples of such benefits include opportunities for social interaction [14], reductions in stress and reported improvements in feeling well-balanced [26]. Thus, efforts to promote trail use, particularly among those groups that less often using trails, may lead to increases in trail use which could have significant public health impacts.

Persons promoting trail use among specific genders, age groups, or ethnicities may want to tailor communication materials to highlight activities preferred by the groups they are targeting. For example, walking groups could be developed and promoted for females and older adults. Those developing promotion materials for the trail should consider highlighting that the trail is free and that the distances are marked. They may also want to consider including pictures of the trail design and scenery in promotion materials. The findings from this study suggest word of mouth and newspaper may be the most effective communication channels when promoting trail use.

There are limitations to this study. First, a cross-sectional study on a Greenville, SC trail may have limited generalizability. In addition, causal inferences about the associations between variables examined in this study cannot be made. However, the valid and reliable measure used and large number of users observed lend strength to the findings.

In conclusion, this study highlights opportunities to increase physical activity on trails. Parks and recreation officials along with health professionals may find the

results useful as they plan targeted strategies to promote trail use among the general public and specific age groups genders, and ethnic groups in South Carolina [19]. Effective strategies are important as successful promotion of physical activity on trails may lead to long-term health benefits for trail users.

Acknowledgments Funding was provided by the United States Environmental Protection Agency under cooperative agreement XA-95454910-0.

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