Evaluating Change in Physical Activity with the Building of a Multi-Use Trail

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Background: Cross-sectional studies suggest a positive association between the presence of trails and physical activity participation. Prospective evaluations of the impact of building a multi-use trail, in terms of change in physical activity levels among nearby residents, are needed.

Design: The study was designed as a quasi-experimental noncontrol pre–post design.

Setting/ Participants: Participants included 366 adults aged ≥18 years living within 2 miles of the evaluated trail.

Intervention: A railway of >23 miles was under development for conversion to a multi-use trail in central North Carolina. A segment of the trail was evaluated by randomly selecting and telephone interviewing adults living within 2 miles of the planned trail before trail construction began and approximately 2 months after completion of construction.

Main Outcome Measures: Outcomes were time spent in leisure activity, leisure activity near home, walking, bicycling, moderate activity, vigorous activity, and transportation activity.

Results: At follow-up, of the 366 adults living within 2 miles of the trail, 11.0% had not heard of the trail, and 23.1% had heard of the trail and had used it at least once. In multivariable logistic models, leisure activity, leisure activity near home, moderate activity, vigorous activity, and walking for transportation did not significantly change for those who used the trail compared to those not using the trail.

Conclusions: This prospective study of the building of a multi-use trail did not demonstrate an increase in physical activity among adults living near the trail. Other prospective studies are encouraged, to take advantage of rigorously evaluating different types of trails that are to be constructed in rural and urban settings.

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Introduction

According to the socioecologic framework,[1,2] physical activity is likely influenced at multiple levels, including intrapersonal, interpersonal, organizational, community, and public policy or societal.[3,4] Protective effects of the environmental and policy level factors on physical activity are receiving increasing attention. If environmental and policy factors that favorably impact physical activity can be identified, the effectiveness of public health efforts to increase physical activity levels may be improved by designing interventions to change these factors. Changing environments in desirable ways along with policies that affect physical activity may result in favorable shifts in physical activity in the population, and thus facilitate individual behavior change.[5]

Cross-sectional studies indicate that those who report having a trail in their neighborhood were more likely to report engaging in physical activity or in walking.[6–13] Furthermore, a cross-sectional study in Georgia found that those who had places to walk were significantly more likely to meet current recommendations for physical activity than those who did not have places to walk.[14] A Pennsylvania study of older women found that those who reported living within walking distance to a biking or walking trail had significantly more average weekly steps as assessed by a pedometer, although self-reported walking showed no differences.[15]

Only two studies[16,17] have conducted prospective evaluations. First, using a quasi-experimental noncontrol pre–post design, an Australian study examined the short-term impacts of a print and radio promotional campaign on a newly constructed 16.5-km rail trail

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Table 1. Frequency of final disposition codes for baseline and follow-up telephone survey

	Baseline		Follow-up	
	n	%	*n*	%
Total sample	2125		685	
Completed	685	32.2	436	63.7
Refused or interview terminated within questionnaire	480	22.6	27	3.9
No answer or line busy (called 15 times)	418	19.7	41	6.0
Nonworking phone number or no eligible respondent at number	388	18.3	171	25.0
Other ineligible respondents	97	4.6	9	1.3
Fax line (called three times)	30	1.4	0	0
Non-English speaker/unable to communicate	27	1.3	1	0.2

(e.g., railroad bed converted to a trail).[16] The campaign targeted individuals living within 5 km of the trail. Telephone surveys were conducted in this geographic area among adults aged 18 to 55 years just prior to the opening of the trail and repeated 3 months later. Following the campaign, although awareness of the trail increased slightly, mean walking and bicycling time did not significantly increase. However, counts of trail use collected at the trail indicated significant increases in bicycling. A second quasi-experimental pre–post design with a comparison group examined the impact of a multifaceted intervention on use of trails and walking behavior in rural Missouri.[17] Although the use of trails increased, community-wide increases in walking did not occur.

To our knowledge, no published studies have prospectively evaluated the naturally occurring impact of the completion of a multi-use trail on physical activity. Therefore, the purpose of this study was to document any change in physical activity occurring among adults that might be attributable to the construction of a multi-use trail.

Methods

This study took place in Durham, North Carolina, located in the central part of the state. Surveyed adults lived within 2 miles of an abandoned railroad bed, identified for a rails-to-trails conversion. The first (northernmost) 3.2-mile segment of the trail opened in June 2000. This segment was 10 feet wide and paved for pedestrians, bicyclists, and others. We sought to evaluate the next segment of the trail, which extended the paved trail with similar construction by another 2.8 miles, along with a 2.0-mile spur. This portion of the trail passed by two schools, shopping areas, apartment buildings, and neighborhood subdivisions, with many access points along the way. Construction of this trail provided an excellent opportunity to study this "natural experiment." The evaluation was conducted using a quasi-experimental, noncontrol pre–post design.

Source Population

The segment of the evaluated trail traversed 11 census block groups. Adults living in this area served as the source population under study. According to the U.S. 2000 census,[18] this area comprised 28,304 people. Using the Xtools ArcView extension[19] to calculate population density, the area averaged 116.5 persons per square mile. Among people aged ≥25 years, 91.5% had at least a high school education and 56.2% had at least a bachelor's degree. For the total population, 41.2% were black and 47.3% were white.[18]

Study Population

In July 2000, Genesys Marketing Systems Group (www.m-s-g.com) provided us with a randomly generated listing of 2125 households that listed their telephone number in the White Pages and lived within the 11 census block groups. After sending out a postcard informing participants that they would be called, telephone surveys began immediately and continued through April 2001, with most interviews completed during summer and fall 2000. The trail section under evaluation did not officially open until September 28, 2002. Follow-up interviews were conducted in November 2002. Time between surveys ranged from 1 year and 7 months to 2 years and 4 months.

Adult respondents were randomly chosen in two stages: the first stage at the household level and the second stage at the individual level, selecting the adult with the most recent birthday. Calling followed the telephone protocol of the Behavioral Risk Factor Surveillance System (BRFSS).[20] This consisted of calling ≤15 times for each sampled phone number distributed across weekday, weeknight, and weekends, with the final disposition of all calls summarized in Table 1. The baseline response rate, as calculated by the Council of American Survey Research Organizations method,[21] was 47.2%. At follow-up, 63.7% of participants of the baseline survey completed the follow-up survey. Less than 4% refused the second interview; most incomplete interviews were due to nonworking phone numbers.

Survey

The telephone survey was conducted similarly at baseline and follow-up, and consisted of questions regarding physical activity, neighborhood environment, general health, and sociodemographics. Questions specifically mentioning the trail were only asked at follow-up, after physical activity was ascertained, in an effort to avoid creating bias in participants' responses by educating them about the trail. The survey measures are summarized below.

Leisure activity. Leisure activity was assessed using the BRFSS module on leisure activity (1984 to 2000),[30] by asking the

following question: "During the past month, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?" ("Yes" or "No"). If participants answered "Yes," they were asked the type, frequency, and duration of the two most common leisure activities performed in the past month. For each of the two activities reported, a question was added that asked, "Where do you usually take part in this activity? Would you say near your home, near your workplace, or neither near your home or workplace?" This allowed us to categorize leisure activities that occurred near the home. Participants were grouped into three levels based on current physical activity recommendations[31,32]: those who met recommendations (defined as being moderately active in leisure for ≥30 minutes for 5 to 7 days a week or vigorously active in leisure activity ≥20 minutes for 3 to 7 days a week), those who were insufficiently active (defined as some leisure activity, but not enough to meet recommendations), and those who were inactive (not participating in any leisure activities in the past month). To our knowledge, validity of these questions has not been reported in the scientific literature. For no leisure activity in the past month, the reliability assessed by a kappa coefficient ranged from 0.44 to 0.58,[33–35] indicating "moderate agreement."[36]

Walking and bicycling. Walking was assessed using three questions from the 2001 BRFSS module on physical activity, which were developed as optional questions that states could opt to use.[37] Participants were asked, "In a usual week, do you walk for at least 10 minutes at a time for recreation, exercise, while at work, to get to and from places, or for any other reason?" If they responded "Yes," information on the days per week and minutes per day that they spent walking was ascertained. Questions on bicycling were asked in a similar manner. To our knowledge, validity and reliability of these questions have not been reported in the scientific literature.

Moderate and vigorous physical activity. Moderate and vigorous physical activity were assessed using the 2001 physical activity module from the BRFSS survey.[38] Participants were asked, excluding occupational activity, if they had participated in "any moderate activity for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes some increase in breathing or heart rate" in a usual week. Participants were also asked about participation in "any vigorous activity for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate." If they responded "Yes" to either question, then they were asked how many days per week that they engaged in the activity for ≥10 minutes at a time and how much total time per day they spent doing these activities. Using data from these questions, participants were grouped into three levels based on current physical activity recommendations[31,32]: those who met recommendations (defined as being moderately active for ≥30 minutes for 5 to 7 days a week or vigorously active for ≥20 minutes for 3 to 7 days a week), those who were insufficiently active (defined as some physical activity, but not enough to meet recommendations), and those who were inactive (not participating in any moderate or vigorous physical activities for ≥10 minutes at a time in a usual week). In a multi-ethnic sample of women aged 20 to 50 years, reliability indicated by the intraclass correlation coefficient was 0.69.[39] Two studies reported fair validity of these measures.[37,40]

Transportation activity. Participants were asked two questions each on walking and biking for transportation: (1) "In the past month, how many times did you walk (bike) for transportation, such as to and from work or shopping?" (2) "In the past month, when you walked (biked) for transportation, how many minutes or hours did you usually do this at a time?" Reliability and validity of these questions have not been published.

Trail use. In order to determine whether participants were using the trail, participants who reported walking or biking were asked where that activity usually took place. If they answered "greenway or other walking/jogging/biking trail," then the name of the specific trail that was used was recorded.

Trail and neighborhood characteristics. All participants were asked if their neighborhood had sidewalks ("Yes," "No"), walking, jogging, or biking trails ("Yes," "No"), or heavy traffic ("Yes," "No"). All participants were also asked at follow-up if they had ever heard of or used the trail. Those who had heard of the trail were asked if they were adjacent property owners. Participants were also asked if they had ever used the trail, and, if not, whether they were planning on using it in the next 6 months or the next month. A five-level, stages-of-change variable was created based on responses. At follow-up, those who had ever used the trail were asked if being able to use the trail changed the amount of time they spent being physically active or exercising. The response options were "Yes, it increased," "Yes, it decreased," or "No." Participants were also asked a similar question about the number of times that they were able to be physically active or exercise.

Neighborhood safety. General neighborhood safety was ascertained by asking, "How safe from crime would you consider your neighborhood to be? Would you say extremely safe, quite safe, slightly safe, or not at all safe?"[41] This question was developed as an optional one for the BRFSS, and has moderate reliability.[39,42,43]

General health. Participants were asked at baseline, "Would you say your general health is excellent, very good, good, fair, or poor?"

Body mass index. Self-reported height and weight were collected to determine body mass index (BMI), calculated by dividing weight in kilograms by height in meters squared. For both men and women, overweight was defined as a BMI of 25 to 29.9 kg/m^2, and obesity was defined as a BMI of >30 kg/m^2.[44] Because the prevalence of underweight participants (BMI<18.5 kg/m^2) was low, these respondents were grouped with the normal weight category (18.5 to 24.9 kg/m^2).

Sociodemographics. Respondents were asked questions at baseline regarding demographics (e.g., age, race/ethnicity, marital status) and socioeconomic status (e.g., education, employment). Employment was grouped into two categories, employed or not employed (out of work, homemaker, student, retired, or unable to work), and marital status was grouped into partnered (married or member of an unmarried couple) or unpartnered (never been married, divorced, separated, widowed).

Seasonality Measures

All follow-up surveys were conducted during the same season of the year. However, there was variation in when the baseline survey was conducted, so we attempted to account for this by obtaining information about weather during those specific time periods. Data on average daily temperature, dewpoint, and precipitation were obtained for the month before the baseline survey for each participant from recorders at the Raleigh–Durham International Airport,[22] located approximately 12 miles from the midpoint of the evaluated trail.

Geographic Information System Measures

At baseline, 675 home addresses were assigned a latitude and longitude by a geocoding company (Mapping Analytics, www.mappinganalytics.com). For ten addresses that were not geocoded to the street level, MAPQUEST (www.mapquest.com) was used to obtain the location. We obtained a line file of the trail from the city of Durham, and the road network of the area around it from Environmental Systems Research Institute (ESRI) Inc. (Redlands CA). Shortest or Euclidean distance from the participant's home to the trail was calculated using ESRI ArcView 3.3 using the Nearest Feature extension.[23]

Statistical Methods

Of the 685 adults who completed the baseline questionnaire, participants were excluded from these analyses for the following reasons: 249 did not complete the follow-up survey, 48 had moved since the baseline survey, and 22 lived >2 miles from the trail segment under evaluation. A total of 366 remained for use in the analysis.

To evaluate whether physical activity changed in association with development of the trail, medians (along with the Wilcoxon nonparametric test for differences) and interquartile ranges were calculated for the physical activity measures.

Three-level unconditional logistic regression models were fit to the differences between physical activity measures (e.g., baseline time subtracted from follow-up time). The dependent variables included change in time spent in leisure activity, leisure activity near the home, moderate activity, vigorous activity, walking, walking for transportation, bicycling, and bicycling for transportation. Because of the small number who participated in bicycling for transportation, these models could not be adequately fit and are not presented. The outcomes were categorized into three levels based on change in activity duration from Time 1 to Time 2: decreased, increased, or no change. Three cut-points for these groups were considered (15, 30, and 45 minutes), because the choice of the cut-point can affect results.

Three-level unconditional logistic regression models were also fit to examine changes in status of "meeting recommendations," using both leisure activity and overall moderate or vigorous activity as defined above. The categories for the outcomes were meets recommendation at Time 1 but not Time 2 and meets recommendations at Time 2 but not Time 1, which were compared to the referent (either meets or does not meet recommendations at both Time 1 and Time 2).

For multivariable modeling, all covariates listed at the bottom of Table 4 were considered. Separate models were built for each outcome measure of physical activity using a backward stepwise procedure, putting all covariates into a full model, and then dropping covariates one at a time based on their p value. The models were evaluated using -2 log likelihood tests. If the trail use variable changed by >10% with removal of a variable, that variable was retained. SAS, release 8.2 (SAS Institute Inc., Cary NC, 2001) was used for all analyses.

Results

Sample Characteristics

Most participants were in excellent, very good, or good general health, and had ≥16 years of education (Table 2). Approximately two thirds were women, one third were non-Hispanic black, and two thirds lived within 1 mile of the trail. Participants who completed both surveys (n =436) did not differ from those who completed only the baseline survey (n =249) in general health, education, or employment (data not shown). However, those who completed only the baseline survey were more often younger, unpartnered, non-Hispanic white, and male.

Use of the Trail

At baseline, 61.3% reported any walking, jogging, or biking trails in their neighborhood, and at follow-up the prevalence was 66.9%. At follow-up, 11.3% had not heard of the trail, and 23.9% had both heard of the trail and used it at least once. If participants mentioned walking or bicycling as one of their two leisure activities, and then were asked where that activity usually took place. At baseline, two participants reported using the trail corridor, before construction, for walking, and two reported using it for bicycling. Among those who had ever used the trail at follow-up (n =80), 22.5% felt that the amount of time they spent being physically active did increase, while 77.5% did not. Also among those that had ever used the trail, a similar percentage (26.6%) felt that the number of times they were physically active increased, while 73.4% did not.

Change in Physical Activity

Unadjusted differences in physical activity from baseline to follow-up are presented continuously (Table 3) and categorically (Table 4). Those who had never used the trail had significant declines in median time spent in moderate physical activity, vigorous physical activity, and bicycling for transportation. Those who had ever used the trail also had significant declines in median time spent in vigorous physical activity.

When considering the multivariable logistic models (Table 4), leisure activity, leisure activity near home, moderate activity, vigorous activity, and walking for transportation did not significantly change. Participants who used the trail were less likely to increase their walking by >30 or 45 minutes per week from baseline. Participants who used the trail were also more likely to

Table 2. Characteristics of analysis sample (n = 366)

	n	%
General health		
Excellent	97	27.0
Very good	148	41.2
Good	87	24.2
Fair/poor	27	7.5
Age (years)		
18–29	32	8.9
30–39	90	25.0
40–49	85	23.6
50–64	106	29.4
≥65	47	13.1
Education		
≤12 years	35	9.7
13–15 years	55	15.2
≥16 years	272	75.1
Gender		
Female	236	64.7
Male	129	35.3
Employment status		
Employed	256	70.5
Not employed	107	29.5
Marital status		
Partnered	219	60.3
Not partnered	144	39.7
Race/ethnicity		
Non-Hispanic white	214	58.5
Non-Hispanic black	125	34.2
Other	27	7.4
Overall moderate/vigorous physical activity (baseline)		
Meets recommendations	160	43.8
Insufficiently active	187	51.2
Inactive	18	4.9
Overall moderate/vigorous physical activity (follow-up)[a]		
Meets recommendations	140	38.3
Insufficiently active	184	50.3
Inactive	42	11.5
Sidewalks in neighborhood		
Yes	182	50.0
No	182	50.0
Walking, jogging, biking trails in neighborhood		
Yes	222	61.3
No	140	38.7
Heavy traffic in neighborhood		
Yes	172	47.4
No	191	52.6
Safety of neighborhood		
Extremely safe	81	22.5
Quite safe	234	65.0
Slightly safe	43	11.9
Not at all safe	2	0.6
Measured distance from trail		
0–0.5 miles	123	33.6
>0.5–1.0 miles	145	39.6
>1.0–2.0 miles	98	26.8
Awareness and contemplation of trail use[a]		
Not aware	38	11.3
Aware, not used it and not thinking of using it	132	39.4
Aware, not used it and not planning to use it in next month, but thinking of using it in next 6 months	54	16.1
Aware, not used it, but planning to use it in next month	31	9.3
Aware, used it	80	23.9
Own property/home adjoining the trail[a]		
Yes	47	13.5
No	300	66.5

[a] Measured at follow-up; otherwise assessed at baseline.

decrease their bicycling time from baseline, although the estimates were somewhat imprecise due to the low prevalence of bicycling.

We also examined whether those who used the trail might be more likely to meet recommendations for physical activity, defined separately using leisure activity questions and moderate/vigorous physical activity questions. For both definitions of recommended activity, use of the trail was not associated with either meeting recommendations at follow-up but not at baseline, or meeting recommendations at baseline but not at follow-up, compared to those who did not change their status (either did or did not meet recommendations at both times).

Discussion

This study prospectively evaluated whether physical activity increased in association with the building of a multiuse trail. Leisure activity, leisure activity near the home, moderate activity, vigorous activity, walking, and walking for transportation did not increase over time, whether the participant used the trail or not, and trail use was not significantly associated with changes in most of these activities. When considering our retrospective evaluation, 11% were not aware of the trail, 65% had never used the trail, 17% to 18% had used the trail but did not feel that it increased their time or frequency of activity, and 5% to 6% had used the trail and reported that it did increase their time or frequency of physical activity.

Our results can be compared to two other retrospective trail evaluations. First, using a trail intercept survey of almost 2000 users at six Indiana trails ranging in length from 3 to 15 miles, 70% to 87% (range across the six trails) of users at the trail reported that the trail increased their participation in trail activities, such as walking, jogging, or bicycling, while the rest reported that the trail did not increase those activities.[24] The trail users reported a median of 100 to 200 minutes of use per week. Second, in a Missouri study, those who were not regular walkers were more likely to report increases in physical activity due to a trail than regular walkers.[6] Brownson et al. stated that there might be a ceiling effect, whereby regular walkers may use the trail to maintain activity, while those who are inactive might

Table 3. Medians and IQ range of physical activity, overall and stratified by whether had ever used trail

		Baseline			Follow-up			
	Strata	***n***	**Median**	**IQ range**	***n***	**Median**	**IQ range**	***p* value[a]**
Leisure activity (minutes/week)	Overall	363	165	60–280	363	170	60–270	0.19
Ever used trail	Yes	77	180	105–285	77	180	75–300	0.29
	No	267	150	45–270	267	140	35–255	0.18
Leisure activity near home (minutes/week)	Overall	362	120	0–240	362	120	0–240	0.37
Ever used trail	Yes	77	120	30–225	77	150	30–240	0.33
	No	266	90	0–240	266	120	0–230	0.49
Moderate activity (minutes/week)	Overall	336	135	60–240	336	120	50–225	0.08
Ever used trail	Yes	76	162.5	90–270	76	140	80–300	0.46
	No	241	120	60–240	241	100	40–210	**0.03***
Vigorous activity (minutes/week)	Overall	352	35	0–120	352	0	0–80	**<0.0001****
Ever used trail	Yes	80	90	0–180	80	20	0–120	**0.01***
	No	253	0	0–120	253	0	0–60	**<0.0001****
Total walking (minutes/week)	Overall	338	90	30–180	338	90	30–180	0.48
Ever used trail	Yes	79	105	30–210	79	70	25–180	0.21
	No	241	90	20–180	241	90	30–180	0.39
Walking for transportation (minutes/week), 2 outliers dropped	Overall	353	0	0–0	353	0	0–0	0.41
Ever used trail	Yes	76	0	0–0	76	0	0–0	0.32
	No	261	0	0–0	261	0	0–0	0.32
Bicycling (minutes/week)	Overall	347	0	0–0	347	0	0–0	0.47
Ever used trail	Yes	77	0	0–30	77	0	0–0	0.16
	No	253	0	0–0	253	0	0–0	0.98
Bicycling for transportation (minutes/month)	Overall	360	0	0–0	360	0	0–0	0.41
Ever used trail	Yes	78	0	0–0	78	0	0–0	0.34
	No	264	0	0–0	264	0	0–0	**0.01***

[a]The *p* values derive from Wilcoxon nonparametric test for differences.
*$p<0.05$; **$p<0.0001$ (bolded).
IQ, interquartile.

increase their activity. Our retrospective evaluation also indicated a self-reported increase in activity due to the trail, but our prospective evaluation did not support this.

It is important to interpret these findings in light of the setting within which the trail was built. Among the participants at baseline, 50% reported sidewalks and 61% reported walking, jogging, or biking trails in their neighborhood. This prevalence is higher, for example, than the prevalence reported in a random sample of adults living in six other North Carolina counties (39% reported sidewalks and 25% reported trails in neighborhood).[10] Moreover, the segment of the trail that was evaluated extended an existing trail. A "cleaner" evaluation might occur if a geographic area is evaluated does not contain any trails and/or sidewalks.

While our study provides important insight into this question, future studies examining this topic can improve on this study. It is important to note that the changes described took place in the absence of a strong targeted campaign to increase awareness and usage of the trail. It may be that efforts to increase trail awareness and use are essential. Several considerations when designing next studies are offered below.

First, our quasi-experimental noncontrol pre–post study design allowed us to examine changes longitudinally. However, the introduction of a control community would have allowed us to control for secular changes that might have occurred during this time period.

Second, this study relied solely on self-reported physical activity, due to budgetary restrictions. Future studies should assess objectively measured physical activity (e.g., accelerometer or pedometer), in addition to self-reported physical activity.

Third, our study of adults living near the trail would have been enhanced by triangulation with field observations and intercept surveys of trail users. It would be helpful to understand the characteristics of those who use the trail, the distance that they travel to the trail, their perceptions of the trail, and if trail use has changed since completion.

Fourth, the timeline of a "natural experiment" does not always fit with research and funding timelines. The study was intended to assess physical activity 1 year later, with surveys occurring during the same season of the year. Because of the delay in construction of the trail, all follow-up surveys were conducted in the fall, ranging from 19 to 28 months after the first survey. We attempted to control for this in our statistical models by introducing variables that accounted for weather during the baseline survey.

Fifth, future studies should consider measuring and testing hypothesized mediators (e.g., enjoyment

Table 4. Sample proportions and ORs with 95% CIs of whether participants who ever used trail changed their physical activity from baseline to follow-up

		Ever used trail		Ever used trail		
Outcomes (covariates in model)[a]	**Results**	**Yes *n* (%)**	**No *n* (%)**	**(Yes vs no) OR (95% CI)[b]**	**OR (95% CI)[c]**	**OR (95% CI)[d]**
Leisure activity (minutes/week)						
(A,B,C,D,H,J,K,L,O)	Decreased	26 (33.8)	102 (38.2)	0.86 (0.42–1.80)	1.13 (0.49–2.61)	1.01 (0.50–2.03)
	No change (referent)	23 (29.9)	80 (30.0)	1.00	1.00	1.00
	Increased	28 (36.4)	85 (31.8)	1.07 (0.51–2.26)	1.32 (0.57–3.05)	1.23 (0.59–2.57)
Leisure activity near home (minutes/week)						
(D,H,K,L)	Decreased	22 (28.6)	96 (36.0)	0.73 (0.36–1.45)	1.14 (0.54–2.44)	0.79 (0.41–1.54)
	No change (referent)	25 (32.5)	81 (30.3)	1.00	1.00	1.00
	Increased	30 (39.0)	90 (33.7)	0.96 (0.51–1.83)	1.14 (0.55–2.40)	0.99 (0.53–1.87)
Moderate activity (minutes/week)						
(B,I)	Decreased	24 (31.6)	102 (42.3)	0.69 (0.35–1.35)	0.61 (0.29–1.26)	0.84 (0.43–1.63)
	No change (referent)	22 (28.9)	67 (27.8)	1.00	1.00	1.00
	Increased	30 (39.5)	72 (29.9)	1.23 (0.63–2.39)	1.04 (0.50–2.13)	1.65 (0.86–3.17)
Vigorous activity (minutes/week)						
(A,B,C,E,G)	Decreased	31 (38.9)	78 (30.8)	1.24 (0.66–2.32)	1.42 (0.75–2.71)	1.23 (0.66–2.29)
	No change (referent)	35 (43.8)	140 (55.3)	1.00	1.00	1.00
	Increased	14 (17.5)	35 (13.8)	1.03 (0.46–2.30)	1.29 (0.59–2.81)	1.14 (0.51–2.58)
Total walking (minutes/week)						
(A,B,C,D,F,I,J,K)	Decreased	26 (32.9)	71 (29.3)	0.87 (0.44–1.73)	1.20 (0.57–2.51)	0.82 (0.41–1.63)
	No change (referent)	38 (48.1)	97 (40.1)	1.00	1.00	1.00
	Increased	15 (19.0)	74 (30.6)	0.46 (0.21–1.01)	0.95 (0.45–2.04)	0.43 (0.19–0.98)
Walking for transportation (minutes/month)						
(B,C,D,F,H,I,J,K,M,N)	Decreased	4 (5.2)	16 (6.1)	0.33 (0.07–1.47)	0.65 (0.18–2.27)	0.22 (0.04–1.45)
	No change (referent)	65 (84.4)	227 (86.6)	1.00	1.00	1.00
	Increased	8 (10.4)	19 (7.3)	1.29 (0.47–3.55)	1.10 (0.43–2.81)	1.43 (0.52–3.95)
Bicycling (minutes/week)						
(B,C)	Decreased	12 (15.6)	14 (5.5)	4.17 (1.70–10.20)	3.99 (1.81–8.79)	4.14 (1.33–12.90)
	No change (referent)	58 (75.3)	229 (90.2)	1.00	1.00	1.00
	Increased	7 (9.1)	11 (4.3)	2.47 (0.86–7.11)	2.09 (0.88–4.98)	2.64 (0.90–7.77)
Bicycling for transportation (minutes/week)						
	Decreased	1 (1.3)	1 (0.4)			
	No change (referent)	73 (93.4)	264 (99.6)			
	Increased	4 (5.1)	0 (0.0)			

[a] Covariates in final adjusted model: A, centered age in years; B, general health (excellent/very good, good/fair/poor); C, distance from trail (0–0.5, >0.5–1.0, >1.0–2.0 miles); D, education (≤12, 13–15, ≥16 years); E, gender; F, marital status (partnered, unpartnered); G, race/ethnicity (non-Hispanic white, other); H, adjacent home/property owner (yes, no); I, body mass index (underweight or normal weight, overweight, obese); J, work status (employed at either survey, not employed); K, safety from crime in neighborhood (extremely safe, quite safe, slightly safe, not at all safe); L, days/month with average daily temperature >80°F; M, days/month with average daily temp <40°F; N, days/month with average daily dewpoint above 68; and O, days/month with precipitation ≥0.10 in.
[b] Outcome cut points: <−30, −30 to +30, >+30 minutes/week.
[c] Outcome cut points: <−15, −15 to +15, >+15 minutes/week.
[d] Outcome cut points: <−45, −45 to +45, >+45 minutes/week.
CI, confidence interval; OR, odds ratio.

of activity, self-efficacy in using the trail), to better understand why the building of a trail might change physical activity. The next step in this line of research would then be to take the mediators that were found to affect change in physical activity, and test them in an intervention setting. These tests would involve assessing if the intervention resulted in a change in the mediator, and whether the change in the mediator resulted in a change in physical activity.[25,26]

Sixth, we did not want our survey to educate participants about the trail and thereby become an intervention. We believe that we were successful in this regard because we asked about the trail only at follow-up and after ascertainment of physical activity.

Seventh, portions of rails-to-trails pathways may be usable before formal development of the trail. To enable proper classification of pre-trail use while also trying to avoid bias, participants were asked at baseline where they walked or biked most often. This enabled us to be able to assess how many people were already using the trail, which turned out to be quite low (n =4).

Limitations

There were several limitations to this study. First, a telephone sample from the White Pages listings was used, because knowing each participant's home ad-

dress, as well as efficiency in calling within a selected small geographic area, was vital. This sampling procedure excluded persons not listed in the White Pages of the phone book. However, two other studies compared health estimates obtained from random-digit dialing to using White Page listings and did not find substantial bias in prevalence estimates.[27,28] This sampling procedure also excluded those without a telephone and those who relied only on cell phones, but this number was likely quite low. According to the 2000 U.S. Census, telephone coverage in this geographic area was 99.5%.[18] The survey also excluded those few people who did not speak English, because we did not have bilingual interviewers. Second, stages of change for overall physical activity were not collected at baseline. In another study, contemplators were found to have more negative perceptions of their environment than did those in maintenance stage for physical activity.[29] Third, the sample that remained in our study at follow-up differed from the U.S. 2000 census characteristics for that region (i.e., more highly educated). This could reflect the sampling procedure and could also be due to a bias of those who were lost to follow-up. Fourth, our sample was not large enough to detect possible interactions, such as with distance to the trail. Further, in these analyses we tested many associations, but chose not to adjust for multiple testing because we had specific a priori hypotheses. Finally, any change in physical activity may be attributable to a factor that we did not measure, or substitution may also be occurring, wherein active participants were replacing activity done elsewhere with activity performed on the trail. Also, the measure for trail use (any vs none) may be diluted by those using it infrequently. It may be that those who use it more often are most likely to increase their physical activity.

Conclusions

This prospective study of the building of a multi-use trail did not demonstrate an increase in physical activity among adults living near the trail. Other prospective studies are encouraged, to take advantage of rigorously evaluating different types of trails that are to be constructed in rural and urban settings.

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