

**Wonder's Way Bike Pedestrian Pathway on the Arthur Ravenel, Jr. Bridge:
A Successful Model for Facilitating Active Living in Lowcountry South Carolina¹**

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This project is a partnership with the Berkeley-Charleston-Dorchester Council of Governments and was funded by the Robert Wood Johnson Foundation.

EXECUTIVE SUMMARY

Abstract

A number of policies and interventions increasingly recommend the building of better infrastructure (such as the construction of sidewalks, paths, trails, and bike lanes) as a way to increase the public's physical activity levels. These policies and interventions are a result of accumulating research which shows that physical infrastructure (such as living near a trail) and activity levels are connected. Documentation, however, of specific projects that have led to increased activity levels is scarce. This research project evaluates one particular path, the construction of the new Wonder's Way bicycle and pedestrian path on the Arthur Ravenel Jr. Bridge (Cooper River Bridge), in Charleston South Carolina. The objectives of this research included assessing the: (1) the impact of the path on users' overall activity levels, (2) regularity and mode of path use, (3) reasons for path use, (4) mode of transportation to the path, (5) demographic correlates with patterns of path use, (6) characteristics desired in a path, and (7) attitudes towards the quality of the current bridge path.

Methods

This study administered onsite surveys (both quantitative and qualitative) to 393 users of the new, 2.71 mile long, Wonder's Way Path which connects Charleston and Mt. Pleasant South Carolina over the Cooper River. The surveys were administered in the winter, spring and summer of 2007 (from January through July).

Summary of Major Findings

Sixty-seven percent of surveyed path users indicated that their activity levels had increased since the opening of the bridge path. Increases in activity levels were significantly related to race and whether or not the path user regularly walked the bridge. Eight-five percent of Black respondents reported increased activity levels versus 64% of White respondents. In addition, 75% of those that indicated that they were Regular Walkers versus 56% of those that were not Regular Walkers reported increased activity levels. Gender was significantly associated with whether someone was a self-reported Regular Walker, Runner or Bicyclist. Women were more likely to report being regular bridge walkers (68% of women versus 40% of men), and men were more likely to report both being regular bridge runners (48% of men versus 37% of women) and bicyclists (36% of men versus 11% of women). In terms of the commuting behavior of respondents, 10% of the participants indicated that they utilized the path in order to commute to work or conduct chores. When asked to rate their reasons for why they commute on the path, participants listed "To Fit Exercise in to Routine" at the top. It was found that two hundred and eighty six of the bridge users (73 %) drove to the bridge path in order to utilize it. Finally, participants were asked to rate what they find to be important in a hypothetical path and also the quality of the current path. While "Safety" received the highest rating of characteristics that are important in a hypothetical path, "Scenery" received the highest rating for the quality of characteristics of the new bridge path. These and other ratings are detailed in the document below.

I. INTRODUCTION

Literature:

The relationship between physical activity and good health is now well-documented. Physical inactivity, which strongly influences obesity, is associated with many chronic diseases, including heart disease, high blood pressure, stroke, and diabetes, among others.² Not only has a strong association between physical inactivity and disease been well documented, it has also become clear that the numbers of adults and children in the U.S. that are either overweight or obese has grown substantially. In fact, the proportion of youth who are overweight and adults who are obese more than doubled in the last two decades of the 20th century.³ In South Carolina the rates of overweight and obesity are among the highest in the nation. One in Four adults in South Carolina is obese and 3 out of 5 adults are obese or overweight.⁴ Health conditions in the Berkeley, Charleston, and Dorchester regions are consistent with statewide trends of poor health. A 2000 survey, for instance, shows that 58 % of the region's population is at risk for the types of chronic diseases that are related to a sedentary lifestyle.⁵ The good news is that going from a sedentary lifestyle to one which adopts exercise, even moderate exercise such as walking, can produce large health benefits.⁶ Though the connection between physical activity and health is well established, only 26% of adult Americans achieve the recommended levels⁷ of physical activity and 28% report no active leisure time at all.⁸

A number of policies and interventions are increasingly aimed at promoting physical activity by building and promoting better infrastructure.^{9 10 11} Sometimes referred to as “New Urbanism,” one body of policy suggestions focuses on the creation

and revitalization of dense, pedestrian friendly, mixed-use communities.¹² Additional strategies that are recommended include the establishment of mall walking programs and the building of infrastructure that encourages physical activity (such as bike lanes, crosswalks, and trails, among others). These policies and interventions are a result of accumulating research which shows that while automobile-oriented infrastructure, such as sprawl, discourages physical activity,¹³ supportive infrastructure, such as sidewalks, encourages both higher activity levels¹⁴ and non-motorized travel.¹⁵ Some of this literature shows a direct link between living near trails and paths and higher overall activity levels.¹⁶

In addition to the health benefits that they offer, walking and bicycling are effective means of low-cost, resource friendly, and environmentally sustainable transportation for short distances. Our high level of dependency on cars for travel and the related automobile infrastructure has come at a steep price. Costs include the increasing hours spent at the wheel¹⁷; obesity from inactivity related to increased driving and limited spaces for non-motorized mobility¹⁸; civil insecurity related to our dependency on oil and global economic insecurity related to the growing gap between the supply and demand of a finite resource¹⁹; and massive environmental degradation and pollution²⁰. In addition, both purchasing and maintaining a car is costly.²¹ Walking and biking provide potential alternatives for those who cannot afford the purchase of a car and the \$6,000 a year that the average driver pays in fuel and maintenance costs. However, in automobile dominated regions of the country that are under-resourced in terms of sidewalks and bike lanes (especially areas experiencing suburban sprawl like greater Charleston) non-motorized travel has become increasingly inefficient and dangerous.

Current census figures document the degree to which the automobile has become dominant as other forms of travel have become marginalized. Consider, for example, the 2000 census report on travel to work rates: over 75.7% of trips in the U.S. are conducted by people who traveled alone in automobiles, 12.2% by people who carpooled, 4.7% by people who used public transit (this includes taxis), 2.9% by people who walked, and 1.2% by people who traveled by other means (3.3% worked at home).²² Data from the Department of Transportation on walking and bicycling rates for all trips (not just travel to work) estimates that walking makes up only 8.6 % of all trips and bicycling makes up only .9% of all trips.²³ While workers and travelers can not be expected to travel long distances by foot or bike, it is striking to note while one quarter of all trips are less than one mile, three-fourths of those short trips are made by automobile.²⁴ It is these types of short, yet frequent, small trips that citizens can be encouraged to take by foot or bike. In fact, studies have shown that the building of sidewalks, paths, and trails does increase the numbers of people who walk and bike for travel.²⁵

The results, outlined below, of the Wonder's Way study provides a step toward understanding the relationship between infrastructure and activity/commuting levels and understanding the key motivating interests of outdoor exercisers and non-motorized commuters. More specifically, while there is substantial documentation of the existence of a positive connection between infrastructure and activity levels, very little research shows the direct impact that a *new* facility (such as a new trail/path) can have on increasing the activity levels of community members. One study of trail users in rural West Virginia did find that 98% of trail users on two new trails reported that their activity levels had increased since beginning to use the new trails.²⁶ ²⁷ However, another recent

study showed that the construction of a new trail in North Carolina had no impact on the activity rates of community members living near the trail.²⁸ In addition, there is no documentation of how a *bridge* path, and especially a *new bridge* path, might impact activity levels. Finally, there is also very little information (and the information available is somewhat conflicting) on what community members actually want in a path, trail, or other facility.²⁹ In addition, while a few pieces on non-motorized commuters have appeared over the past few decades, the literature lacks any sort of comprehensive documentation of the rates, demographic profiles, and motivations of this type of traveler. This study represents an attempt to contribute to some of these gaps that exist in our current understanding of the relationship between non-motorized travel (both exercisers and commuters) and infrastructure.

Charleston and the Wonder's Way Bridge Path:

The 2.71 mile long and 12 foot wide Wonder's Way³⁰ path, which opened for traffic on July 15, 2005,³¹ connects the Charleston peninsula with the town of Mt. Pleasant in South Carolina.³² Paths such as this one are uniquely important for communities like Charleston and Mt. Pleasant that are bisected by rivers or other water ways.³³

II. METHODS

Data Collection and Design:

This research is based on a cross-sectional, onsite, study which used data from an interceptor³⁴ interview survey (containing both quantitative and qualitative questions) of

adults exercising and commuting³⁵ on the new bridge path in Charleston, SC. Surveys were administered to 393 users and obtained data on (1) the impact of the path on users' overall activity levels, (2) regularity and mode of path use, (3) reasons for path use, (4) mode of transportation to the path, (5) demographic correlates with patterns of path use, (6) characteristics desired in a path, and (7) attitudes towards the quality of the current bridge path.

While the survey primarily collected quantitative data, it also contains three qualitative, open-ended questions, including: 1) what do you like most about this bridge path, 2) what could be done to improve this bridge path, and 3) is there anything else that you'd like to comment on that I didn't address today? All of comments on this section of the survey were reported verbally by respondents and recorded by hand by the surveyors and, therefore, should be read as paraphrases of the original comments.

Sample:

The sample (n=393) contains 57% walkers (n=225), 26% joggers/runners (n=101), and 17% bike riders (n=67).³⁶ Trained student-interviewers administered the survey to 373 adult path users who live within 20 miles of the path. Surveys were conducted for 7 months during three seasons, during both weekdays and weekends, and during multiple times of the day. Surveys were not conducted on rainy days but were conducted on overcast days. Each survey took approximately 5-10 minutes to complete. The interviewers delivered the surveys orally and recorded the responses on a clip board for the respondents. Respondents were offered a free water bottle for their time.³⁷

Respondents who noted that they lived more than 20 miles from the path were not included in the survey.³⁸

III. RESULTS

The racial composition of the sample (n =3 93) was more White and less Black than the SC population as a whole with 89% White and 11% Black.³⁹ South Carolina, on the other hand, is 67% White and 29% Black. The gender composition of the survey is close to the gender composition of South Carolina as a whole. In the survey, gender breaks down in to 56% women and 44% men⁴⁰ while in South Carolina as a whole women make up 51% and men make up 49% of the population.⁴¹ The age range of the participants in the study is fairly well distributed with most of the participants (27%) falling in the 18-27 age category, 20% falling in the 28-37 age category, 24% falling in the 38-47 category, 18% falling in the 48-57 category, and the least of the participants (11%) falling in the 58 and older category.⁴² (See Table 1 for a summary of the key demographic characteristics of survey participants).

In addition, note that 17% of the individuals who were approached and who agreed to participate, but who were not actually surveyed, lived more than 20 miles from the bridge (total number interviewed =3 93, total number approached =476). This fairly high percent rate indicates that the path operates as a strong tourist attraction.

Impact of Path on Physical Activity Rates:

Sixty-seven percent⁴³ of path users (n=262) indicated that their activity levels had increased since the opening of the bridge path (See Table 1). The high use of the bridge

path for physical activity and exercise was mirrored in the open-ended portion of the survey where respondents were asked what they like best about the bridge path. Sixty-three of the comments in this section praised the exercise and workout benefits offered by the bridge.

Increases in activity levels were significantly related to Race and whether or not the path user regularly walked the bridge. In terms of race, 85% of Black respondents reporting increased activity levels versus 64% of White respondents (see Table 2). This finding fits with the literature which has found that Blacks are more likely than Whites to utilize sidewalks and other amenities (for primarily walking), rather than going to gym, as their exercise modality.⁴⁴ A few studies are also showing that paths, trails, and similar facilities appear to be uniquely helpful for increasing the activity levels of Blacks given that this part of the population reports higher activity levels while working or traveling to work than during leisure time.⁴⁵

In addition, the regularity (“regular” is defined as once a month or more) of walking was significantly associated with reports of increases in activity levels. Seventy Five percent of those that indicated that they are Regular Walkers⁴⁶ versus 56% of those that were not Regular Walkers reported increased activity levels (see Table 3). There was no significant relationship between regularity of running or biking with increased activity levels. This indicates that the availability of the bridge path has more of an impact on moderate exercisers (the regular bridge walkers) than on more strenuous exercisers (regular bridge runners or bikers). This finding also fits with the literature which suggests that due to its affordability, convenience, and acceptability, walking may

be an activity that is easier to encourage than other activities like joining a gym. This is especially true for hard-to-reach populations like minorities, the elderly, and women.⁴⁷

Regular Modality:

Most of the participants were walking across the bridge on the day of the survey (57%), while 26% were running, and 17% were biking. Walking was also the activity that most participants engaged in “Regularly” on the bridge (56 %).⁴⁸ Forty-two percent⁴⁹ were Regular Runners, and 22%⁵⁰ were Regular Bicyclists (see Table 4). This profile fits with government findings that walking is the most common form of physical activity in the U.S.⁵¹

Gender was the only demographic factor that was significantly associated with whether someone was a self-reported regular walker, runner or bicyclist. Women were more likely to report being regular bridge walkers (68% of women versus 40% of men), and men were more likely to report both being regular bridge runners (48% of men versus 37% of women) and bicyclists (36% of men versus 11% of women) (see Table 5). This finding fits with the literature which indicates that women are more likely to walk for exercise than are men.⁵² It is also well established that men tend to be more likely to cycle than women.⁵³

What Participants Want in a Hypothetical Path:

Participants were asked both about the importance of characteristics on a hypothetical path and also were asked to rate the quality of the new Wonder’s Ways path on a list of characteristics.

Participants rated characteristics for a hypothetical path on a scale of 1-5 (with 1 being “not at all important” and 5 being “very important”) in the following order: Safety, Well Maintained, Adequate Space, Access On and Off, Adequate Lighting, Convenient Location, Scenery, Accessible Parking, Paved Terrain, Restroom/H2O Facilities, Hilly Terrain, Social Atmosphere, and Flat Terrain (see Table 6). The high rating of “Safety” and “Well Maintained” is supported by the literature on trails which shows that users highly value the safety and maintenance of paths. In fact it’s been found that trails that are perceived to be well-maintained and safe are used more often.⁵⁴

How Participants Rate the Wonder’s Way Bridge Path:

Bridge users gave the bridge path very high marks, 7 out of 11 characteristics were rated above a 4 on a scale of 1-5 (with 1 being “very poor quality” and 5 being “very good quality”). Participants rated the quality of the bridge path characteristics in the following order: Scenery, Maintenance, Terrain, Lighting, Convenience of Location, Safety, Access On and Off, Parking Near the Path, Social Atmosphere, Free of Congestion, and Restroom/H2O Facilities (see Table 7). As two participants summed up their enthusiasm on the open-ended section of the survey:

Great job on the bridge – love it (13)

It’s great, the best thing to happen to Charleston in years (248)

Only three qualities received mean ratings in the 3 level (“Parking Near the Path”, “Social Atmosphere”, and “Free of Congestion”) and one quality received a rating in the 2 level (“Restroom/H2O Facilities”). The low rating for the access to “Restroom/H2O” facilities was echoed in the open-ended section of the survey with 91 comments naming

restrooms and/or H2O facilities as infrastructure in need of improvement. One respondent made reference to the improvement to water facilities that had already been made and commented that they were:

Happy to have the new water fountain (63)

The item that seems to point most to the need for future attention is the low rating for the Wonder's Way path quality in terms of "Free of Congestion." This is important because respondents rated "Adequate Space" as third in importance for hypothetical path characteristics (see Table 6). The space problems on the path were echoed in the open-ended section of the survey. In fact, when asked if respondents felt that the bridge path needed any improvement, the biggest complaint was space. Specifically, 69 respondents noted that space was a problem. And of those comments that listed problems with space, the most common complaint was tension between bicyclists and pedestrians. Many noted simply that the path needs "wider lanes". Many more, however, pointed to specific tensions between pedestrians and bicyclists. For instance, one respondent said:

Fix the Pedestrian and biker conflict of getting in the way of each other (139).⁵⁵

The above comment is fairly neutral in tone. However the high levels of space-related frustration that many pedestrians and bicyclists were feeling is evident in the negative and divisive tones of many of the other comments. Negative comments were directed at both pedestrians and bicyclists.

The negative comments directed against bicyclists and pedestrians tended to focus on the perceived dangers imposed by one group or the other. The following pedestrian comments reflect the concerns about perceived bicyclist imposed dangers:

Take bikers off! Bikers are dangerous to walkers (15)

Bikers are dangerous and “scary” to pedestrians, the path needs wider lanes (39)

Slow the bikers down (132)

The following is a sample of comments directed at the perceived dangers posed by pedestrians:

Pedestrians should stay in a single file line to get out of the way of bikers (51)

Walkers need to stay out of the biking lane (52)

Walkers are in the way of bikers’ safety (150)

The frustration caused by the space conflicts and potential dangers are further reflected in the way that some of the complaints were directed at the perceived “attitudes” of either bikers or pedestrians. Some example comments are as follows:

Teach Pedestrians courtesy to bikers (57)

Bikers are rude (4)

Many respondents did offer suggestions for how to alleviate space conflicts. Some are financially unrealistic now that the bridge and path have been completed (widening the path or putting a separate path on other side). Other suggestions would be, relatively speaking, simple to enact, such as installing a rubber barrier⁵⁶ between pedestrians and bicyclists and putting up more signs.

Though “Safety” only rated as number 6 for quality of the New Bridge, it rated as number 1 for importance in hypothetical bridge path characteristics, and it did appear often in the open-ended section of the survey. The following respondent, for instance, praised the safety of the bridge and commented that:

It's nice to know you are safe to come at any time of day (13)

A total of 29 comments noted that one of things they like about the bridge path is safety. Most comments did not specify what they mean by “safety” but the majority of those that did specify indicated that they felt safe from traffic on the bridge. For instance, one respondent explained that:

The barrier makes it safe to walk with traffic (316)

However, 25 comments referred to unsafe qualities of the bridge path that need improvement.⁵⁷ Of those comments, most pointed to the feeling that the parking area and the experience of crossing from the parking area to the bridge were unsafe (17) (several of these named the Charleston side as being particularly unsafe). For instance, one respondent noted that:

Even though people may live downtown they drive to the Mt. Pleasant access area because it is safer, the parking on East Bay is dangerous. (This respondent also noted that they know of many people who have had their cars broken into in the Charleston side parking lot) (177)

It is important to note that only one respondent suggested that the path is easy to “get to” safely.

Nine of the 25 comments suggested changes to the actual bridge path that would make crossing it safer. Three of the 9 comments suggested that the bridge path would be safer if a higher barrier were installed between cars and path users to prevent against exposure to unsafe debris. For instance, one person said there needs to be a:

Chain link fence at the top to provide safety from the bridge debris (109)

In addition, five of these 9 comments suggested installing emergency phones on the bridge and one of the 9 suggested that blue lights should be placed on the bridge.

Parking was also noted as a problem in the open-ended section of the survey; forty-four⁵⁸ comments indicated that parking should be improved.

Also, though “Social Atmosphere” was only rated as 9th in terms of the quality of the New Bridge, a number of respondents did mention on the open-ended section of the survey that one of the assets of the bridge path is that it offers a place to socialize. For instance, one respondent commented that it provides:

Time to bond with the person you are going over with (314)

As noted above in the section titled “Impact of Path on Physical Activity Rates” path users pointed to the opportunity to exercise as one of their favorite qualities of the new bridge path. Sixty-three of the comments praised the exercise and workout benefits offered by the bridge.

Note that “Terrain” is listed as 3rd in terms of its quality on the current bridge path (see Table 7). However, when asked to rate hypothetical characteristics of bridge paths (Table 6), “Hilly Terrain” was rated as 11th and “Flat Terrain” was rated as 13th. Since the bridge path does have an incline and the surrounding Lowcountry in general is flat, it appears that a number of participants are attracted to the bridge path for its

uniquely hilly character (relative to other local options). The open-ended questions show that, indeed, bridge path users do value the hill. References to the incline were the 2nd most frequent positive praise about the bridge path (81 positive comments were made about the hill). Most participants simply noted, as in the following comments, that:

The hill is challenging (111)

Not many hills in Charleston, the incline is good (374)

Note also that participants rated “Scenery” on the Wonder’s Way path as very high quality (see Table 7) but it only appeared as number 7 in terms of importance on hypothetical path characteristics (see Table 6). “Safety”, on the other hand, as noted above, was rated as 6th in terms of quality (see Table 7). The literature shows that both safety⁵⁹ and scenery⁶⁰ are positively associated with activity levels. One recent article also indicates that particular mixes of scenery and safety are especially appealing to path users. This 2007 study found that Chicago urban residents seemed to prefer trail areas that had a mix of both natural and built-environment views. This could be related to the desire for feeling safe which may be compromised in settings where there is a lot of vegetative overgrowth but minimal views of other activities, such as shops and cafes.⁶¹ The Wonder’s Way bridge path offers the benefits of scenery without the drawbacks of the types of vegetative overgrowth that may make exercisers and commuters feel unsafe.

The high rating of “Scenery” was mirrored in respondent comments on the open-ended section of the survey. One hundred and eighty comments on the open-ended portion of the survey referred to the scenery (it was by far the most commonly cited positive feature of the bridge). The following comments reflect the general positive sentiments expressed about the views from the bridge path:

Scenery and the bridge itself is pretty (50)

Great view, the new ships on the harbor are fun to watch (85)

Scenery at night, it's all lit up (270)

A great scene over the water (300)

Midpoint view is a sight to see! (319)

The draw that scenery can provide to potential exercisers is beginning to be documented in other research as well.⁶²

“Convenience of Location” was rated as 5th in terms of quality and showed up 13 times as a positive attribute in the open-ended section of the survey. Convenience of location is also starting to appear in other research on path user attitudes.⁶³ Though the bridge path provides a convenient location for exercising and commuting, the need for more connectivity between the bridge path and other non-motorized paths/trails/lanes or sidewalks is evident in the numbers of bridge users that reported that they drove to, rather than walked, ran, or biked, to the path. Specifically, two hundred and eighty six of the bridge users (73 %)⁶⁴ drove to the bridge path in order to utilize it. At the time of the data collection for this survey, there was no adequate bridge path connectivity with other paths and/or trails. Since the completion of the surveys for this project, construction of additional paths has been started on the Charleston side of the bridge.⁶⁵ In addition, though not asked to comment on this topic, 7 separate respondents vocalized their wish that Charleston and/or Mt. Pleasant would build more pedestrian and bike friendly facilities. Three more separate respondents noted specifically that they would like to see a similar path installed across the West Ashley Bridge.

Finally, a few items appeared on the open-ended portion of the survey that were not addressed on the quantitative part of the survey. First, a few respondents (7) commented that the bridge is uniquely beneficial for the type of structure that it offers to the exerciser's workout. For instance, two exercisers noted that:

It's very goal oriented because you want to get to the other side (305)

It's a structured workout because you can't stop unless you go back down (220)

In addition, one unexpected criticism appeared frequently (23 times) on the open-ended portion of the survey. Twenty-three respondents noted that pets, or pet waste, posed a problem on the path. The following two comments are typical of the types of concern expressed by respondents:

Pets get in the way of bikers, causing unsafe conditions when trying to avoid their waste or presence on path (181)

There should not be dog poop on the bridge (263)

Commuting versus Recreating:

As quite a few participants pointed out, the path offers:

The only way to get downtown without a car, unless it's a boat (84)

Ten percent of the participants indicated that they utilize the path in order to commute to work or conduct chores (see Table 1). Only 67 of the 393 participants (see Table 1) were bicyclists on the bridge on the day of the survey. This may be because bicyclists are traveling at a faster speed than walkers (n=225) and runners (n=101) and are less likely, therefore, to stop for a survey. Since the bicycle is so convenient for non-motorized commuting to go to work or conduct chores, the overall numbers of commuters that use the Wonder's Way path are likely to be underrepresented.

Gender was significantly associated with the likelihood of using the path for commuting with men being more likely to use the path for commuting (15%) than women (6%) (see Table 8). This finding does fit with the *bike* commuting literature which indicates that men have higher rates of bike commuting than women. The 2005 American Community Survey, for instance, found that men are three times as likely as women to bike commute to work.⁶⁶

Participants were asked to rate their reasons for why they commute on the path on a 1-5 scale in which (1 is a “low level reason” and 5 is a “high level reason”). With a mean score of 4.8, “To fit Exercise in to the Routine” received a top rating. The rest of the ratings, in order of “highest” to “lowest” level reason are as follows: For the Chance to be Outside, For the Scenery, To Give Me Time to Reflect, For the Fun of It, To Contribute to Less Resource Depletion, To Save on Gas and other Car Expenses, To Avoid Parking Hassles and/or Costs, and To Save Time (see Table 9).

IV. DISCUSSION AND CONCLUSION

The results of this project support research and policy efforts over the past decade which document and advocate that physical activity and non-motorized transit can be facilitated by supportive infrastructure. Structures, such as bridge paths, clearly make it easier for community members to fit exercise into their daily lives. Sixty-seven percent of respondents attributed increased activity levels to the construction of the path and the open-ended portion of the survey generated 63 comments that praised the path for its exercise and work-out benefits. It appears, as well, that supportive infrastructure can be especially successful at increasing the activity levels of the least active and hardest to

reach segments of the population. For this study, Black respondents and moderate exercisers were most likely to report increases in activity from the opening of the bridge path. Eighty-five percent of Black respondents versus 64% of White respondents reported increases in activity levels with the construction of the new bridge path. The connection between walking access and activity levels among Blacks is especially salient given that this population has very high rates of obesity and other chronic diseases that are related to inactivity⁶⁷ and they are also among the groups, including women, which are least likely to meet recommended levels of physical activity⁶⁸.

Seventy-five percent of Regular Walkers, as opposed to 56% percent of non Regular Walkers reported increases in activity levels attributed to the new bridge path. While women did not report significantly higher levels of increased activity than men, women were significantly more likely than men to report being Regular Walkers. This indicates that Women's and other moderate exercisers' (walkers) needs, in addition to Black exercisers' needs, are uniquely facilitated by the local development of supportive infrastructure. These results provide evidence that walking, a simple form of exercise, is ideal for many people who do not currently meet recommended activity levels. It requires low exertion levels, it can potentially be fit into daily routines (such as travel to work, shopping, and running errands), and it doesn't require any financial investment.⁶⁹ These findings support other research which shows that the promotion of walking with supportive infrastructure can be effective at increasing the activity levels among populations with generally low activity levels.⁷⁰

The ratings of the quality of the current path and the comments in the open-ended section of the survey indicate that overall this Wonder's Way path serves as a strong

model for how to construct successful pedestrian and bicycle infrastructure along a bridge. The survey responses also indicate that the path offers unique and desired qualities that are specific to the needs of Lowcountry exercisers (the incline) and to exercisers in general (the structured workout). The Scenery offered by the path was rated as number one on the quality scale and it also generated the largest number of positive comments from respondents. While the survey did not interview tourists, the 17% of all the users that were “approached” were tourists. This indicates that the bridge path serves as a significant tourist attraction. The results of the study also suggest that supportive physical infrastructure development contributes to environmental sustainability by encouraging non-motorized transit. Recall that ten percent of the surveyed bridge users reported that they commute on the bridge path.

This study also points to some of the considerations that marketing campaigns should take in to account when attempting to promote either physical activity or alternative transit programs. For instance, “To Fit Exercise in to Routine” was rated as the most important reason why commuters use the path. Future non-motorized transit campaigns, such as “bike to work” campaigns, may benefit by focusing attention on the most salient desires of potential non-motorized commuters. Likewise, promotion materials that highlight certain characteristics of the bridge path that are most salient to current users (for instance scenery and exercise, among others) would likely improve the efficacy of any campaign aimed at increasing physical activity levels.

This project also documents several important lessons which should be incorporated into future projects. These lessons are evident in the concerns and frustrations that participants voiced in regards to a few of the path characteristics. One

unexpected frustration was directed at pet dangers and waste. This problem can be easily remedied with better enforcement and public education. A more serious concern with space was voiced in the surveys; respondents rated the quality of “Free of Congestion” as only tenth. A look at the open-ended section of the survey indicates that most of the congestion frustration is due to space conflicts between pedestrians and cyclists. A few simple and low cost suggestions were offered, and detailed above, for addressing some of this tension on the current bridge. “Restroom/H2O Facilities” was rated as eleventh on the quality scale and frustration with inadequate facilities was echoed in the comments on the open-ended section of the survey. Safety also came up as a recurring problem. Though bridge users felt safe from traffic-related dangers on the bridge path, a few respondents did suggest that a better job could be done in terms of protecting pedestrians and bicyclists from traffic-related debris and a few suggested installing safety items, like emergency telephones, on the bridge. In addition, access to the path was listed as a problem (with the parking lot area on the Charleston side of the path generating the greatest amount of concern in regards to crime-related safety).

The number one lesson from this study is that the bridge path has been an enormous success in terms of encouraging increased activity levels of the population in general and serving the particular needs of alternative commuters. The public’s desire for more paths, and similar amenities, was made clear on the survey. For instance, while “Convenience of Location” was rated as fifth on the quality scale; the high numbers of users that drove to the path are suggestive that it could be made more convenient if it were better connected to other established walking/biking routes. Several respondents also directly voiced their hope that Charleston and Mt. Pleasant would invest in more

supportive infrastructure, like the bridge path, and that Charleston would invest in a similar path over the Ashley River.

Finally, the Wonder's Way path contributes to the "charm" of the city. The potential for this path and similar future sites to act as tourist draws is significant and would more than balance out any financial investment in the original infrastructure. Charleston County and Mt. Pleasant should be encouraged by the results of this study and are well advised to build on this success to create more pedestrian and bike friendly forms of infrastructure in the region.

Limitations of this study include the cross-sectional design. It does not contain baseline information on activity levels that existed prior to the construction of the path. In addition, data from this study on activity levels and increased activity levels are all based on self reports. There is, therefore, no way to know whether overall activity levels really did increase. Also, the study utilized interceptor-based onsite surveys; since some potential respondents passed by while interviews were being conducted a true response rate (number of participants divided by total number of individuals using the path during the interview session) was not attained. Note also that walkers were the most likely types of users to participate in the survey, so bicyclists and possibly runners may be under-represented in the study. Finally, since this study was conducted onsite by intercepting path users, the activity levels and attitudes of the general Charleston community were not represented in this study.

ACKNOWLEDGEMENTS

This project would not have been possible without generous support from the Robert Woods Johnson Foundation and the Berkeley, Charleston, Dorchester Council of Governments (BCD COGs). Numerous individuals also provided crucial help in the undertaking of this project. Vonie Gilreath, Senior Planner at COG, provided the original inspiration for this project and worked tirelessly to help design and implement the bridge survey. Several College of Charleston students and BCD COGs interns also made invaluable contributions to the project including administering the survey, entering and coding the data, and searching the literature. This dynamo team included Mat Akery, Maryann Hoyt, Kia Jenkins, Lindsay Kopp, Caroline Silverman, Mary Alice Springs, and Meredith Trevino. Finally, many thanks go to the 393 survey participants who were kind enough stop and contribute to the survey.

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other book was recently updated and is coming out in spring 2009 for its 2nd edition; this reader is co-edited with Leslie King and is titled *Environmental Sociology: From Analysis to Action*. Her articles have appeared in the *Human Organization*, *Sociological Inquiry*, and *Social Justice Research* journals. Her current projects explore connections between the built environment, physical health, and environmental sustainability.

ENDNOTES

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- ¹ Final Report prepared for Berkeley, Charleston, Dorchester Council of Governments COGs.
- ² For examples of documentation see: Hahn, R. A., S. M. Teutsch, and R. B. Rothenberg. 1990. "Excess Deaths from 9 Chronic Diseases in the United States, 1986." *JAMA*. 264(20): 2654-2659; McKenna, et al. 1998. "Current Issues and Challenges in Chronic Disease Control." In *Chronic Disease Epidemiology and Control, 2nd edition*, Browson, R.C., P L. Remington, and J. R. Davis (Eds). Washington: American Public Health Association, 1-26.
- ³ For documentation see: U.S. Department of Health and Human Services. 2001. "The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity." (can be found at <http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat5.chapter.2>); and Centers for Disease Control. 2000. *Behavioral Risk Factor Surveillance System (BRFSS)*. 2000. (can be found at <http://apps.nccd.cdc.gov/brfss/>).
- ⁴ South Carolina Department of Health and Environmental Control. 2008. "Obesity Prevention and Control." (can be found at www.scdhec.gov).
- ⁵ SCDHEC. 2000. "2000 Behavioral Risk Factor Surveillance Study for South Carolina."
- ⁶ U.S. Department of Health and Human Services. 1996. *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
- ⁷ The Department of Health and Human Services updated its recommendations for physical activity in 2008. The current recommendation for aerobic activity is to be active throughout the week, for at least three days a week for a minimum of 2.5 hours of moderate or 1.15 hours of vigorous activity. See U.S. Department of Health and Human Services. 2008. "2008 Physical Activity Guidelines for Americans." (can be found at www.health.gov/PAGuidelines/adultguide/default.aspx#toc).
- ⁸ Behavioral Risk Factor Surveillance System (BRFSS). 2000. Centers for Disease Control and Prevention (can be found at <http://apps.nccd.cdc.gov/brfss/>).
- ⁹ For a recent special journal issue on this topic see the March/April 2007 "Special Issue: Active Living Research" in the *American Journal of Health Promotion*. 21 (4). For examples of two more articles in academic journals on this topic see: Racioppi, F., C. Dora, and H. Rutter. 2008. "Urban Settings and Opportunities for Healthy Lifestyles: Rediscovering Walking and Cycling and Understanding Their Health Benefits." *Built Environment*. 31(4): 302-314; and Killingsworth, R., J. Earp, and R. Moore. 2003. "Supporting Health Through Design: Challenges and Opportunities." *American Journal of Health Promotion*. 18(1): 1-2.
- ¹⁰ For a key national government document that promotes improvements in infrastructure for increasing physical activity levels see: U.S. Department of Health and Human Services. 2000. *Healthy People 2010: Understanding and Improving Health*. Washington, DC: U.S. Government Printing Office (can be found at <http://www.healthypeople.gov/Document/>). For a key international document that makes this promotion see: World Health Organization. 2002. *A Physically Active Life Through Everyday Transport: With Special Focus on Children and Older People With Examples and Approaches From Europe*. Copenhagen, Denmark: WHO (can be found at <http://www.euro.who.int/document/e75662.pdf>).
- ¹¹ For a national program that promotes these policies see the Active Living By Design website. This program is funded by the Robert Wood Johnson Foundation and is part of the School of Public Health at the University of North Carolina in Chapel Hill. As part of its public health advocacy, the program promotes, funds and evaluates innovative approaches to utilizing community design to increase physical activity (can be found at www.activelivingbydesign.org).
- ¹² For a summary of New Urbanism see the following website: <http://www.newurbanism.org/>.
- ¹³ Rundle, A., A.V. Diez Roux, L.M. Freeman, et al. 2007. "The Urban Built Environment and Obesity in New York City: A Multilevel Analysis." *American Journal of Health Promotion*. 21(4): 326-334; Ewing, R., T. Schmid, R. Killingsworth, et al. 2003. "Relationship between urban sprawl and physical activity, obesity, and morbidity." *American Journal of Health Promotion* 18(1): 47-57; Frank, L.D., P.O. Engelke, and T.L. Schmid. 2003. *Health and Community Design: The Impact of the Built Environment on Physical Activity*. Washington: Island Press; and Ewing R., R. Pendall, and D. Chen. 2002. *Measuring Sprawl and Its Impact*. Washington, D.C.: Smart Growth

America. (can be found at <http://www.smartgrowthamerica.org/sprawlindex/MeasuringSprawl.PDF>).

¹⁴ * For four systematic reviews of the literature on this topic see Gebel, K., A.E. Bauman, M. Pettigrew. 2007. "The Physical Environment and Physical Activity a Critical Appraisal of Review Articles." *American Journal of Preventive Medicine*. 32: 361-369; Owen, N., N. Humpel, E. Leslie, et al. 2004. "Understanding Environmental Influences on Walking: Review and Research Agenda." *American Journal of Preventive Medicine*. 27: 67-76; Saelens, B.E., J.F. Sallis, L.D. Frank. 2003. "Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures." *Annals of Behavior Medicine*. 25: 80-91; and see Kahn, E.B., L.T. Ramsey, R.C. Brownson, et al. 2002. "The Effectiveness of Interventions to Increase Physical Activity. A Systematic Review." *American Journal of Preventive Medicine*. 22(4): 73-107. ** For a selection of over a decade of other journal articles that also document this relationship see: McCormick, G.R., B. Giles-Corti, and M. Bulsara. 2008. "The Relationship Between Destination Proximity, Destination Mix, and Physical Activity Behaviors." *Preventive Medicine*. 46: 33-40; Coogan, M.A., K.H. Karash, T. Adler, et al. 2007. "The Role of Personal Values, Urban Form, and Auto Availability in the Analysis of Walking for Transportation." *American Journal of Health Promotion*. 21(4): 363-370; Librett, J.J., M.M. Yore, and T.L. Schmid. 2006. "Characteristics of Physical Activity Levels Among Trail Users in a U.S. National Sample." *American Journal of Preventive Medicine*. 31(5): 399-405; Gordon, P.M., S.J. Zizzi, and J. Pauline. 2004. "Use of a Community Trail Among New and Habitual Exercisers: A Preliminary Assessment." *Preventing Chronic Disease: Public Health Research, Practice, and Policy*. 1(4): 1-11; McCormick, G., B. Giles-Corti, A. Lange, et al. 2004. "An Update of Recent Evidence of the Relationship Between Objective and Self-Report Measures of the Physical Environment and Physical Activity Behaviors." *Journal of Sports Science and Medicine*. 7: 81-92; Saelens, Brian E., James F. Sallis, Jennifer B. Black, Diana Chen. 2003. "Neighborhood-based differences in physical activity: An environmental scale evaluation." *American Journal of Public Health* 93:9, 1552-1558; King, W.C., J.S. Brach, S. Killinsworth, et al. 2003. "The Relationship Between Convenience of Destinations and Walking Levels in Older Women." *American Journal of Health Promotion*. 18(1): 74-82; Brownson, R.C., E. H. Baker, R. A. Housemann, et al. 2001. "Environmental Determinants of Physical Activity in the United States." *American Journal of Public Health*. 91(12): 1995-2003; Troped, P.J., R.P. Saunders, R. R. Pate, et al. 2001. "Associations between self-reported and objective physical environmental factors and use of a community rail-trail." *Preventive Medicine*. 32(2):191-200. Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18(3): 235-241; Sallis, J.F., A. Bauman and M. Pratt. 1998. "Environmental and Policy Interventions to Promote Physical Activity." *American Journal of Preventive Medicine*. 15: 379-397; King, A.C., R.W. Jeffery, F. Firdinger, et al. 1995. "Environmental and Policy Approaches to Cardiovascular Disease Prevention Through Physical Activity: Issues and Opportunities." *Health Education Quarterly*. 22: 499-511; and Schmid, TL Pratt M. Howze E. "Policy as intervention: environmental and policy approaches to the prevention of cardiovascular disease." *American Journal of Public Health*. 1995; 85: 1207-11.

¹⁵ Craig, C. L., R. C. Brownson, S.E. Cragg, et al. 2002. "Exploring the Effect of the Environment on Physical Activity: A Study Examining Walking to Work." *American Journal of Preventive Medicine*. 23: 36-43.

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¹⁷ Nationally, between 1980 and 1995, the total vehicle miles driven each year grew by 59 percent. (Smith GM. 1999. It's Official: Traffic is Worse. *Atlanta-Journal Constitution*, November 17: A1.

¹⁸ Frumkin H, Frank L, Jackson R. 2004. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. Washington: Island Press: 90-107.

¹⁹ Most oil is used to fuel transport vehicles, especially the automobile. For a few examples of recent discussions regarding both national and international security in relation to the production and trade of oil, see Prugh T., C. Flavi, and J. Sawin. 2005. "Changing the Oil Economy." In *State of the World: Redefining Global Security*, Renner M., H. French, and E. Assadourian (Eds.). NY: W.W. Norton and Company; Roberts, P. 2004. *The End of Oil: On the Edge of a Perilous New World*. Boston: Houghton Mifflin Company: 237-258; and Heinberg R. 2003. *The Party's Over: Oil, War, and the Fate of Industrial Societies*. Gabriola Island, BC: New Society Publishers: 191-201.

²⁰ Automobile transportation is related to air and water pollution, land lost for the development of infrastructure, global warming, sprawl, and public health problems such as asthma. For a few summaries that document auto related pollution and degradation see Roberts P. 2004. *The End of Oil: On the Edge of a Perilous New World*. Boston: Houghton Mifflin Company: 116-140; Frumkin H, Frank L, Jackson R. 2004. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. Washington: Island Press; Porter R. 1999. *Economics at the Wheel: The Costs of Cars and Drivers*. San Diego: Academic Press: 55-83; Sierra Club. 1998. *The Dark Side of the American Dream: The Costs and Consequences of Suburban Sprawl* (a Sierra Club report that can be found at www.sierraclub.org); and Whitelegg J. 1997. *Critical Mass: Transport, Environment, and Society in the Twenty-first Century*. London: Pluto Press.

²¹ The average cost of maintaining a car each year (including gas, oil, maintenance, tires, tickets, registration, insurance, and driver's license) is estimated by different sources to be between \$5,000 and \$8,000 year. [For other published estimates see STPP. 2000. *Driven to Spend*. Surface Transportation Policy Project Center for Neighborhood Technology (www.transact.org); Porter, R.C. 1999. *Economics at the Wheel: The Costs of Cars and Drivers*, San Diego: Academic Press: 20; and Kay, J.H. 1997. *Asphalt Nation*. Berkeley: University of California Press: 120.

²² U.S. 2000 Census (long form) (can be found at www.census.gov).

²³ U.S. Department of Transportation. 2001. *2001 National Household Travel Survey*. (can be found at http://www.bts.gov/publications/highlights_of_the_2001_national_household_travel_survey/).

²⁴ National Highway Administration. 1995. *Nationwide Personal Transportation Survey (NPTS)*. Washington, DC: U.S. Department of Transportation.

²⁵ Pucher, J., and Dijkstra, L. 2003. "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany." *American Journal of Public Health*. 93: 1509-1516.

²⁶ Gordon, P.M., S.J. Zizzi, and J. Pauline. 2004. "Use of a Community Trail Among New and Habitual Exercisers: A Preliminary Assessment." *Preventing Chronic Disease: Public Health Research, Practice, and Policy*. 1(4): 1-11; and Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241.

²⁷ For another study documenting the positive impact of a new trail see Merom, D., A. Bauman, P. Vita, et al. 2003. "An Environmental Intervention to Promote Walking and Cycling – the Impact of a Newly Constructed Rail Trail in Western Sydney." *Preventive Medicine*. 36(2): 235-42.

²⁸ Evenson, K.R., A.H. Herring, and S.L. Huston. 2005. "Evaluating Change in Physical Activity with the Building of a Multi-Use Trail." *American Journal of Preventive Medicine*. 28: 177-185.

²⁹ For a general discussion of this topic see Corti, B., R.J. Donovan, and C.D.J. Holman. 1997. "Factors Influencing the Use of Physical Activity Facilities: Results from Qualitative Research." *Health Promotion Journal Australia*. 7:16-21. Aspects most liked on trails in one 1997 study were scenic beauty, availability as a place to exercise, convenient location, safe surface, and lighting (see Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18(3): 235-241). A more recent 2004 study found that respondents rated the following as high in importance for trail quality: atmosphere, scenery, and safety (Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241). The findings of the Wonder's Way study contribute to this developing understanding of what exercisers and commuters want in a path and indicate that all of the above characteristics, and more, are notable in terms of their importance to the bridge path users.

³⁰ The Garrett P. Wonder's Memorial Bicycle-Pedestrian Way, or Wonder's Way, was dedicated in memory of the late Garrett Patrick Wonders. Garrett Wonders was killed on his bicycle by a truck in

Moncks Corner South Carolina in 2004 (Quick, D. 2006. "Bike Lane Dedication Tops Week of Bicycle Events." *The Post and Courier*. May 15).

³¹ The new cable stay bridge replaced the two aging cantilever truss bridges (the 1929 Grace Bridge and the 1966 Pearman Bridge), neither of which offered safe bicycle pedestrian access. The bridge offers eight travel lanes (12 foot wide each) for motorized vehicles. See the Cooper River Bridge Site for the South Carolina Department of Transportation (SCDOT) at www.cooperriverbridge.org.

³² The pedestrian path follows the Charleston Harbor side of the bridge between Morrison Drive in Charleston and Coleman Boulevard in Mt. Pleasant. Viewing platforms extend out at the location of the towers and offer bicyclists and pedestrians a place to view the harbor.

³³ The Charleston peninsula is connected to the town of Mt. Pleasant over the Cooper River and is connected to the Charleston communities of James Island and West Ashley over the Ashley River.

³⁴ An interceptor-based approach to the collection of survey data was utilized instead of a population-based survey approach because of its better ability to identify and probe for the activity levels and attitudes of the users of this particular path.

³⁵ The term "commute" will be utilized from this point on to refer to anyone who walks, runs, or cycles to get to work or to conduct chores.

³⁶ It is unclear whether this represents the distribution of the variety of user modalities on the bridge or whether it was simply easier to attract the attention of walkers due to lower speed of modality. Anecdotally, surveyors indicated that due to the low speed of travel of walkers, they were easier to attract. Biking and jogging/running modalities are, therefore, potentially under-represented in the survey results.

³⁷ On a few occasions water bottle supplies ran out and surveys were conducted without the distribution of free water bottles.

³⁸ After respondents were asked if they were interested in being interviewed, they were asked to indicate if they lived 20 or more miles away from the bridge. Since it is unlikely that such individuals might utilize the path on a regular basis, they were not administered the survey.

³⁹ Due to low numbers of respondents that indicated "Asian American", "Hispanic", or "Other" as race and/or ethnicity categories, the race variable was collapsed in to "Black" and "White" for analyses.

⁴⁰ This finding reflects the literature which indicates that women and men have generally similar rates of path and trail use. See Librett, J.J., M.M. Yore, and T.L. Schmid. 2006. "Characteristics of Physical Activity Levels Among Trail Users in a U.S. National Sample." *American Journal of Preventive Medicine*. 31(5): 399-405; and Eyler, A.A., R.C. Brownson, S.J. Bacak, et al. 2003. "The epidemiology of Walking for Physical Activity in the United States." *Medicine and Science in Sports and Exercise*. 35: 1529-1536

⁴¹ U.S. Census Bureau. 2005-2007 *American Community Survey 3 Year Estimates*. (can be found at http://factfinder.census.gov/home/saff/main.html?_lang=en).

⁴² U.S. Census Bureau. 2005-2007 *American Community Survey 3 Year Estimates*. (can be found at http://factfinder.census.gov/home/saff/main.html?_lang=en).

⁴³ Of the 391 respondents that answered this question (2 of the total 393 survey participants are missing data on this item), 262 (67%) indicated that their overall activity levels had increased.

⁴⁴ For an example see Librett, J.J., M.M. Yore, and T.L. Schmid. 2006. "Characteristics of Physical Activity Levels Among Trail Users in a U.S. National Sample." *American Journal of Preventive Medicine*. 31(5): 399-405. Physical inactivity is also more prevalent among women than men, Blacks and Hispanics than Whites, among older than younger adults, and among the less affluent than the more affluent. See U.S. Department of Health and Human Services. 1996. *Physical Activity and Health: A Report of the Surgeon General*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention

⁴⁵ Young, D.R., K.W. Miller, L.B. Wilder, et al. 1998. "Physical Activity Patterns of Urban African Americans." *Journal of Community Health*. 23(2): 99-112.

⁴⁶ "Regular" walkers, runners, or bicyclists are those that indicate that they walk, run, or bike the bridge more than one time a month.

⁴⁷ Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241; and Siegal, P., R. Brakbill, and G. Heath. 1995. "The Epidemiology of walking for exercise: Implications for Promoting Activity Among Sedentary Groups." *American Journal of Public Health*. 85: 707-710.

⁴⁸ (n = 392, 1 missing case)

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- ⁴⁹ (n = 390, 2 missing cases)
- ⁵⁰ (n = 392, 1 missing case)
- ⁵¹ Center for Disease Control and Prevention. 2001. "Increasing Physical Activity: A Report on Recommendations of the Task Force on Community Preventive Services." *MMWR Morbidity Weekly Review*. 50: 1-14.
- ⁵² Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241
- ⁵³ Federal Highway Administration. 1994. *The National Bicycling and Walking Study. Case Study Number 1: Reasons Why Bicycling and Walking Are and Are Not Being Used More Extensively as Travel Modes*. Washington, D.C.: U.S. Department of Transportation.
- ⁵⁴ Reynolds, K.D., J. Wolch, J. Byrne, et al. 2007. "Trail Characteristics as Correlates of Urban Trail Use." *American Journal of Health Promotion*. 21 (4): 335-345; and Powell, K.E., L. Martin, P.P. Chowdhury. 2003. "Places to Walk: Convenience and Regular Physical Activity." *American Journal of Public Health*. 93: 1519-1521.
- ⁵⁵ These numbers refer to the numbering system used for keeping track of the surveys. Each survey was assigned a number (1-3 93).
- ⁵⁶ It should be noted, however, that community members not involved in the survey have indicated that a rubber barrier may cause walkers to trip.
- ⁵⁷ This number does not include comments that indicated that respondents felt unsafe due to the tensions between bicyclers and pedestrians.
- ⁵⁸ This figure includes those individuals who indicated specifically that parking is unsafe.
- ⁵⁹ Reynolds, K.D., J. Wolch, J. Byrne, et al. 2007. "Trail Characteristics as Correlates of Urban Trail Use." *American Journal of Health Promotion*. 21 (4): 335-345; and Powell, K.E., L. Martin, P.P. Chowdhury. 2003. "Places to Walk: Convenience and Regular Physical Activity." *American Journal of Public Health*. 93: 1519-1521.
- ⁶⁰ Tilt, J.H., M. T.M. Unfried, and B. Roca. 2007. "Using Objective and Subjective Measures of Neighborhood Greenness and Accessible Destinations for Understanding Walking Trips and BMI in Seattle, Washington." *American Journal of Health Promotion*. 21 (4): 371-379; Humpel, N., A. Marshall, E. Leslie, et al. 2004. "Changes in Neighborhood Walking are Related to Changes in Perceptions of Environmental Attributes." *Annals of Behavior Modification*. 27: 60-67; Humpel, N., N. Owen, and E. Leslie. 2002. "Environmental Factors Associated with Adults' Participation in Physical Activity, A Review." *American Journal of Preventive Medicine*. 22: 188-199; and Ball, K., A. Bauman, E. Leslie, et al. 2001. "Perceived Environmental Aesthetics and Convenience and Company with Walking for Exercise among Australian Adults." *Preventive Medicine*. 33: 434-440.
- ⁶¹ Reynolds, K.D., J. Wolch, J. Byrne, et al. 2007. "Trail Characteristics as Correlates of Urban Trail Use." *American Journal of Health Promotion*. 21 (4): 335-345.
- ⁶² Gordon, P.M., S.J. Zizzi, and J. Pauline. 2004. "Use of a Community Trail Among New and Habitual Exercisers: A Preliminary Assessment." *Preventing Chronic Disease: Public Health Research, Practice, and Policy*. 1(4): 1-11; and Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241.
- ⁶³ Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241.
- ⁶⁴ Of the 391 respondents that answered this question (2 of the total 393 survey participants are missing data on this item), 286 (73%) indicated that they drove to the bridge path.
- ⁶⁵ The East Bay Street Bike Lane and Pedestrian Path was connected to the Cooper River Bridge on June 5th. The 12 foot wide and half-mile-long East Bay Path extends Wonder's Way from the bridge to Chapel Street downtown. Long term plans include the intention to connect the Greenway in West Ashley SC (a 10.5 dirt trail that runs through abandoned rail tracks adjacent to Highway 17), over the Ashley River Bridge, through the Charleston Peninsula along East Bay Street, over the Cooper River Bridge, and in to Mt. Pleasant where it would continue alongside route 17 in Mt. Pleasant.
- ⁶⁶ U.S. Census Bureau. 2005. *American Community Survey 2005*. U.S. Census Bureau.

⁶⁷ Jemal, A., R. Siegel, and E. Ward, et al. 2007. "Cancer Statistics 2007." *Cancer Journal for Clinicians*. 57: 43-66. Also see the AOA fact sheets. Washington (DC): American Obesity Association. (can be found at www.obesity.org/subs/fastfacts/obesity_Minority_Pop.shtml.)

⁶⁸ Physical inactivity is also more prevalent among women than men, Blacks and Hispanics than Whites, among older than younger adults, and among the less affluent than the more affluent. See U.S. Department of Health and Human Services. 1996. *Physical Activity and Health: A Report of the Surgeon General*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. For additional documentation that lower income groups are less active than other population groups see U.S. Department of Health and Human Services. 1996. *1992 Behavioral Risk Factor Surveillance System (BRFSS)*. U.S. Department of Health and Human Services.

⁶⁹ Frank, L.D., P.O. Engelke, and T.L. Schmid. 2003. *Health and Community Design: The Impact of the Built Environment on Physical Activity*. Washington: Island Press, p. 65.

⁷⁰ Brownson, R.C., R.A. Housemann, D.R. Brown, et al. 2000. "Promoting Physical Activity in Rural Communities: Walking Trail Access, Use, and Effects." *American Journal of Preventive Medicine*. 18 (3): 235-241; and Siegal, P., R. Brakbill, and G. Heath. 1995. "The Epidemiology of walking for exercise: Implications for Promoting Activity Among Sedentary Groups." *American Journal of Public Health*.: 85: 707-710.