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The Physical Environment and Runners' Exercise Routes: A Case of Starkville, Mississippi

Robert Thomas Jackson

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The physical environment and runners' exercise routes:

A case of Starkville, Mississippi

By

Robert Thomas Jackson

A Thesis
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Master of Landscape Architecture
in Landscape Architecture
in the Department of Landscape Architecture

Mississippi State, Mississippi

May 2014

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Robert Thomas Jackson

2014

The physical environment and runners' exercise routes:

A case of Starkville, Mississippi

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Encouraging running for exercise can be an important part of a comprehensive strategy for making communities more attractive for healthy physical activity. In order to make communities more runner-friendly, research must identify the features of the physical environment that are important for runners. This study identified these features through five focus groups of twenty-two runners. The focus group participants discussed the places they had run within the study community and described their positive and negative qualities. These discussions were then analyzed by examining direct quotations of the discussion transcripts and by noting the amount of participants concerned about particular issues. The findings showed that the participants chose their routes based on their ability to meet their exercise needs, safety, ease of access, and potential to be a fun experience. These insights into these runners' preferences can be used to help make communities more conducive to physical activity.

DEDICATION

To my parents, Donald and Viodelda Jackson, and my grandparents, John and Shirley Jackson, for their love, support, inspiration, encouragement, and guidance.

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CHAPTER I

INTRODUCTION

1.1 Background

Numerous outlets have recently reported stories on the increasing popularity of running, including articles in *Sports Illustrated*, *The New York Times*, *The Guardian*, *Time*, and other running-related regular columns and blogs appearing in many local newspapers. Such a heightened interest in running presumably would also be accompanied by a rise in running-related research. To be sure, running-related injury research was widespread, yet few researchers seemed to have tackled another issue that may also be critically important to runners—the running environment. A brief history of obesity research may partly explain this lack of research coverage on the running environment.

Since the 1960s, obesity rates have rising to troubling levels within the United States (National Institutes of Health 1). The exact causes were unclear, though many researchers agreed that a combination of different factors were likely to be responsible (National Institutes of Health 13). Some of these often-mentioned factors were development patterns that favored automobile transportation at the expense of pedestrian and bicycle transportation (Mokdad et al. 1195-1200; Frank et al. 3; Pikora et al. 1693-1694). Thus, research is increasingly exploring the effects of the physical environment,

especially its built environment components, on people's walking habits in an effort to increase the rates at which people walk throughout their communities (Oka 281, 292).

However, the public's overall health can also be improved by also focusing on those already engaging in adequate amounts of physical activity (Giles-Corti and Donovan, "Relative Influence" 1808). For that reason, efforts should be made to help prevent these people from slipping into physical inactivity rather than concentrating all efforts on getting the sedentary to engage in physical activity (Giles-Corti and Donovan, "Relative Influence" 1808).

With this in mind, a review of recent literature revealed that limited research existed studying the effects of the physical environment on recreational runners and where they chose to run. Anecdotal evidence suggested runners could be found in environments normally considered hostile toward pedestrians. Perhaps, then, runners were influenced by a different set of environmental features than those that typically influenced pedestrians. Thus, this research attempted to identify environmental features that influenced runners' route choices and compared them against features found to influence pedestrians.

1.2 Problem statement

The purpose of this study was to identify physical environment features that were important for recreational running. Previous research had already identified many environmental features important for pedestrians; consequently, one of the goals of this study was to evaluate the importance of these features for runners. Additionally, this study sought to identify other physical environment features that might have been important for runners but were not commonly associated with pedestrian behavior in

previous research. Within these broader goals, this study focused chiefly on these following sub-topics, into which various environmental characteristics could be categorized based on the nature of their importance to runners:

- The identification of environmental features that influenced runners' perception of the intensity of their physical activity along their running routes
- The identification of environmental features that influenced runners' enjoyment of their running routes
- The identification of environmental features that influenced runners' perceptions of safety along their running routes
- The identification of environmental features that influenced convenience of running locations for runners

Consequently, an exploratory research strategy capable of discovering such features was determined to be the most appropriate.

1.3 Overview of methods

This study used five separate focus groups of known runners to generate the data. Due to the research project's exploratory nature, the discussion questions were mostly open-ended. The written transcripts of the discussions formed the data and were analyzed using qualitative and quantitative approaches.

1.4 Professional significance of the study

A better understanding of runners' environmental preferences would help those who shape the physical environment in making places more exercise-friendly. In

addition, this study could provide deeper insight into the nature of running for those in exercise-related fields such as kinesiology. Finally, runners themselves could benefit from this study by comparing their experiences with those of the runners described in this study. In doing so, runners might then have the opportunity to improve the quality of their future running experiences.

1.5 Delimitations

The findings of this study lacked generalization to the larger population of runners for several reasons. Chief among these reasons was that the study used a small sample size that was not randomly selected. In addition, study participants' responses may have been influenced by other group members' comments or lack of comments on particular topics. Also, the study only included participants from a single community, which may have produced results unique to that particular setting.

1.6 Definitions

- *Run*: To move quickly such that a person's legs are moving at a faster pace than his or her typical walking speed, and such that at some point during each step both feet will be off the ground. For the purposes of this study jogging will simply be considered a slower-paced run, contrary to some of the study participant's views shown later.
- *Runner*: A person who habitually runs for recreation and or exercise.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

A brief history of physical activity research can explain the recent lack of extensive running-related research. After World War II and until the 1980s, public health agencies and researchers focused mostly on recreational and high-intensity exercise as a major part of their strategy to improve public health. Their strategies began to change in the 1980s due to the populations' rising rates of sedentary lifestyles and a growing body of evidence showing that moderate physical activity such as walking and biking could also significantly improve health. Because these types of moderate physical activity tended to be easier than high-intensity physical activity to integrate into daily lives, many researchers have been working on identifying the environmental features that are associated with walking and biking (Frank et al. 4-5).

This shift away from researching vigorous physical activity shows in Timothy Noakes' *Lore of Running*, the "runner's bible" (Khan 103), which based many of its recommendations on decades-old running-related research. What little exists of recent research on running is concerned either with its mechanics, its fitness implications, running-related injuries, or the exercise psychology associated with running (Berg 60).

Rather than reviewing decades-old running literature, the next few sections will review more recent physical activity research, focusing chiefly on walking and to a much

lesser extent, biking. Recent research has found some differences between the environmental features best-suited for walking and those best-suited for biking, many of which seem to be associated with their different speeds. Running speeds are expected to fall between walking and biking speeds; thus, the environmental influences on jogging and running are likely to fall between the two extremes of the environmental influences on walking and biking (Frank et al. 104).

2.2 Categorizing physical environment features

Since a major aim of this study was to determine which features of the physical environment were important to runners, the study merited an organizational strategy for these features. The organizational strategy developed for this study was based on three prior studies from different disciplines, each examining the association between walking and the physical environment. These studies identified important features and provided a means of quantifying the importance of each relative to others.

Lawrence Frank, a landscape architect, was the first author of the book *Health and Community Design: the Impact of the Built Environment on Physical Activity*. He classified the physical environment features influencing physical activity into three components: transportation systems, land use patterns, and urban design characteristics (Frank et al. 99).

The Irvine-Minnesota study, developed by researchers with a background in transportation engineering, organized the physical environment features largely through the site users who participated in their surveys. This study categorized the different features of the built environment into accessibility, pleasurability, perceived safety from traffic, and perceived safety from crime (Day et al. 146).

The Systematic Pedestrian and Cycling Environmental Scan (SPACES) was developed by researchers with a background in preventive health care. The researchers used interviews with local experts from a cross-section of relevant disciplines as well as a panel of local, national, and international experts, to rank built environment features based on their supposed influence on creating pedestrian and biking-friendly environments. The study organized these features into four groups: functional, safety, aesthetic, and destination (Pikora et al. 1696).

The SPACES audit tool seemed to be the most widely known (Day et al. 145), and the current study used a modified version of their tool to organize its own examination of physical environment influences on runners. An additional component, individual factors, was added to their SPACES organization in order to account for the large portion of the pedestrian-physical environment interaction that is based on the pedestrian's background and not on the immediate environment. The functional component of SPACES was modified to contain those aspects of the physical environment that helped or hindered runners' ability to meet their exercise goals while running. Much of the aesthetic and destination aspects were combined into an enjoyment category. Another important theme, accessibility, emerged during the study and was also added to the framework.

2.3 Self-determination theory

The current study not only aims to identify physical environment features important for runners, but also seeks to understand why these features may be important. For this reason, the study will also need to consider theories explaining the relationship

between environment and behavior. Self-determination theory offers a means by which the effects of these different environmental features on runners may be better understood.

Self-determination theory is the “premise that individuals are active in their pursuit to satisfy three basic and universal psychological needs for autonomy, competence, and relatedness. These needs determine the direction and persistence of an individual toward engaging in goal-directed behaviors that are likely to result from satisfying these needs” (Hagger and Chatzisarantis xi). This theory recognizes that both intrinsic and extrinsic motivations drive people’s actions as they try to fulfill these three basic needs with their behaviors, even physical activity behaviors such as running (Hagger and Chatzisarantis xi).

A person who is intrinsically motivated derives satisfaction from that activity regardless of any external pressures or rewards (Ryan and Deci 2). This type of motivation plays a major role for those who are able to engage in long-term regular physical activity (Ryan and Deci 5), though the theory’s proponents also acknowledge the important role of non-intrinsic motivations in maintaining physical activity participation (Ryan and Deci 4; Giles-Corti and Donovan, “Relative Influence” 1804).

To this end, self-determination theory has identified two forms of non-intrinsic motivations: extrinsic motivations and amotivations (Ryan and Deci 6). Extrinsic motivations are those motivations that are driven by outside pressures or outcomes that are not intrinsic to the activity itself (Ryan and Deci 7). These extrinsic motivations can range on a continuum (known as organismic integration theory) from highly integrated, such as exercising because it has become a part of one’s preferred daily routine, to highly external, such as wanting to avoid a coach’s punishment (Ryan and Deci 7). In addition, a

person's motivational orientation to engage in an activity can move on the continuum, becoming more or less integrated or internalized depending on the social environment (Ryan and Deci 10).

Amotivation is the state that inhibits a person from engaging in an activity and can have many different sources. Ryan and Deci (10) identified some of the sources of amotivation, including the feeling that the activity has no value, the activity will have an undesirable outcome, or the activity has resulted in past negative experiences.

The self-determination theory that Ryan and Deci have proposed, as well as the ensuing body of research supporting their framework, have acknowledged some role for the social environment in its ability to support or hinder motivation by its ability to aid or hinder the fulfillment of the three basic psychological needs. According to Ryan and Deci (4), the environment's role in motivation was that "Environments do not cause motivation, which is a property of the living organism, but rather nurture or diminish it." However, the physical environment may directly influence physical activity motivations as well as indirectly motivate them through its influence on social environments, a connection which other studies have found (Giles-Corti and Donovan, "Socioeconomic" 608). Consequently, running for exercise and recreation may be especially influenced by the physical environment, as the physical features of the environment may affect runners' extrinsic motivations and amotivations that help determine where they will run.

2.4 Relationships between the physical environment and PA

2.4.1 Exercise goals

According to prior physical activity research, runners may have several sources of motivation as they try to meet multiple exercise goals with their running routines. As

previously mentioned, intrinsic and extrinsic motivations likely play a major role in driving physical activity (Ryan and Deci 6). According to Noakes, a major extrinsic motivator for runners was preparing for races (17), which within self-determination theory would be considered pursuit of improving competence (Hagger and Chatzisarantis xi).

Since races tend to vary by distance and other characteristics (Noakes 17), it follows that in order to improve performance, training related to anticipated competition conditions (Noakes 54) must also be varied. Different types of muscle fibers are activated during these different conditions for which a runner may train, which may include variations in exercise type, intensity, and duration (Noakes 16-17). As a result, Noakes wrote that “logically, optimal training should be at all running intensities so that all muscle fiber types are trained equally.” (Noakes 17)

Specifically, some environmental features known to affect runners’ performance include hills, wind direction and speed, and the running surface (Noakes 58), which would merit their inclusion within running routines should they be anticipated in upcoming competitions. In fact, running uphill, running downhill, and running on flat terrain can be considered distinct exercises (Noakes 53), therefore requiring preparation for each condition.

In addition, runners may also need to include different surface types in their training, since studies showed that rougher terrain and other such obstructions required more effort from runners than smoother surfaces (Noakes 58). Studies also found that firmer surfaces required less effort than looser surfaces such as sand (Noakes 58).

2.4.2 Safety concerns

Much of the literature dealing with physical activity and the physical environment was concerned with vehicular traffic safety. Some studies also found that some aesthetic features and other environmental features affected the perception of crime safety, while a small number of studies were concerned with the physical environment's ability to cause injury. These studies' concerns could be classified as amotivational factors within self-determination theory since they discourage physical activity in particular locations.

Several studies explored the associations between a location's street network and its traffic safety for pedestrians. A location's "street network" was its organization of streets into a pattern, which could be arranged organically, arranged as a grid, or arranged hierarchically. Gridded and organic street arrangements tend to provide travelers with more route options (Frank et al. 118). These higher-connectivity neighborhoods also tend to have more pedestrian traffic and more pedestrian safety features compared to lower-connectivity neighborhoods (Moudon et al. 54). Another study found that pedestrians in a pedestrian-oriented downtown village shopping center, one of these high-connectivity neighborhoods, were half as likely to be involved in a collision as pedestrians in an automobile-oriented shopping center (Ossenbruggen et al. 496).

However, most post-WWII residential developments in the United States had hierarchically-arranged street patterns that form self-contained units (Frank et al. 126). As a result, they discouraged through-traffic (Frank et al. 126) and could concentrate vehicular traffic onto a few arterial streets that could be dangerous for pedestrians (Untermann 258). Conversely, these postwar developments had fewer street intersections

that pedestrians must cross (Southworth and Owens), a condition which runners might find favorable.

In addition to street network patterns, particular land uses have been associated with pedestrians' safety from traffic. Higher rates of pedestrian collisions were found on or near educational facilities (Loukaitou-Sideris et al. 349; Clifton et al. 426), concentrated commercial areas (Ossenbruggen et al. 496; Clifton et al. 426), alcohol establishments, bus stops (Harwood et al. 26; Zegeer and Bushell 5), and subway stations ((Miranda-Moreno et al. 1633). The high volumes of pedestrian traffic in many of these areas may be the cause for these higher rates of collisions (Ossenbruggen et al. 496; Harwood et al. 27; Zegeer and Bushell 5). However, studies found that pedestrian fatalities were more common in residential areas than in commercial areas (Graham and Glaister 1601; Clifton et al. 426).

Environmental features could also affect the nature of a location's vehicular traffic, which in turn has been found to affect pedestrian safety. For example, wider streets have been associated with higher vehicle speeds, both of which were associated with higher rates of pedestrian collisions (Gaarder 539-540; Cho et al. 693). Higher vehicle speeds have been associated with higher rates of severe pedestrian injuries and higher pedestrian death rates (Zegeer et al. 5; Cho et al. 699). Passenger cars were more likely to collide with pedestrians, but non-passenger cars, which tended to travel on different streets than passenger cars, were more likely to cause severe injury (Lee and Abdel-Aty 778-779, 781, 785; Clifton et al. 426).

Researchers have also found differences in pedestrian collisions between urban and rural areas. Urban areas have been found to have higher rates of pedestrian collisions

than rural areas, likely due to their greater concentrations of pedestrians and people (Zegeer and Bushell 3,5; Herbert Martinez and Porter 45-46; Clifton et al. 426; USDOT, “Pedestrians” 1; Zegeer and Bushell 5). However, pedestrian crashes in rural areas were 2.3 times more likely to result in death (USDOT, “Rural/Urban” 1).

A number of studies were concerned with investigating the roles of micro-scale environmental features in creating pedestrian-friendly environments. One of these important features seemed to be sidewalks, with pedestrian crashes twice as likely in sites without sidewalks than sites with sidewalks (Ossenbruggen et al. 497). Other features also associated with higher rates of pedestrian collisions were large numbers of vehicle lanes, the ratio of traffic of one street compared to the other in the intersection (Harwood et al. 63; Zegeer and Bushell 5), traffic volume (Ossenbruggen et al. 496; Harwood et al. 63; Zegeer and Bushell 5), average street length, presence of major arterial streets, and population density (Miranda-Moreno et al. 1633). In addition, prior research has also looked at pedestrian safety regarding turning bays, driveways (Clifton et al. 426), modern roundabouts, pedestrian prompting devices, and multi-way stop sign controls, (Persaud et al. 804; Cho et al. 693). Studies have also found that traffic control devices increased pedestrian safety, although site infrastructure, pedestrian amenities, roadside design, and land use activity have shown to be more effective in reducing pedestrian collisions (Ossenbruggen et al. 496-497; Persaud et al. 809; Cho et al. 693).

Nights, low-light conditions, and other types of poor-visibility conditions have also been found to factor into many pedestrian collisions, playing a role in over two-thirds of pedestrian fatalities (Zegeer et al. 5; Retting et al. 1461; Clifton et al. 426). In addition, studies have found that bicyclers and pedestrians perceive themselves more

visible to drivers of motorized vehicles than they actually were (Tyrell et al. 487; Wood et al. 776).

In addition to vehicle-related environmental features, runners' safety may also be affected by the character of the ground surface. A study from a sports medicine journal examined differences in injury rates and injury types between soccer players who played on dirt fields and soccer players who played on artificial turf, who likely sustained many of their injuries while running (Kordi et al. 2). This study found that soccer players had higher rates of injury on dirt fields than on artificial turf fields. The researchers suggested that the injury rates may be partly related to the surface's rigidity, the friction between the surface and the shoe, and the extent to which the surface was uneven.

As previously mentioned, personal factors likely played the most important role in determining a runners' behavior. For this reason, the current study also reviewed studies concerning demographic factors and some other individual determinants for their possible influence on running behavior. Runners themselves may be more likely to engage in risky behavior on their exercise routes, as suggested by a dissertation that studied marathon runners' habits (Hoepfel 134). Some common risky behaviors that emerged from this study included running in streets going the same direction as traffic, running on unsafe surfaces, and running in excessive summer heat or humidity (Hoepfel 134).

Other studies have found that certain demographics have higher rates of pedestrian collisions, including people in low socioeconomic levels (Rosenbloom et al., "Heaven's" 400), disabled pedestrians (Zegeer et al. 5-6), younger pedestrians (Diaz 172-174; Davies 2), minorities (USDOT, "Race" 7-8; Chang 2008, p. 24), and males (USDOT, "Pedestrians" 1; Clifton et al. 429, 435; Chang 24). Studies conflicted over

whether or not older pedestrians exhibited higher rates of collisions (Davies 2; USDOT, “Pedestrians” 2; Clifton et al. 430, 435; Chang 25).

Yet other researchers have studied pedestrian’s abilities to perceive an area’s risk for a collision. One study found that the perception of a particular area for the risk of a pedestrian collision, rather than its actual risk, was more strongly correlated with the area’s actual pedestrian crash rate (Cho et al. 700). As a result, a dangerous area may actually have a low crash rate because pedestrians perceived the area as risky and tended to avoid the location (Cho et al. 700; Zegeer et al. 5). Another study explored the effects of fatigue on pedestrians’ abilities to perceive an area’s risk for a collision (Rosenbloom et al., “Attitudes” 1264), which could play a role in runners’ risk perception on their exercise routes.

2.4.3 Enjoyment

Two major components of self-determination theory, intrinsic motivation and highly-integrated extrinsic motivation, can be classified more simply within this study under the term “enjoyment.” Most literature identifying “enjoyment” influences on physical activity focused on pedestrians’ enjoyment of the aesthetic quality of their surrounding environment.

Previous research has studied the relationship between increased walking amounts and aesthetically-pleasing physical environments (Giles-Corti and Donovan, “Socioeconomic” 602); Humpel et al., “Perceived” 121; Ball et al. 437). In fact, in one survey participants reported that one of their favorite aspects of their local walking trails was their scenic beauty (Brownson et al. 238). And in addition to aesthetics, researchers have associated more walking with having interesting things to see in a neighborhood

(Giles-Corti and Donovan, “Socioeconomic” 606), as well as other factors beyond the physical appearance of a location that can also influence physical activity enjoyment in a particular place.

More walking may also influence environmental perceptions, as in Humpel et al. (“Perceived” 121), which found that those who walked for exercise more often also tended to hold more positive views of their neighborhood’s aesthetics, among other environmental qualities. Similarly, De Bourdeaudhuij et al. (90) noted that moderate intensity physical activity within one’s neighborhood was associated with greater emotional satisfaction. Likewise, Ball et al. (437), in a survey studying walking for exercise and recreation, found that those with more negative views of their neighborhood’s aesthetics tended to report less walking.

A runner’s perception of the social environment associated with running may also influence where he or she runs. Giles-Corti and Donovan (“Socioeconomic” 1802) found that members of a physical activity-related organization such as organizations related to sports, recreation, or outdoor clubs, were more likely to meet recommended physical activity levels. Similarly, Eyster et al. found connections between less social support and less walking (1533). Likewise, Ball et al. found that walking companions and pets were associated with more walking for exercise and recreation (437), and Giles-Corti and Donovan found that those with more exercise companions were more likely to meet recommended physical activity levels (“Socioeconomic” 1802). In fact, Giles-Corti and Donovan (“Socioeconomic” 1802) went as far to suggest social determinants, along with individual determinants, were more significantly associated than physical environment determinants with meeting recommended levels of physical activity.

2.4.4 Accessibility

Within the self-determination theory, accessibility-related characteristics would be classified under amotivation, since places that were easier to access and better-suited for running would contain fewer amotivational characteristics. Also termed convenience in some literature, accessibility seemed to play an important role in determining where people like to run.

In the study by Brownson et al. (239), survey participants reported that one of their favorite characteristics about their local walking trails was their convenience. Other studies also found associations between physical activity and the convenience (De Bourdeadhuij et al. 90) or proximity (Giles-Corti and Donovan, “Relative Influence” 1802) of places to engage in physical activity, especially for informal physical activity facilities such as streets and public spaces (Giles-Corti and Donovan, “Relative Influence” 1800). Other studies have shown that the farther the surveyed people lived from a physical activity facility, whether formal or informal, the less likely they were to use it (Brownson et al. 239; Giles-Corti and Donovan, “Relative Influence” 1800) and also perhaps less likely to engage in physical activity (Giles-Corti and Donovan, “Relative Influence” 1802). This suggests that the proximity of physical activity facilities to one’s residence may be a key factor in determining the accessibility of those facilities.

A few studies have looked specifically into the association between the distance of the residence to physical activity facilities and the accessibility of those facilities. Several studies found that people tended to exercise most in residential areas nearer their homes (Sallis et al. 183; Reed and Phillips 288; Eyler et al. 1533), especially for vigorous exercise (Giles-Corti and Donovan, “Relative Influence” 1800). Additionally, Giles-Corti

and Donovan (“Relative Influence” 1801) found that fewer people used physical activity facilities near their work compared to those who used them near their homes. And in Eyler et al. (1533) most of the survey participants that engaged in non-occupational walking reported doing so in their neighborhoods.

Others studies found that those engaging in vigorous exercise may be more likely to participate in physical activity farther from their home than those engaging in less vigorous exercise and are less concerned with the quality of their immediate physical environment. Giles-Corti and Donovan (“Relative Influence” 1802) found that those who reported using physical activity facilities farther from home tended to do so for vigorous exercise. Giles-Corti and Donovan (“Relative Influence” 1809) also suggested that physical environment factors, including convenience, were weak influences compared to the influences of social and individual factors in influencing rates of physical activity. However, what the physical environment did seem to influence, especially with regards to accessibility, was the amount of physical activity taking place in a particular area (Giles-Corti and Donovan, “Relative Influence” 1809).

2.5 Summary and contribution of the current study

In short, recent research had already explored much of the relationship between physical activity and the physical environment, having focused chiefly on enjoyment, safety, and accessibility-related factors of the environment. Since recent literature studying running and the physical environment was sparse, a large portion of this body of research was concerned chiefly with walking-related physical activity.

Recent literature did cover, however, how runners may use the physical environment to achieve their exercise goals. Other research reviewed here showed how

prior researchers organized the different features of the built environment with regards to their effects on physical activity, providing guidance for the current study's similar efforts. This study also reviewed exercise psychology literature in order to better understand how behavior was affected by the different features of the environment. With all this aforementioned body of literature in consideration, this study aims to contribute to that body by finding those features of the physical environment that were important for runners.

CHAPTER III

METHODS

3.1 The general perspective

The purpose of this study was to explore the role of the built environment in shaping runners' exercise routes. The study used a qualitative research approach, which John W. Creswell defined as “a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (4). Thomas et al. wrote that qualitative research involved specific settings for the meaning of the participants' experiences, which can then be combined to generate theories (367-368). Qualitative research can often answer questions that quantitative research cannot easily answer, especially those seeking to better understand attitudes, behaviors, and experiences (Huston and Rowan 2454).

More specifically, the study used focus groups as its research technique. This technique involved interviewing a small group of people about a certain topic (Thomas et al. 371). Focus groups are useful in the early stages of research on a topic of interest, especially when little is known about the topic (Stewart and Shamdasani 15; Morgan 11). The results of focus groups can generate large amounts of data in the participants' own words (Stewart and Shamdasani 16). This gives the researcher the opportunity to study the responses in-depth and look for subtle features within the data (Stewart and Shamdasani 16). Afterwards, the data generated by the focus group can provide a

direction for other types of research that provide more quantifiable data (Stewart and Shamdasani 15).

In comparison to other types of research, focus groups can offer several advantages. Focus group research can allow the researcher to be more efficient because he or she can gather information from several people at once (Thomas et al. 371; Stewart and Shamdasani 16; Morgan 15). Also, focus groups allow for direct interaction between the researcher and the participants and provide opportunities to record nonverbal responses in addition to the verbal responses (Stewart and Shamdasani 16). An advantage of focus groups over individual interviews is that participants in a group setting exert a form of quality control over the information collected (Thomas et al. 371). In such a setting, participants are less likely to give false or extreme views (Thomas et al. 371). Other advantages of the focus group are that it can be enjoyable for the participants, and the interviewees may not be as intimidated by the interviewer (Thomas et al. 372). In addition, by hearing what others have to say, participants have the opportunity to rethink their views (Thomas et al. 372) or build upon those of others (Stewart and Shamdasani 16; Morgan 18).

3.2 The research context

The focus group discussions took place in classrooms and conference rooms in Mississippi State University's Department of Landscape Architecture buildings. At the time of the study, all the participants lived in or near the city of Starkville, Mississippi, whose 2010 population was 23,888 (U.S. Census Bureau), or on the adjacent campus of Mississippi State University, whose 2013 enrollment was 19,636 (MSU Student Enrollment Profile 1).

3.3 The research participants

The researcher advertised for volunteers to participate in the study from several groups: a local running club, a university walking/jogging class, and a university exercise psychology class. The study was advertised by email to the running club members and verbally to the college classes. The potential participants were told that all that had been jogging or running on a regular basis for at least two years were eligible to participate, the same criteria used in a previous study of runners (Bodin and Hartig 144). For the current study, running on a “regular basis” was defined as running habitually for exercise with sufficient frequency such that the activity felt reasonably familiar; thus, potential participants had a major portion of the responsibility in deciding whether they fit this criterion. In addition, participants had to be eighteen years old or older for liability reasons.

After advertising to the college classes, the researcher collected email contact information from those interested in participating. The researcher also personally selected some participants from the community who were known to be knowledgeable on the research topic. All these people were then emailed additional information about the study and asked if they were still interested in participating. This email also asked the participants to name some general times they would be available to attend a discussion.

A total of twenty-two participants agreed to take part in the study. Based on the responses to these emails, the researcher then scheduled these participants into five separate focus groups to occur during times that people were likely to be available to participate. Morgan suggested a minimum of two focus groups (42) and no more than

necessary to answer the research question (43). Likewise, Krueger and Casey suggested three to four separate groups were usually necessary in order to achieve saturation (26).

The target number of participants for each of the focus group discussions in this study was four to six people, though the actual group size ranged from three to seven people. In order to account for absent participants, Morgan recommended over-recruiting by twenty percent (44) while Stewart and Shamdasani recommend over-recruiting by two people (57). As a result, five to seven people were recruited for participation in each group, but due to short-notice cancellations some groups had as few as three participants.

Focus groups of these sizes are considered small, but the researcher wanted to avoid larger groups because they can be more difficult to manage. However, these smaller groups also have limitations. In a smaller group, there is a higher demand for contribution from each participant (Morgan 43). Smaller groups are also more sensitive to wider variations in group dynamics, because each participant has more influence on the group discussion (Morgan 44).

And in addition to scheduling around participants' availability, the researcher also sought to schedule the groups so that their composition would be conducive to a successful discussion. Two of these groups were originally intended mainly for older participants, ranging from twenty-two to late sixties. The other three groups would have younger participants, ranging from twenty to twenty-eight. The reasoning for this separation was the concern that the younger participants might have been intimidated by the presence of the older participants (Krueger and Casey 73, Morgan 46), though age-mixing may be acceptable if the topic cuts across age groups (Stewart and Shamdasani 37; Krueger and Casey 73). Additionally, the groups were originally composed so that

they could be as gender-balanced as possible. The researcher also made efforts to limit the amount of participants in groups who knew each other, such as distributing running club participants across separate groups and separating married couples into different focus groups.

However, in order to include as many who volunteered to participate as possible, and in order to accommodate short-notice scheduling conflicts, the actual makeup of the focus groups was not nearly as balanced as originally intended. If a selected volunteer was unable to find a time in his or her schedule to attend the assigned focus group, the researcher placed the volunteer into a different focus group that met at a different time. Also, the married couples recruited for the study had attended the same focus group sessions due to shared responsibilities.

However, the researcher did not anticipate that the study would include sensitive discussion topics, reducing the necessity of only recruiting participants who did not know each other. The researcher still had to be vigilant to make sure that groups of friends within the focus groups did not adversely affect the larger groups' discussion. Income and other factors related to economic status were not used as criteria in selecting participants.

Once scheduled into their focus groups, the participants were then contacted with their scheduled focus group meeting time. At this time, the participants were also emailed a consent form and cover letter. Within this email was an explanation of the purpose of the study, the study schedule, the incentives for participation, contact information, and the expected role of the participants were explained to the participants. The potential participants were given at least two weeks' notice before attending their respective focus

group session. The participants were then contacted the day before the session as a reminder, as suggested by the literature (Krueger and Casey 89). The signed consent forms were then collected when the participants arrived at their focus group discussion, upon which they were given another copy of the consent form for their personal records.

Table 3.1 Summary of study participants

Number of participants	22 (13 females and 9 males)
Size of groups (five groups in total)	3 groups of 3 participants 1 group of 6 participants 1 group of 7 participants
Age range	20 to 67 years mean = 29.36 years median = 24.5 years
Race	21 white participants, 1 black participant
Education	14 college students (age 20-28) 8 college graduates (age 26-67)
Running experience range	2-30 years mean = 11.68 years median = 8.75 years

Table 3.2 The focus group participants

Group 1

<i>Name</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Race</i>	<i>Running Experience</i>
Female 1.2	22	Female	Undergraduate student	White	11-12 years
Female 1.1	24	Female	Undergraduate student	White	7-8 years
Female 1.4	27	Female	Graduate student	White	14 years
Female 1.3	32	Female	College graduate	White	18 years
Female 1.5*	63	Female	College graduate/retired	White	30 years
Male 1.1*	67	Male	College graduate/retired	White	30 years

Table 3.2 (continued)

Group 2**

<i>Name</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Race</i>	<i>Running Experience</i>
Female 2.1	20	Female	Undergraduate student	White	3 years
Female 2.3	20	Female	Undergraduate student	White	8-9 years
Male 2.2	21	Male	Undergraduate student	White	10 years
Female 2.2	21	Female	Undergraduate student	White	5 years
Female 2.4	21	Female	Undergraduate student	White	9 years
Male 2.1	22	Male	Undergraduate student	White	5 years
Female 2.5	28	Female	Graduate student	White	2 years

Group 3

<i>Name</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Race</i>	<i>Running Experience</i>
Male 3.2	26	Male	Graduate degree	White	5-6 years
Male 3.1	26	Male	College graduate	White	5 years
Female 3.1	31	Female	College graduate	White	12 years

Group 4

<i>Name</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Race</i>	<i>Running Experience</i>
Male 4.1	20	Male	Undergraduate student	Black	8 years?
Female 4.1*	42	Female	College graduate	White	30 years
Male 4.2*	45	Male	College graduate	White	20 years

Group 5

<i>Name</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Race</i>	<i>Running Experience</i>
Female 5.1	21	Female	Undergraduate student	White	12 years?
Male 5.1	22	Male	Undergraduate student	White	3 years
Male 5.2	25	Male	Undergraduate student	White	8 years

Notes:

*Because of scheduling conflicts, married couples participated together in Group 1 and Group 4.

**During Group 2's interview transcriptions, some female participants' voices were indistinguishable from one another. Comments from these participants were labeled "Female 2.0."

3.4 Data collection

The researcher created a discussion guide based on the guidelines provided by focus group literature. Developing a discussion guide helped increase consistency across the different focus group sessions, which could be helpful during the analysis (Krueger and Casey 43). The discussion guide is included in Appendix D.

The researcher moderated all this study's focus group discussions for purposes of consistency. The researcher mostly used a low-involvement moderator strategy for all the focus group sessions. This meant minimizing the moderator's discussion involvement, especially regarding directing the participants' comments (Morgan 48). Intervention on the moderator's part would be mostly to maintain the discussion on topic (Stewart and Shamdasani 89). This strategy is appropriate for exploratory research (Morgan 48; Stewart and Shamdasani 74) and content analysis, as it allows for the results to reflect more of the participants' perspectives rather than the moderator's (Morgan 49). However, the moderator also used some higher-involvement moderator strategies, which mostly consisted of probe questions meant to draw additional information (Stewart and Shamdasani 89) from topics which the participants had already raised.

The audio of each focus group session was recorded and afterwards transcribed. The researcher's cellular phone was used to record the discussions. The phone was placed in plain sight of the participants and was introduced at the beginning of the discussion as recommended in the literature (Krueger and Casey 105). The researcher also had an iPod as a backup recording device in case the phone failed to function properly at any time. Both the devices were tested prior to each discussion.

The researcher also took field notes during each discussion, as recommended by the literature (Morgan 63). Once the discussions were recorded, the researcher produced written transcriptions of the discussions. In order to improve accuracy, the researcher listened to each discussion's recording at least three times. These transcripts then formed the study's basic data (Morgan 61).

3.5 Data analysis

Elo and Kyngas (112) wrote that in order to demonstrate the trustworthiness of the data analysis, the “analysis process and the results should be described in sufficient detail so that readers have a clear understanding of how the analysis was carried out and its strengths and limitations.” Hsieh and Shannon (1286) added “creating and adhering to an analytic procedure or coding scheme will increase trustworthiness or validity of the study. Careful description of the type of approach to content analysis used can provide a universal language for ... researchers and strengthen the method's scientific base.” Thus, the description of and rationale behind the process undertaken for the current study's data analysis that follows.

The qualitative content analysis of the data followed the procedures described in current qualitative content analysis methodology literature. First, the researcher read the transcripts of the discussions several times, as instructed by the literature, in order to “obtain a sense of the whole” by immersion in the data (Graneheim and Lundman 108; Hsieh and Shannon 1279; Elo and Kyngas 109).

The researcher then began organizing the data mostly using the approach known as conventional content analysis (Hsieh and Shannon 1279) or inductive content analysis (Elo and Kyngas 109). This type of analysis is recommended for describing phenomena

(Hsieh and Shannon 1279) and when not much prior literature exists on the subject (Hsieh and Shannon 1279; Elo and Kyngas 109). This approach emphasizes avoiding using preconceived categories and instead relies on the data to generate categories (Hsieh and Shannon 1279).

Nevertheless, the researcher must also acknowledge the role played by another approach to data analysis. Directed (Hsieh and Shannon 1281) or deductive (Elo and Kyngas 109) content analysis is generally used for testing existing theory or for further describing incomplete prior research. This prior research is then used as the starting point for generating the coding categories (Hsieh and Shannon 1281), for which the researcher needs to determine operational definitions prior to and while organizing the data (Hsieh and Shannon 1281). The framework created by this prior research need not be rigid, and categories can be inductively generated within this unconstrained matrix of the prior theoretical framework (Elo and Kyngas 111). In addition, anything that does not seem to fit within any of these previously generated categories can be given a new category (Hsieh and Shannon 1281). Because prior to data collection and analysis the researcher reviewed literature similar to the current study's research problem, the researcher already had knowledge of other theoretical frameworks (Ryan and Deci; Hagger and Chatzisarantis; Frank et al; Day et al; Pikora et al.). During data analysis, the researcher realized that his coding and categories were developing into organizational structures similar to several of these prior studies.

For the conventional content analysis component of the qualitative analysis, the researcher began by using exact words from the text to create the codes, as recommended by Hsieh and Shannon (1297) and Graneheim and Lundman (108). After spending some

time coding this way, the researcher was then able to begin developing better codes that could encompass more than a single thought or statement on the transcript, as recommended by Hsieh and Shannon (1297) and Graneheim and Lundman (109). This stage of analysis used coding by writing headings in the margins of the transcripts, allowing the free generation of categories, as suggested by Elo and Kyngas (109-111). Then the researcher began sorting these codes into clusters, categories, sub-categories (Hsieh and Shannon 1279; Elo and Kyngas 111), and continued abstracting these categories into progressively higher-order categories until they were abstracted as far as reasonably possible (Elo and Kyngas 111). The researcher was also continuing to define these codes, categories, and subcategories to ensure that the content was being properly organized (Hsieh and Shannon 1279).

An item of note was that the current study focused on analyzing the focus group discussions' manifest content rather than the latent content. The obvious, or visible components of the transcripts formed the manifest content (Graneheim and Lundman 106) while the underlying meanings not directly spoken in the transcripts formed the latent content (Graneheim and Lundman 106). Some comments made during the focus group discussions were clearly negative or positive in tone, but merely reading the written transcript would not transfer that tone. For these situations, the comments' latent descriptions were included to help clarify the participants' comments.

CHAPTER IV

RESULTS

Two focus group participants, while in conversation with one another, began developing their own outline explaining how they chose where they ran. Within the following brief excerpt of dialogue, they managed to sum nearly all participants' concerns and their importance relative to one another:

FEMALE 4.1. Once you have a certain level of safety—

MALE 4.2. —level of safety, like not dangerous.

FEMALE 4.1. Right.

MALE 4.2. And then, once it's not dangerous, it's being anything that's not dangerous, is um, then it becomes, where is it the most pleasant, you know?

FEMALE 4.1. Convenient.

MALE 4.2. Convenient, yeah. And so that pleasant, it's probably aesthetics, or, familiarity with area, like association with good things in an area ...

The only other major concern missing from this dialogue was the role that exercise goals played in determining where participants ran, which many other participants mentioned or hinted throughout the study.

Exercise goals, traffic safety, crime safety, enjoyment, functionality, and convenience were the major factors the participants considered when choosing where they were going to run. The desire to fulfill some sort of exercise goal was the major motivational factor in getting the participants to run and could determine the importance of other factors. Safety was the next most important factor. Once a place was sufficiently

safe, then the participants considered its enjoyment for running, its functionality for running, and its convenience for running. None of these factors existed in isolation; instead they all seemed strongly interconnected.

4.1 Exercise goals

One of the major themes that emerged from the interviews was the selection of running routes to meet particular fitness goals. These goals could be long-term fitness outcomes such as training for running in a particular condition, or these goals could be short-term fitness outcomes such as incorporating or avoiding particular route features because of the additional challenge these features provide. At least nineteen of the twenty-two participants had considered exercise goals in their running route selection.

4.1.1 Route length

Twelve research participants across all the focus groups mentioned route length in their discussions. The participants typically selected their route length before starting their run. Some selected their route length mainly to meet a fitness goal for that day, while others selected their route length to fit within a certain amount of leisure time. In addition, route length seemed to influence the type and amount of features that were desirable or undesirable to encounter while running, as illustrated by a participant who said, "... if you're wanting to do a six mile loop run, your, your thought of what would be a nice route would be different than if you were going to do a mile run or if you were going to do a ten-mile run" (Male 4.2). In another example of the relationship between route length and running environment, another participant, referring to scenery, said "it's really important for long runs" (Male 5.1).

All but one of the participants who spoke about route length did so strictly in terms of miles; that exception also measured route length by time. In addition, nine participants spoke of the lengths of their routes or route segments as loops. Two, though, would sometimes follow the same route back to their starting point. The following quotes illustrated how participants typically began describing their routes:

MALE 2.2. ... [where we have been running recently] we have a loop, like a couple of loops marked off that are like about even miles, like eleven to five miles, six miles, seven miles, eight miles ...

FEMALE 3.1. ... [one of the subdivisions where I like to run is] like a small circle, and then a large circle, and then there's some roads that connect in between, so you can get a good two and a half miles in that neighborhood, zig and zag, without having to repeat the same path.

Participants mentioned several different ways of measuring their route length.

One determined his route length from a roadmap website:

MALE 3.2. ... I don't go into any run, even around [city name], without knowing exactly where I'm going to go, what turns I'm going to make. Um, I'll leave some room to be spontaneous and to try to take other options, but uh, you know, I know that if that day I need to run three and a half miles, I'm going to map it out so that I'll run exactly three and a half miles, um, and then just get out and follow the directions I keep in my head.

Another determined route lengths by looking at runner-specific map websites that showed others' personal routes, while another mentioned seeking routes used for competitions. Two mentioned tracking their route length while running by using their phone or other type of GPS device. One of these said she tended to be confined to running in or along streets because the devices were originally intended for automobile travel. Several participants mentioned using landmarks to determine their progress along

their route while another preferred straight stretches of road where she could see her position along the route segment:

FEMALE 5.1. . . . that road—it's exactly half a mile, so I run down there and back, and that's a mile, and I can see all the way down there, and it's really easy for me to gauge at what distance I'm running. I like it.

FEMALE 5.1. I, I'd also like it [the running path] to be, like rather flat, and pretty much a straight shot to where you can see how far it is.

4.1.2 Route obstacles

Nineteen participants in all of the groups mentioned incorporating certain environmental features into their routes to meet exercise goals. These goals could be part of broader personal fitness goals, or they could be part of training regimens for competitions. Many of the participants enjoyed the challenge that these obstacles presented. However, under some circumstances some environmental features could be detrimental to runners' personal fitness goals or training goals. A total of nineteen participants across all five groups mentioned route obstacles in relation to meeting or falling short of their exercise goals.

Eight participants out of three groups spoke positively of hills, and some had included hills into their running routes, deliberately making their route more difficult to run. One of the participants had sought differently-sized hills to incorporate into her runs. Two of the participants said they preferred steeper hills on which they could quickly dash to the top, while another preferred gentler hills on which he had to run uphill for an extended length of time. One participant, however, preferred flatter routes, while another liked a mixture of flat segments and hills. The following quotes show some examples of participants' comments concerning hills:

FEMALE 2.0. My route where I run, back at home, ... it's also a bunch of different inclines and so it's different, it's not just one, steady, like, uh, straight surface.

FEMALE 2.3. Yeah, the research park is a really nice place to run, and has nice trails. You have the rough terrain that go up on hills, get inclines, and then also you just have like your flat running trails.

MALE 3.2. ... I'll go to either extreme I think. I'll run somewhere where it's very flat, or here's a hill or two in town that I'll sometimes intentionally try to work into my run so I can get a, you know, a quick little burst of activity going up a hill, so, hills are not a deterrent to me. I'll plan a run, um, you know, for a good steep hill every now and then.

Another feature many participants deliberately incorporated into their routes for additional difficulty was a gravel running surface. One participant mentioned using gravel as “a training tool” to “get a different terrain, different surface, strength of ankles, the foot ...” (Male 5.2). Another said she ran on gravel “to change it up from time to time” because “you have to work that much harder for foot placement” (Female 3.1). Three participants in three groups spoke negatively of gravel, eight mentioned both positive and negative aspects of gravel, and four in four groups preferred a more solid surface. A total of fifteen participants across four groups mentioned gravel.

Four participants trained for competitions and would often include hills, gravel, and other obstacles for the purpose of simulating upcoming race conditions:

FEMALE 3.1. I mean I like gravel from time to time. It really depends on if I'm working, like if I'm training for something [be]cause I feel like, like the heat, it's a, extra hurdle ...

All four of these participants used the university's research farms for these types of competition training:

FEMALE 1.4. Yeah I ran those two [the university research farms] often, like when I was getting ready to do a 5K, that was going to be with

obstacles or something, like somewhere else especially if I was traveling to go somewhere else to go run. I like that place because of the, the topography really helps out ... Get me ready, or more ready for ... whatever atmosphere I was going to that I wasn't familiar with.

The participants mentioned that sometimes the objective of their run was to maintain a particular running pace or to run the length of a route within a certain period of time, and others seemed to imply this by their aversion for obstacles that interrupted their run. For these types of runs, participants preferred routes with fewer interrupting obstacles such as the rural roads outside the city, especially the university's research farms. Another ran mostly through subdivisions during work hours because of reduced traffic volume and fewer pedestrians. Routes within the city limits often presented too many obstacles for runners to be able to meet their time goals. "That's why I don't run through town that often, because it's just too, it's too much of a hassle to deal with traffic lights, and look to see if cars are coming the other way," said one of the participants (Female 1.3). Another participant felt similarly about running through the university campus:

FEMALE 5.1: It's really annoying running on campus when you have to wait at the stop lights for the cars. I don't like that. [Be]cause I'd rather just run straight through and try and be like Frogger and avoid traffic.

Some of the obstacles participants associated with running within the city limit included stairs, ramps, stopping at traffic lights, stopping at intersections, avoiding traffic, and dodging pedestrians:

MALE 4.2: ...and it's just, I mean it's [referring to Main Street] not runnable. You've got steps, you got a lot of, you got a lot of stuff.

On the other hand, on occasions when some participants were not concerned with their run time, they had higher tolerance for these types of obstacles in the city limits:

FEMALE 1.4. ... The lights are inconvenient, but I don't mind the, I don't mind the people and all the traffic and the commotion because usually if I'm running in town, like I'm sort of banking on that to happen, so I don't, you know, really worry about trying to get a good time ..."

A total of fourteen participants in all five groups mentioned interrupting obstacles having an effect on their running routes.

Participants also mentioned a few other items that aided their motivation while running. Two participants said they were less likely to stop running and walk if a road curve kept hidden the route endpoint, as illustrated in the following excerpts:

MALE 3.2. I think I really like curvy roads sometimes, because I tend to psych myself out a lot when I'm running, and if I can see my destination, I'll tell myself like, "Oh you can see it, right there, why don't you go ahead and stop and just walk the rest of the way.' So if there's a lot of curves and I can't, you know, exactly see where I'm going it'll kind of keep me motivated to keep running. So as much as I enjoy just getting on a straight away and going sometimes, I do like to get on the road with curves on it.

FEMALE 3.1. ... if I see the destination, I'm like oh, I'm almost there, I can stop and walk. So, I will intentionally try not to run close to my finish point. Do you know what I'm saying, like if I start in the center, and I'm going to finish in the center, I'll intentionally run so that I can't see it until I'm ready to go home ...

Also, two participants mentioned that sometimes they preferred a route that allowed two or more runners to run safely side by side. Having another person running alongside them, especially a stronger runner, motivated them to run faster and helped them improve their running. On the other hand, three participants preferred running alone for a similar reason. When running accompanied, they felt pressured to run faster than their typical pace, which fatigued them sooner.

4.2 Safety

MALE 4.2. ... I don't think about what is the safest place I could run, because if that, you know, you'd be on a track ...

FEMALE 1.5. I think it's also important to feel secure where you are.
(Others agree) You don't feel threatened either by the environment or by traffic, or hostility from any source, or whatever ...

Safety while running was one of the major themes that the focus group participants raised during discussions. In fact, safety was mentioned in every discussion by almost every participant. The participants also varied in their safety perception and in how they incorporated safety concerns into their running routes. These safety concerns were categorized by the type of harm they can cause to the runner.

4.2.1 Overuse injuries

In every focus group there were participants who considered the running surface material and its potential to cause injury, for a total of nineteen participants across all five groups. In all but one focus group, thirteen participants mentioned that repeatedly running on concrete could cause joint injuries, especially in their ankles and knees, as in the following dialogue:

MALE 1.1. Concrete is much harder than asphalt.
FEMALE 1.5. It [concrete] is the worse surface to run on, for your joints.
(1.12.22)
FEMALE 1.3. ... I don't like running on concrete because it's not good for your knees.

The following quotes provide further evidence of the participants' dislike for concrete:

MALE 2.1. Uh, I don't like my feet hitting concrete. It's [asphalt] a lot easier to run on.

MALE 5.2. ... technically concrete is not the best ... for your joints and all that if you're putting in a lot of miles ...

However, many of these participants had run on concrete sidewalks anyway because of traffic safety concerns:

FEMALE 1.3. I wouldn't run on sidewalks unless there's a bunch of cars.

Twelve of the participants preferred running on surfaces that were softer than concrete, perceiving them as less likely to lead to chronic injury. Many of these participants mentioned preferring asphalt over concrete, provided the asphalt was without cracks or holes that could create tripping hazards:

MALE 5.1. I'd say, like potholes and stuff. That would be a negative on a, 'cause you could twist your ankle or something in a pothole. So having a smooth, smooth running surface.

Nine mentioned liking running on gravel, though two participants strongly disliked gravel. Even four of the participants that liked gravel noted additional risks associated with gravel, such as tripping or rolling ankles:

FEMALE 5.1. ... if you're running, if you've never run on gravel, as you said, your ankle is not going to be very well.

FEMALE 2.0. I know I stepped in gravel one time and I rolled my ankle.

Four other participants also mentioned gravel during discussions, though without expressing like or dislike. In total, fifteen participants mentioned gravel during the discussions. A few participants also liked dirt trails for their soft surface.

One participant thought that track surfaces were the softest and best for runners, having their surface designed especially for runners:

FEMALE 2.0. Tracks are easy to run on too, just because it's softer.

However, she and another participant also seemed to think that small tracks could also lead to repetitive strain injuries, which they attributed to repeatedly turning in the same direction while running laps around the track:

FEMALE2.5. ... when it was bad weather and I was running at [indoor gym track] a lot, and it was a really small track, and I would notice

that like, whichever direction I was turning, like that hip would really start to hurt.

Similarly, eight participants had injury experience or concerns with crowns and cross slopes on roads and some sidewalks. They said that running extensively on excessively cross-sloped surfaces caused pain or discomfort on one side of their body. For this reason, four participants chose to run in the middle of streets where the surface was more level, which in turn drove two of these participants to avoid roads with higher traffic volumes. A few participants also disliked many on-street bike lanes for their steep cross slopes resulting from their location at the outer edge of the roads:

FEMALE 1.3. ... the road slopes, and it slopes worse on the edge where the bike lanes are, and so if I'm going down Main Street, I'm going to run in the middle of the road, which I know is stupid, but if it's early in the morning, I'll look around for cars, and if a car is coming, I'll get over, but I hate running, cause I feel like I'm running like at an angle.

FEMALE 2.5. ... and if the road's uneven, I can't handle that.

Additionally, a few participants mentioned the difficulty of running on excessively sloped road shoulders:

FEMALE 1.3. No you can't, you can't even run on the grass [on a heavily trafficked road's shoulder] in some places, 'cause it's so sloped off to the side of the road.

4.2.2 Traumatic injuries

Nine participants across four groups were also concerned with how running surfaces might cause them to trip, roll their ankle, or some other type of traumatic injury. Some of the hazards that participants mentioned included sidewalks with holes, cracks, breaks, uneven joints, fallen tree limbs, and garbage scattered on the surface:

FEMALE 1.3. I don't like the sidewalks either, because they're, because a lot of them are broken up ...

Poor lighting reduced the visibility of these items, resulting in one participant's experience of tripping and falling over a broken sidewalk. Afterwards, if running at night, he only ran on roads in spite of the traffic danger.

MALE 3.2. ... I think I told you [the researcher] about the night that I was running at night time and there was a lot of traffic and I didn't want to be in the way, so I ran on the sidewalk and one, you know, one slab was sticking up and caught me and pitched me down to the ground and I skinned my knee, and I thought ah, it's worth it to try and brave the traffic to run in a place that I know is going to be smooth and not all messed up.

Five participants across three groups mentioned having run on grassed surfaces, and some of these also expressed some concern with grassed surfaces. The grass could hide an uneven ground surface or other tripping hazards. As a result, some participants were wary of running on grassed road shoulders even though it could help in avoiding vehicular traffic:

MALE 5.2. I guess it would be nice to have some grass that you know is smooth ...

However, two participants had enjoyable experiences running on grass trails, noting that the softer surface had less impact on their body than more rigid surfaces:

MALE 5.2. ... that's something we don't have around here, is like a ... grassy or a dirt or you know something that's softer that's not gravel. I guess gravel is the closest option we have that reduces impact a little bit.

A participant did complain, though, about small aggregate from sports fields getting into his shoes while running. A few other simply mentioned having run on grass without expressing the quality of the experience.

The fifteen participants across all five groups who mentioned gravel expressed a wide range of views concerning its running suitability. Under certain conditions, nine participants were wary of running on gravel because of the hazards it might pose to tripping. Recently laid gravel roads were often too thick and unstable for runners to safely run, and they had to wait for sufficient vehicular traffic to compact the gravel before they felt comfortable running on it. In addition, if the gravel particles were too big, they also formed a tripping hazard. The nine participants that liked running on gravel preferred that the gravel be compacted and be made of small-sized aggregate:

FEMALE 1.4. ... I really like running on like the tiny rocks or gravel ...
It's like clouds—I mean I can just go. If I can get my breathing right, I can just go, forever. I mean, I love it, it's, that's what I look for, is, those soft surfaces.

MALE 2.2. ...it's, one of my favorite places to run because it's really small like that pea gravel, so I mean, it's not like you're sinking into it like sand, but it's just nice enough to not be concrete ...

However, two participants did not like running on gravel at all, and a few mentioned that their favorite running surfaces tended to be smooth. A few participants seemed to think that runners' comfort with running on gravel was related to their amount of running experience, with more experienced runners feeling more comfortable on gravel than less-experienced runners:

MALE 3.2. I started out hating gravel, but then really kind of fell in love with it, um, like out at North Farm and South Farm.

Three participants mentioned gravel but expressed did not clearly mention their like or dislike for it. One saw it simply as a training tool and was careful not to express like or dislike.

Another concern of the participants was the threat of becoming a crime victim, appearing in four groups. This was particularly a concern of six female participants, though one of the male participants expressed some concern about the issue:

FEMALE 4.1. ... when we talk about safety and running, my, the first thing that comes to my mind is not being attacked. I guess that's just what a female would say ...

Most of these female participants mentioned seeking running places where a certain quantity of other people were outside, believing themselves safer from crime in such places, as the following dialogue showed:

FEMALE 2.5. I kind of look for activity, like you were saying, it's kind of social. If I see other people running there, or walking dogs or something I know that it's—

FEMALE 2.0. Safe.

FEMALEe 2.5. Pretty popular, safe area.

FEMALE 2.0. I agree with that. Cause that's what I look for, people running, and so you know it's safe, and no one, it's not going to be like a predator coming after you. It's not a dark little creepy little place, and traffic.

Another participant added:

FEMALE 2.0. I like to see people when I run, like, say like, social. I don't necessarily feel safe whenever I'm alone.

Running with a running group also seemed to lessen these fears of being a crime victim. Two female participants said that with a group they were able to run without fear in areas where they were normally hesitant to run. These male and female participants also mentioned seeking running routes that were well-lighted at night, believing these areas safer from crime. Poorly-lighted places and objects that created “dark hiding places” were also a concern. The male participant mentioned that his fear of crime was mostly founded on the fear of being robbed of his headphones and portable music device while

running. Wild animals and loose dogs were also the male participant's concern in isolated areas. On the other hand, this male participant and a female participant mentioned avoiding running alone in isolated areas in case they were injured and no one were around to help:

FEMALE 5.1. [Something else important is having] slightly high traffic, not, not high traffic areas, but somewhere that's not completely out in nowhere where, let's say you fall and you break your leg, nobody's going to ever see you again, potentially, have slightly, high-ish, moderately trafficked area.

4.2.3 Traffic safety

At least eighteen participants across all the focus groups were concerned with traffic safety when deciding where they wanted to run. In fact, many of them said that traffic safety was the most important issue in determining their running route. "I'd take safety over scenery though, if, you know, if I had to make a choice," said one of the participants (Female 1.4). Another participant's comments captured particularly well the common sentiment throughout the groups, having said, "yeah, unless you have a death wish, conflict with traffic and cars, would be the thing that would, most prompt you to go somewhere else I think" (Male 1.1).

4.2.3.1 Traffic volume

For fourteen of the participants across all five groups, traffic volume along their running routes played a major influence in determining their running routes, especially along streets that had no sidewalks or that only had on-street bike lanes:

FEMALE 2.5. Yeah, but um, I just don't like the amount of traffic and like flying through [on particular streets] and I really don't think people are paying attention, because they're just like, going to the next place, and so I just don't really trust, that being in the bike lane is really effective
...

FEMALE 2.0. [My favorite places to run are] obviously where there's not much traffic ...

MALE 1.1. [This particular route is] very safe, yeah, very seldom meet a car.

MALE 3.2. Yeah, so that's a nice place to run just where there are very few people, very low traffic.

Some of these runners often avoided high-trafficked roads by running in areas with limited access to outside traffic. These such areas included subdivisions with only a few entrances and the university's research farms, large portions of which are only open to vehicles during work hours on weekdays:

FEMALE 3.1: And they close that gate [on South Farm] after a while so you know nobody else is coming.

MALE 2.2. ... a lot of people we run on South Farm and North Farm, those are very nice, like you hardly get any cars out there and if they are they're just research trucks. Um, and that's, those are really nice places to run.

A major way that twelve of the runners across four groups avoided running in high vehicular traffic was by timing their runs to coincide with low traffic volume along particular streets. One of the most popular times for many runners was early in the morning before many people leave their homes for work or school. Several participants said that every street in the city was a pleasant running experience when traffic volume was minimal. One participant typically ran in subdivisions during the middle of the day because most residents were gone at that time. A few also mentioned running in evenings once many people had returned home from work or school, and another mentioned midday running on the university campus:

MALE 3.2. Um, I'll try to run on campus if I'm running in the middle of the day or at night time, uh, mostly because the speed limit is low, um, and so I know that if I am going to be around traffic, that it'll be slow traffic ...

4.2.3.2 Notable runner-unfriendly locations

Several streets were mentioned many times in many of the focus groups because of their high traffic volume and no safe place for the runner to avoid the traffic. Twelve different participants mentioned South Montgomery Street, which was too narrow for a runner and a vehicle to safely occupy the same lane, and instead of a shoulder there were drainage swales with steep side slopes on each side of the road. However, five participants also mentioned having positive or neutral experiences on South Montgomery Street. This meant that every time a car approached, the runner had to stop and carefully wait off the road for the vehicle to pass. In addition, the swale side slopes were too steep for running.

MALE 3.2. Uh, anything along Montgomery [Street] is really a pain. Um, either side of the highway [Highway 12], North Montgomery [Street] or South Montgomery [Street], mostly just because it's very heavily trafficked and there's nowhere to go, so if you're running along the side of the road and then a bunch of cars come you have to jump off into a ditch or run into someone's front yard, or—there's no shoulder, there's no sidewalks along it. And even the sidewalks that are along it are very poorly up-kept.



Figure 4.1 South Montgomery Street, Starkville, Mississippi

The second-most often negatively-mentioned street was the city's main business street, Highway 12, mentioned by ten different participants, and which is typically a four or five lane road that runs the length of the city. No participant expressed positive or neutral experiences on Highway 12. Most of this street is lined with strip-type commercial development and very few sidewalks, most of which are not contiguous with one another. The landscape alongside much of the road has too many obstacles for runners to continuously run along its shoulders. Parking lots, landscaping, and billboards must be dodged by runners. In any case, the participants were reluctant to run on road shoulders because of holes or uneven ground that could be concealed by grass.

FEMALE 5.1. [A place I don't like to run is Highway] 12. I tried to run down [Highway] 12; that was a horrible experience. I've gotten so many, uh, people honked at me every two seconds. They thought they were going to kill me. It was not fun... I was on the side when I could be on the side, but there's sometimes not places to be on the side, so I had to be on like, the gutter, and that was not, not official... I had to go in the grass, yeah. I did a lot. I just ran where I could on the side... I tried to stay out of the way of the cars ...

Table 4.1 Most frequently mentioned runner-unfriendly locations

<i>Location Name</i>	<i>Number of participants who gave negative mention</i>
South Montgomery Street	12
Highway 12	10
MSU Campus	6
Downtown Starkville	5
Cotton District	4
Near Home	3
Blackjack Road	2
North Montgomery Street	2
Oktoc Road	2
MSU Gym	2
Stone Boulevard	2
Stone-Oktoc-Blackjack	2
Traffic Circle	2



Figure 4.2 Highway 12, Starkville, Mississippi

4.2.3.3 Notable runner-unfriendly locations

The most frequently positively mentioned location for running was the university campus, mentioned by sixteen different participants. It should be noted, however, that six participants also mentioned negative experiences running on the campus. Nine participants had positive experiences running in the downtown, another eight had positive experiences running in the adjacent Cotton District, and another seven mentioned various streets and districts located near the downtown and still within the city’s historical core.

Nine participants had positive experiences running in South Farm, one of the university’s research farms, while another seven mentioned North Farm, the other research farm. Five mentioned the university’s research park, located between the university campus and North Farm. Eight mentioned positive running experiences near their homes, while nineteen mentioned various subdivisions around Starkville and nearby areas.

Table 4.2 Most frequently mentioned runner-friendly locations

<i>Location Name</i>	<i>Number of participants who gave positive mention</i>
MSU Campus	16
Downtown Starkville	9
South Research Farm	9
Cotton District	8
Near Home	8
North Research Farm	7
Long Meadow Subdivision	6
Green Oaks Subdivision	5
Research Park	5
South Montgomery Street	5
Gillespie Street	3
Louisville Street	3
Starkville High School	3



Figure 4.3 North and South Research Farms, Mississippi State, Mississippi

4.2.3.4 Traffic speed

Four participants across three groups were also specifically concerned with traffic speed along roads they ran. One participant said that even when she was on a sidewalk, she felt uncomfortable running alongside a road if the vehicles were traveling too fast:

FEMALE 2.3. Yeah the speed limit's like, it's a road with a really high speed limit, and it doesn't matter if there's a sidewalk on it or not. I just feel a lot safer, if, it's a slower speed limit, 'cause you can hear the cars coming, and be aware of it and look back before they're past you and if it's a high speed limit they've passed you before you could even, you could even, you know, make yourself safe if you needed to.

Others said they did not mind fast vehicle speeds as long as there was a buffer between them and the vehicle travel lanes. These buffers could be a space between the running lane and the vehicle lane, or they could be some sort of vertical element such as a wall, bollards, or shrubs. Twelve of the participants felt that the city's on-street bike lanes were usually inadequate for runners. A major reason for some was because they did not remove the runners enough from the vehicular traffic. Four were also concerned with the bike lanes that were between two vehicle lanes, which tended to occur at intersections with vehicular turning lanes.

4.2.3.5 Visibility to traffic

However, four participants across two groups also said they did not like too great of a buffer, because they believed it interfered with their visibility to the vehicle drivers:

FEMALE 4.1. Being, being able to be seen by a car is important.

This seemed especially an issue on roads that had many driveways that runners had to cross, which was an issue for four participants. Four across three groups also expressed concern with their visibility around street curves and over hills.

FEMALE 1.2. I've ran on that [roadside] before, and I really like it, but the people go so fast, and it's so curvy, that even if they, even if you're on like the, the right side of the road that you're supposed to be on, if they didn't see you, like, it could be a travesty [tragedy], because they go so fast, back there.

Street lighting also figured into two groups and five participants' perception of their visibility to vehicles. A total of seven participants across four groups expressed concerns over their visibility to traffic.

4.2.3.6 Perceived attitudes towards runners

Across four of the focus groups, ten participants also mentioned that they perceived the local culture was against runners. They felt that vehicle drivers wanted to hit them with their vehicles as they tried running on the streets:

FEMALE 2.5. It's culture too, though, I mean, we were just at a conference in Austin, [Texas], and the traffic knew there were a lot of runners and bikers and things and so they respected it. But here, I've been in a car with somebody and they're "oh, I hate bike riders!" (laughs) Oh gosh, (laughs) you'll run me over, won't you? So I think it's like that culture of where you are and, if everybody else then likes to, I don't think we have that culture here.

FEMALE 1.1: Sometimes you just have this weird sense, if you're running sometimes, that people hate you, you know, or, I feel that they want to hit you.

The participants also felt that this anti-runner culture could be due to the region's perceived lack of interest and support for physical activity. The participants also felt that because of this culture, vehicle drivers were often not expecting to encounter runners along the road, may not be aware of the runner until he or she is too close, or may not know how to properly react to a runner approaching on the road. One participant speaking on this topic said that there were "so many people not paying attention to the

road. I mean they look at their cell phone or themselves, or behind them or, they're definitely not paying attention to you. You're the last thing on their mind"(Female 3.1).

However, some participants mentioned parts of the community as having a stronger tradition of pedestrian activity, which was conducive to running since vehicles in those areas were more likely to expect to encounter pedestrians. These areas were the university's campus and the Cotton District:

MALE 3.2. ... [on the university campus] they'll generally be ok with somebody being in the road just cause they're used to a lot more people being around.

MALE 4.2. You know I want to say one more [place where I like running]. I like running University Drive. And I like running University Drive because, I like being on campus because campus has more of a culture of running, you can see running on it, and then I like University Drive because there's this social dynamic of pedestrians and, and businesses, and I, I just, I think it feels like a college place.

4.2.3.7 Tolerance variations toward traffic safety

Curiously, several participants enjoyed running on streets with up to a certain level of vehicular traffic. These participants would run on low-trafficked streets even if sidewalks were present. Often the sidewalks were in poor condition and were tripping hazards, but even well-maintained sidewalks might be avoided:

FEMALE 3.1. Like it's uneven, and then you got some little steps here, and steps here, and there's a ramp. It's just not practical, I hate sidewalks. They're for, dog-walkers, (MALE3.2 laughs) which is fine, they're not for runners, people that are trying, you know, just trying to maintain a pace.

Three of the participants across two groups explained this behavior by their concern with their perceived status as a runner. Running on sidewalks, they said, was for joggers.

Serious runners would brave the streets with vehicular traffic:

FEMALE 4.1. I think probably there's something about sidewalks, that are just not cool, to run on, like if you're running on a sidewalk you're, you're a jogger, you're not a runner (others laughing).

One participant even mentioned a certain level of enjoyment in sharing the street with vehicular traffic, admitting he was a bit of a thrill-seeker:

MALE 4.2. ... I'm kind of a little-thrill seeker too, so the traffic doesn't bother me ...

This same participant later added:

MALE 4.2. ... And see I don't stop at stop lights. I stop for traffic (all laughing)

In total, eight participants across three groups wanted to be seen as runners rather than joggers.

4.2.4 Additional safety concerns

Six participants across all five groups mentioned using landmarks and other features of the environment for way-finding while running. Only one participant mentioned having been lost while running. He was running in an unfamiliar town in a neighborhood with curving streets, which disoriented his sense of direction.

MALE 3.2. ... well instead of being a nice neighborhood that had all straight roads, a couple of the roads I took would kind of veer off and you know, make a funny little dog leg at some point and cut back, and so before too long I didn't even think I could backtrack my way out of the neighborhood, and I had my head phones in listening to music and so, I had kind of lost my sense of direction, and I knew I could stop somebody and ask, and I knew I wasn't too far from the road cause I could hear it but, you know for a brief minute or two I was thinking, man I should have just stuck to the main road, because I knew I couldn't get lost out there.

Another notable concern for thirteen participants across all five groups was that they felt uncomfortable crossing street intersections:

FEMALE 3.1. Yeah I think that one intersection is the only good one on Montgomery [Street], and it's going across Gillespie [Street], it's not even going down Montgomery [Street].

4.3 Enjoyment

One of the major themes that emerged in every focus group discussion was the need for running routes to be enjoyable, mentioned in some form by at least eighteen participants in all five groups. Most often, when speaking about enjoyment along their running routes, the participants were referring to visual interest, though they also discussed a few other enjoyment-related items. The participants gave different reasons for seeking routes that were visually interesting, and they also discussed what they might find visually interesting along a running route.

4.3.1 Running as an escape

Eleven participants from all five groups mentioned they often ran for exercise as a way to relax, and at least four participants preferred running alone. On these types of runs they sought route characteristics that would help distract them from their normal thoughts. "Running is a way to escape everything, to where I can go to my nothing box, and just, you know not think and just zone out and relax," (Female 1.2) said one of the participants in a comment representative of many other participants' sentiments. Words that appeared often during these parts of the discussions included "relaxing," "vacation," "escape," and being taken to "a different place." Generally, participants used these words when discussing their rural running routes, and they seemed to especially associate them with remote gravel roads and trails:

FEMALE 4.1. Yeah, makes me feel like I'm really getting a vacation, kind of like that, like I'm getting to escape more, if I can have more trees or more trail.

MALE 4.2. ... I get that same feeling that I do on, at the [national wildlife] refuge, of this kind of, otherworldly place. It's just very, it's, the both of them are, are, are neat to run. Uh, they're special.

Four participants across two groups enjoyed routes where the tree canopies created a tunnel with dappled sunlight on the ground:

MALE 3.2. I just think it's really pretty, and the sunlight coming through the trees, and I don't know, I can kind of make myself be somewhere else if I'm, if I'm somewhere where there's a lot of trees and it just feels really comfortable.

MALE 4.2. [On two of my favorite routes] the trees completely canopy, and, but you've got this twelve foot road, you've got ditches on both sides, but then the trees have this beautiful canopy. And so it, you're, it's just like you're in a different, in a different place.

Undesirable interruptions along a route reduced runners' ability to "escape."

4.3.2 Other visually interesting items mentioned

The focus group participants mentioned many more features they liked seeing along their running route. Similar to running as an "escape" from daily life, four sought visually interesting environments to take their mind off their fatigue while running:

MALE 4.1. And then the thing with, about certain areas where you run, you know your surroundings, it would take your mind off how tired you are, just because you'll focus on like, "hey, this is a beautiful lake out here," or something like that. And you know just looking at the scenery, it'll take your mind off your physical fatigue.

MALE 2.2. Yeah, I just agree with the scenery. I mean, you have to have something to look at.

Several others sought visually interesting environments along their routes simply for fun or because they mostly worked indoors:

FEMALE 3.1. I feel like that's most outdoor runners, though, I mean we want to be outside for the scenery, I mean, right? That's why you don't get on a treadmill and look at TV and run, so I think most runners, that's what they want, you know. They want to get outside to be

outside and doing that work, to see something that you don't normally get to see at your computer, or in your office, or, you know, I think that's why we run outside for the most part. I feel like that's the common thread, why we do it.

Natural areas, especially those containing trees, seemed popular among twelve participants, eliciting words such as "pretty" and "beauty" from some female participants:

FEMALE 5.1. I feel like being in nature it all just kind of makes you happier; having some trees, or flowers or something. But then I am a girl ...

Sixteen found the university's campus to be a visually attractive place for running.

Participants also spoke favorably of views of features in the distance, such as large fields and tree lines. In four of the focus groups, nine participants in all five groups mentioned enjoying running alongside bodies of water including lakes, rivers, and ponds. Two participants loved looking at cows while they ran, especially on the university's research farms:

FEMALE 1.4. You know I don't mind watching baby things play, and sort of grazing, and all that goes into that, as long as I can get the variety, cause I mean it just gets, I mean it's a long time to be out there sometimes, and while you're zoned out you're in your, in the zone, running, it's for me also part of what I get to look at too because it's my little vacation from all the work that I'm doing.

Three participants also liked seeing wild animals while running, though one also expressed concern.

Five participants also enjoyed viewing features with more urban character while running. Two participants only ran within central Starkville, but for most it was one of many different locations where they typically ran. Among the reasons participants gave for enjoying viewing central Starkville while running were its small-town character and its traditional urban character:

MALE 2.2. Cause running downtown like we do, we have four miles, we'll go out to Mugshots [Restaurant] and then come back, and that's, like I love running that, 'cause I mean you get that, small town feel, especially going down Main Street, it looks really cool and has sidewalks and cross walks and everything you need.

Another participant also seemed interested in viewing old buildings, specifically mentioning New Orleans's historic districts. Another participant mentioned seeking landmarks unique to that area to include on his running routes, though it was unclear if he was referring to his urban or rural routes, or both. A participant disliked the lack of natural features along Highway 12, one of the city's main commercial streets and lined with strip developments, finding it depressing:

MALE5.2. Yeah like [Highway] 12, all the concrete, and the lack of greenery, and people and all that, just seems a little depressing to me, versus an area like University [Drive], or on campus, or something, you know. Just mentally it would seem better for you to be in this area versus that.

4.3.3 Running to connect with the community

Of the participants who sought running routes as a way to escape, some also said they sometimes ran routes that connected them to the community instead:

FEMALE 1.1. But I don't mind every now and then, going out, seeing people (laughs) either [while running] ...

Specifically, they mentioned the university campus (Figure 4.4), the Cotton District (Figure 4.5), and downtown (Figure 4.6) as locations where they felt connected with the community while running. These were the parts of the community where many people could be seen outdoors—usually walking, exercising, or sitting outside in a bar or restaurant patio. As a result, the participants mentioned often seeing people they knew when they ran through these areas:

MALE 5.2. ... but the prime place is, [be]cause I live near the University Drive, Cotton District area, and then onto campus ... that's my favorite place, just because you you're likely, if you're outside, you're likely to run into someone you know, or you know, interact with the community, and, and, friends and stuff, and somebody, you'll see someone you know ...

These three locations—the university campus, the Cotton District, and downtown—shared several other notable characteristics that several participants liked. One participant described these areas as having “good streetscape, and the good pedestrian-friendly walkability of the road” (Male 5.1). These areas had some of the shortest building setbacks in the community, which along with many street trees contributed to their “good streetscape.” These areas also had an extensive network of different types of sidewalks (brick and concrete-surfaced), bike lanes (on and off-street), and streets with 25 mph to 30 mph speed limits. In some places these different features occurred near one another or even within the same street corridor, which provided different running options, as some participants noted.

In addition, one participant mentioned that he liked running in areas where other runners could be found, and several mentioned how they enjoyed being part of a larger community of runners. Several also enjoyed participating in running groups. Safety concerns played part in several participants' preference to have others around while running, which will be discussed further in a later section. Additionally, participants thought some runners may run through these areas in order to be seen, though none of the participants admitted having done so themselves. And a few participants saw their running partly as a recruiting tool:

MALE4.2. We talked a little bit about community, I think, and having a mass, a critical mass of runners, and I think people seeing people run makes more runners ...



Figure 4.4 The Mississippi State University campus, Mississippi State, Mississippi



Figure 4.5 The Cotton District, Starkville, Mississippi



Figure 4.6 Downtown and Main Street, Starkville, Mississippi

4.3.4 Avoiding boredom while running

Another reason participants gave for including visual interest along their routes was to avoid boredom, which thirteen of the participants in all five groups mentioned in some form. Visual interest or visual variety seemed especially important for longer runs, according to six participants across two groups:

FEMALE 4.1. I mean, we run a lot, so I'm looking for some variety. I like to have this experience where I'm out of touch, but then I also like to, like [Male 4.1] was saying, run through the heart of the community, so that I have this sense of connection ... So I, we need variety, if you're going to run a long time.

Several participants also disliked running on tracks, on treadmills, or even on short outdoor routes. "It gets old" was repeated several times throughout across discussions:

FEMALE 2.5. ... and then in [nearby city name] I really liked the river walk, but it got old really quickly 'cause it's just a 2.2 mile, one-way.

Similarly, participants who usually ran around their neighborhoods would occasionally run in a different part of the town or outside of the town in order to see something different while running:

MALE 3.2. I try to mix it up as often as I can [be]cause I tend to get bored pretty easily if I'm at the same place you know, day after day.

In contrast, one of the least experienced runners did not seem bothered by running repeatedly in the same location:

MALE 5.1. Yeah I really kind of run in the same place every single time, so I haven't really been anywhere that I don't like, that I can think of, at least.

One participant reacted negatively when shown a photograph of a subdivision where the homes seemed built from a same or similar plan. For this participant, running through this location would have felt like work instead of fun:

MALE 3.2. This is something I would actively dislike running in [points to photo of the subdivision]. Just a very cookie-cutter neighborhood where all the houses look the same. You can tell all the trees were just planted, you know, within the past year. There's nothing to go by and there's nothing to look at, um, so I really do like having some kind of visual stimulation while I'm running, or just something that makes me feel comfortable, and this makes me feel very uncomfortable, and very, I don't know, like I'm running through a factory almost, or something.

4.4 Accessibility

A total of fifteen participants out of five groups mentioned accessibility-related concerns during the discussions. The participants generally preferred running in easily accessible places, especially those that could be quickly accessed:

MALE 5.2. I would never go [running] out there unless it's with them [a running group], 'cause it's so far out of the way.

In fact, this participant was among the eight across three groups who mentioned running near their homes among their preferred running locations.

Similarly, nine participants across four groups disliked the idea of driving to where they ran:

FEMALE 1.1. Yeah, I think any runner kind of um; will take what they can get, it just depends—uh, they want to run, start from a spot that's somewhat convenient to them I guess.

Male 1.1. You don't want to drive, for sure.

OTHERS IN AGREEMENT: Nooooo!

FEMALE 1.1. You'll make do if it's the right time of day, and you have people with you.

However, three participants across three groups mentioned they typically drove to where they ran, perceiving the areas near their homes to be inadequate:

FEMALE 2.5. Unfortunately, though, I do find myself driving places to run. I don't leave my door a lot of times when I start running. I go somewhere where I feel like it's a better place to run. It's probably counter-productive.

FEMALE 3.1. It's, it's ridiculous. I live off _____ [Street], and I always drive to run. Like I drive to a place where I can run because it [the area near her home] sucks so bad.

For others, driving to where they ran was for special occasions such as vacations or longer-than-normal leisure time, as in the following discussion excerpt:

FEMALE 4.1. I, hmm. You see, I wish that I did better, like, I feel like I don't really like to drive my car and then run. I like to just run wherever I live, which is lame, but, it's like, I would be looking for something close to where I live.

MALE 4.2: You step out to run, wherever you are?

FEMALE 4.1: Yeah. The driving is like, kind of once in a while, takes more time.

CHAPTER V

DISCUSSION AND CONCLUSION

A general framework emerged in this study that could describe the participants' process for determining where they planned to run. First, they considered the exercise goals they wished to meet for that run. These goals generally included the distance of the run, the amount of time to be spent on run, or training to run for specific conditions. These chosen goals would then influence the type of environment in which the participants wished to run.

Next, the participants would assess the safety, the accessibility, and the enjoyment potential of the different routes they were considering. As some of the participants mentioned, they did not typically choose a route simply because it was the safest. Rather, the routes they were considering running had to meet a certain level of safety. Once the runners had evaluated the potential routes for adequate safety, then they considered their accessibility and potential for enjoyment. The runners may have had to readjust their exercise goals to fit within the running routes available for that occasion.

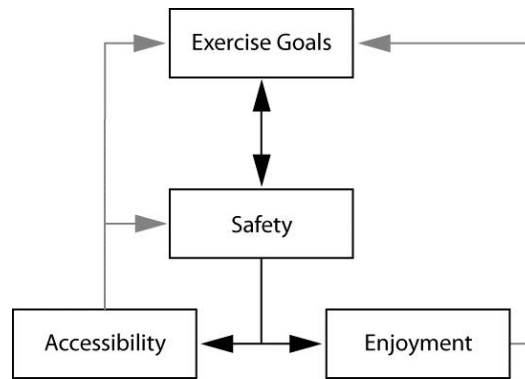


Figure 5.1 The relationships between the major discussion themes

Note: This diagram shows the relationships between the major determining factors for runners' choice of running route.

5.1 Exercise goals

The participants' exercise goals appeared to be the major initial determinant for their choice of running environment. These exercise goals varied not only between the different participants, but also could vary within individual participants for the different instances they ran. Different exercise goals also played a role in the types of scenery the participants wished to see while running. In addition, differences in participants' exercise goals may have been influenced by differences in motivations.

More specifically, the length of the runners' routes, whether measured by distance or by time, seemed to play a major role in the type of environment the runners sought. Many of the participants agreed that for longer runs they preferred visually stimulating environments, which helped reduce boredom and distracted them from fatigue. These attractive environments were important because the amotivational effects of boredom and fatigue seemed stronger for the longer runs. However, no participant mentioned specific distances in relation to their preferred running environments, though one said his ideal running environments would be different for one mile, six mile, and ten mile runs.

Additionally, many of the runners were knowledgeable of the distances of different portions of their routes, using landmarks or GPS to determine their progress along their route. Perhaps then runners might be well-served by placement of distance markers along designated running paths, which could also be used to determine runners' progress along their routes. In turn, knowledge of their position along their routes while running could help runners adjust their pace or intended distance to better suit their exercise goals.

Fatigue during longer runs have also played a role in participants' choices, as was the case of the participant who was less likely to move out of a pedestrians' way if tired. A few others' risky behaviors, such as carelessly running through intersections or carelessness towards avoiding vehicle traffic, may also have been related to their fatigue. This was consistent with a prior study by Rosenbloom et al. ("Social" 1268), which suggested that fatigued pedestrians may make riskier road-crossing decisions.

In contrast, the amotivational effects of fatigue and boredom did not seem a major concern for shorter runs, reducing participants' preference for visually stimulating environments. For these shorter runs, participants may have been more concerned with completing the run within a particular amount of time. For these types of runs, participants tended to prefer fewer obstacles, and may have been more likely to engage in risky behavior such as carelessly running through intersections and not carefully avoiding vehicles. Or these shorter runs may have had the main goal of seeing other people or being seen, as some of the participants said.

Sometimes some participants intentionally included certain obstacles into their routes to help them achieve their exercise goals. Often they included these obstacles to

help themselves prepare for future runs, though several also included obstacles to create different running experiences for themselves. Again, this points to the importance of environmental variety for the participants when running. In this case, they sought an environment which would create variety in their exercise intensity and variety in the way they ran. Based on these observations, runners may benefit from having at least one designated running route in their community that includes differently-sized hills and a variety of running surfaces, the two most commonly-mentioned desirable obstacles. Runners may also find some motivation in horizontal curves by seeking what might be on the other side.

5.2 Safety

Within self-determination theory, a lack of safety served as a motivation, discouraging participants from running in particular locations. And for many of the participants, safety was their chief concern, if not one among their more important ones. In addition, many of the features participants associated with unsafe conditions were also detrimental to unimpeded running, therefore interfering with their exercise goals and enjoyment. As stated in Chapter IV, the participants' concerns over a location's safety encompassed safety from chronic injuries, immediate injuries, crime, and from traffic.

5.2.1 Running surface safety

The participants were concerned with running surfaces' safety based on their ability to cause immediate injuries and chronic injuries. Interestingly, the more experienced participants seemed more concerned than the less experienced participants about the effects of surface rigidity on long term injuries. Almost all the experienced

participants disliked running on concrete because of its perceived rigidity. They preferred asphalt over concrete, and many preferred gravel and dirt surfaces over asphalt. The origin of the participants' dislike for concrete was unclear. A few heard it from former coaches or from others. None cited personal experience, and research on the topic was limited.

A consequence of their dislike for concrete, however, was that many of the participants ran on streets they shared with traffic, even on streets with sidewalks, increasing the chance of collision. This may have contributed to the importance the participants placed on timing their runs to occur during less-trafficked times of day, which varied in different parts of the city. However, many of these runners who disliked sidewalks and concrete also mentioned running on them when in unfamiliar locations.

On the other hand, many of the less-experienced runners preferred running on sidewalks. Perhaps they were unaware of the more experienced runners' sentiments toward concrete, or they had not yet experienced the chronic injuries that the more experienced runners attributed to concrete. Or these less-experienced runners may simply be judging an area's suitability for running based on the same criteria they would for walking, including having not yet had a chance to develop separate criteria for running.

Most of the participants also judged surfaces for their potential to cause them to trip. They tended to avoid uneven surfaces such as broken streets, broken sidewalks, and grass that could hide uneven surfaces. Poor night lighting also reduced participants' ability to detect surface irregularities, as mentioned by one participant.

The results concerning gravel surfaces suggested that as runners gain more experience, many will begin to tolerate and perhaps even prefer running on gravel. The

less-experienced participants disliked running on gravel for fear of tripping, but the more experienced runners felt confident in their ability to judge between safe and unsafe gravel. Several said they grew to like gravel after initially disliking it, usually after experiencing it with running groups. These participants generally agreed that the smaller the aggregate size, the safer it felt for running.

Based on these comments, it may be inferred that many of the participants had risked testing running on different types of gravel.

5.2.2 Crime safety

The participants' crime safety concerns referred mostly to running in isolated areas and running after dark, especially in poorly-lighted areas. A few mentioned avoiding "bad neighborhoods" while running, which could have meant they avoided what they perceived as poorly maintained neighborhoods. This crime safety was more of a concern for female participants in comparison with the males, consistent with prior research (De Bourdeaudhuij et al. 89).

5.2.3 Traffic safety

For many of the participants, traffic safety seemed to be the top factor limiting where they ran. Generally speaking, the participants said they tried avoiding those areas they perceived to have high traffic volumes and high traffic speeds. Interestingly, many of the participants' more specific preferences for traffic safety-related features conflicted with their accounts of the actual locations where they typically ran. This conflict may be due in part to Starkville's smaller size and the resulting limited choice of running locations. Or these conflicts might instead be the result of the existing environments'

inability to adequately accommodate runners. Also worth mentioning, several participants still felt it was necessary that there be some traffic where they ran, both to feel more secure from crime and also for seeking aid in case of an emergency.

5.2.3.1 Running on streets versus on sidewalks conflict

As an example of one of these conflicts, and as previously mentioned, many of the participants preferred running on streets rather than sidewalks, making them more susceptible to traffic collisions. Ossenbruggen et al. (497) echoed these concerns, finding that pedestrian crashes were twice as likely in areas without sidewalks. At the same time, many of these same participants also said they preferred running in places where they were safely removed from traffic. Based on the discussions, participants seemed to be able to fulfill both preferences by running at times of reduced traffic volume, which they believed occurred at different times of day throughout different parts of the community.

5.2.3.2 Street networks conflicts

Several studies have found associations between traffic volume and the pattern of the street networks, a connection which several participants also made. Most of the city's post-WWII residential developments had hierarchically-arranged street systems forming self-contained units, a common development pattern found in many U.S. neighborhoods from the same era (Frank et al. 126). As a result, this pattern tends to discourage through-traffic but also concentrates vehicular traffic onto a few arterial streets (Frank et al. 126) that can be dangerous for pedestrians (Untermann 258), a condition that several of the focus group participants found dangerous for on-street runners as well. However, several participants liked these subdivisions' self-contained nature and the resulting perceived

lower levels of traffic, though they tended to avoid running on the arterial roads that connected separate subdivisions.

On the other hand, these postwar neighborhoods tended to have fewer street intersections that pedestrians would have to cross (Southworth and Owen), a condition which several of the focus group participants found favorable for running uninterrupted. Also, few of the post-WWII developments had sidewalks, so perhaps runners could benefit from some sort of designated lane, especially if they wished to run during high traffic volume times along arterial roads.

In contrast, the city's older neighborhoods, mostly built before WWII, presented the runners with a different set of advantages and disadvantages. The less-experienced participants liked that these neighborhoods had more sidewalks, and participants of all experience levels found them more aesthetically attractive and interesting. However, the more experienced runners also associated these neighborhoods with many obstructions that could disrupt their running. Due to their central locations within the city, these older neighborhoods may also have had higher traffic volumes that could also cause problems for runners. Then again, some participants were drawn to these older parts of the city in part because they perceived more people walking around. This is in line with a study that found that people had a higher likelihood of walking if they lived in urban and suburban neighborhoods built before 1974, though it found no such association with general leisure time physical activity such as jogging or running (Berrigan and Troiano 76).

Yet another study found that when they also contained pedestrian safety features, these types of high street connectivity neighborhoods tended to also have more pedestrians compared to neighborhoods with lower street connectivity and fewer safety

features (Moudon et al. 54). In addition, travelers tended to have more route options when streets are arranged organically or in a grid (Frank et al. 118), giving runners more variety of environments to see.

The focus group participants' preferences conflicted regarding street intersections and their running routes in these older neighborhoods. All who spoke about intersections disliked crossing them, whether it were for safety reasons or because it interrupted their run. However, many of those same participants also mentioned liking running environment characteristics of older neighborhoods that had many intersections; namely, central Starkville and the Cotton District, both of whose small block sizes resulted in a finer-grained street network with many intersections. Perhaps these areas' positive qualities were enough to mitigate for their high incidences of intersections.

5.2.3.3 Running in rural settings

The many issues participants associated with running within the city seemed to drive some to run instead in more rural environments. By choosing to run in these more rural settings, participants faced a different set of benefits and drawbacks. For one, the participants perceived lower traffic volumes on these roads. Though pedestrians faced a higher collision rate in urban areas (Zegeer and Bushell 3,5; Herbert Martinez and Porter 45-46; Clifton et al. 426; USDOT, "Pedestrians" 1; Zegeer and Bushell 5), pedestrian crashes in rural areas were more likely to result in death (USDOT, "Rural/Urban 1). Disturbingly, in the current study no participant mentioned awareness of a higher chance of death on rural roads. Instead, their concerns about running in rural areas were limited to unattended dogs, wild animals, and injuries in isolated areas with no one around to help.

5.2.3.4 Buffers against vehicular traffic

Additionally, many participants wished for buffers of some sort between them and traffic, but ran in the streets anyway, exposing themselves to the traffic. Many of the city sidewalks had a variety of types of buffers separating them from traffic, but many of the participants avoided these sidewalks for their concrete surface. Again, perhaps planners and designers should consider asphalt or other materials besides concrete for sidewalks.

However, some participants were concerned that buffers between the running path and the vehicle lanes could obstruct runners' visibility to vehicles, especially as the vehicles turned off the street into driveways. Some participants suggested bollards and small shrubs as appropriate buffers that do not reduce runner visibility to vehicles. For the inexperienced runners, a grassed strip buffer seemed adequate along streets with slower traffic (e.g. 25 mph). Also, many of the participants felt their visibility to vehicles was impeded by hills, horizontal street curves, and inadequate street lighting.

5.2.3.5 On-street bike lane safety

The participants' willingness to run in on-street bike lanes seemed to be influenced by the speed of the adjacent vehicle traffic. Most seemed uncomfortable running on the stretches of South Montgomery Street that had on-street bike lanes. Though not expressly mentioned with respect to their discomfort on South Montgomery, one of their main objections to the street was the high speeds, which ranged from 30 mph to 45 mph.

Many participants, however, were pleased with running on the city's other on-street bike lanes, which occurred along streets with lower speed limits than South Montgomery. However, even along these streets participants felt uncomfortable in the

bike lane portions that occurred between two vehicle lanes, which occurred at intersections. One found this type of situation “confusing,” so perhaps participants were unsure how best to navigate these situations. Since they normally ran along the edge of the road, they were likely not used to the intersections where following the bike lane would place them nearer the middle of the road.

5.2.3.6 Perceived vehicular traffic attitudes towards runners

Several of the participants perceived that some vehicle drivers were ignorant, unaware, or even antagonistic towards runners they encountered sharing the road. Much of this could be due to the majority of the community’s post WWII automobile-oriented development, throughout which drivers may not be expecting to encounter runners.

Also, some of the participants’ thrill-seeking or risk-taking propensities or disregard for traffic at intersections may contribute to some of the drivers’ antagonism towards runners.

5.2.4 Individual differences in risk tolerance

The study participants expressed a range in their tolerance for unsafe conditions. Some of this variation perhaps could be explained by differences in demographics, differences in personality, and differences in amount of running experience. Eyler et al. (1533) found that in comparison with those who walked regularly, those who never walked or only occasionally walked reported that negative environmental features posed greater barriers against physical activity participation. These “never-walkers” and “occasional-walkers” were also more likely to report lack of confidence and fear of injury

as barriers against beginning walking or increasing their levels of physical activity (Eyler et al. 1533).

Similarly, Humpel et al. (“Changes” 63) found that after a web-based self-help physical activity intervention trial program, participants who had begun with the least positive perception of their environment had the largest increase in positive perceptions of their environment in measures of aesthetics, convenience, access to services, and traffic problems. The researchers in this study (Humpel et al., “Changes” 65) proposed that the lack of increase in positive perception in those with high rates of physical activity was perhaps due to their already positive perception of their environment. Perhaps then, as runners gain more experience, they are less likely to be intimidated by the physical environment and be more willing to explore running in areas they previously would have dismissed as unsafe.

A couple of participants admitted they were “thrill-seekers” and somewhat relished the danger of sharing the road with vehicles, even if sidewalks were available. For these participants, running on sidewalks was “just not cool,” a view they also shared with several other participants with less of these “thrill-seeker” tendencies. However, these same people also had other surface safety-related reasons for running on the road rather than the sidewalks, as described elsewhere in this paper. Additionally, these same “thrill-seekers” and others were concerned with maintaining their image as runners rather than joggers, and they felt that being seen running on the street rather than the sidewalk could help sustain their desired image. Hoepfel (1) observed similar characteristics in her dissertation that studied marathon runners’ inclinations to engage in risky exercise

behavior, finding that marathon runners were indeed more prone to take part in dangerous behavior.

5.3 Enjoyment

Enjoyment and its associated environmental features also played a major role in determining where the participants preferred to run. Prior research suggested that in order for a person to maintain a physical activity routine, enjoyment of the physical activity itself can act as a strong motivator (Ryan and Deci 5). Since all the participants had been running at least two years, and many for several more years, there was some aspect of running that they enjoyed and motivated them to continue running. Indeed, some of the participants expressly mentioned enjoying running while others implied such. Based on some participants' comments, many likely were often intrinsically motivated to run, generally enjoying wherever they ran as long as their environment did not contain too many amotivations.

Those that were not as intrinsically motivated to run must then have enjoyed other environmental factors, which served as their extrinsic motivators. Certainly though, most of the participants were also motivated to some extent by highly externally regulated motivators, such as pressure to appear physically fit or to pass military physical fitness exams.

One of the important extrinsic motivators was the enjoyment of outdoor scenery. Many of the participants stressed the importance of aesthetically-pleasing environments along their running route, consistent with previous findings related to pedestrians (Brownson et al. 238; Giles-Corti and Donovan, "Socioeconomic" 606; Humpel et al.,

“Perceived” 121; Ball et al. 437). As previously mentioned, enjoyment of scenery could reduce the amotivational impacts of fatigue and boredom during longer runs.

Additionally, results of the study suggested that the participants preferred that these environments have a variety of scenery, also consistent with prior research studying pedestrians’ preference for interesting environments (Giles-Corti and Donovan, “Socioeconomic” 610). The variety of interesting scenery the participants sought included different types of natural scenery, older portions of the town, and the presence other people. They deemed boring places such as subdivisions with similar houses and strip commercial development. Furthermore, the participants generally had a variety of route types that may also have served to help keep them interested and motivated to run.

Another important theme related to enjoyment while running, and that emerged in several discussions, was the idea of running to “escape.” The participants sought escape from their typical work environment and from other people. They also found escape by running while in rural and natural landscapes, which is consistent with a previous study (Bodin and Hartig 148).

Likewise, some of these same participants mentioned sometimes running to connect with the community, either by running with others or seeing others while running. Similarly, previous research found that those engaging in physical activity with others had higher physical activity levels (Giles-Corti and Donovan, “Relative” 1802; Ball et al. 437).

5.4 Accessibility

Within self-determination theory, accessibility affected the participants as an amotivation in that they tended to dislike running in places not easily reached. The

importance of accessibility may be reflected by many of the participants mentioning running near their home, which was consistent with prior research exploring the association between proximity of a physical activity facility to the area of residence and its use (Sallis et al. 183; Reed and Phillips 288; Eyster et al. 1533; Brownson et al. 239; Giles-Corti and Donovan, “Relative” 1800), especially for vigorous exercise (Giles-Corti and Donovan, “Relative” 1800). These findings show the importance of making residential areas physical activity-friendly, suggesting that if planners and designers prioritize parts of the community to be physical activity-friendly, perhaps they could achieve greater impact by focusing on these residential areas. Additionally, the frequency with which the participants ran in streets near their homes suggested the importance of informal physical activity facilities for runners, also consistent with a previous study that found higher physical activity rates were associated with proximity to informal physical activity facilities (Giles-Corti and Donovan, “Relative” 1800).

Though previous research did not find as strong an association between the workplace and use of nearby physical activity facilities (Giles-Corti and Donovan, “Relative” 1801), a few participants wished for more suitable running locations nearer their workplace. Some also mentioned knowing many people that ran near their work during their lunch break. And as two participants suggested, workplace showers would be necessary for people to be able to run near their work.

In contrast, longer travel distances could reduce the participants’ willingness to run at a particular location. As an example, some participants disliked driving to a location to run, which one said reduced the likelihood that she would run at all. Others mentioned driving often to a running location because near their residence was

inadequate for running. They still disliked driving to their running location, but their motivation to run often seemed strong enough to overcome the amotivation. As a result, running facilities located far from population centers may not be used as often as those located nearer, consistent with prior research (Giles-Corti and Donovan, “Relative” 1808). In contrast, when a participant had a large amount of leisure time, such as on a weekend or on a vacation, they then were willing to drive farther to running locations.

5.5 Implications and applications for landscape architecture

The findings of this study provide some insights for policy makers, developers, planners, and designers interested in creating environments that facilitate outdoor physical activity, specifically running. In summary, places adequately designed for simultaneous use by pedestrians and bicyclists seemed to also provide most runners with a good running environment. Pedestrian and bicycle facilities adjacent to each other would provide runners with many options for safely running on or adjacent to a street. To illustrate, this would appear as a sidewalk with a buffer between it and the street, next to which would be an on-street buffered bicycle lane (See Figure 5.2). A mix of on-street and off-street routes could fulfill many of the participants’ need for variety in their routes, especially if those routes took runners through areas of different land uses, and “natural”-looking areas in particular.

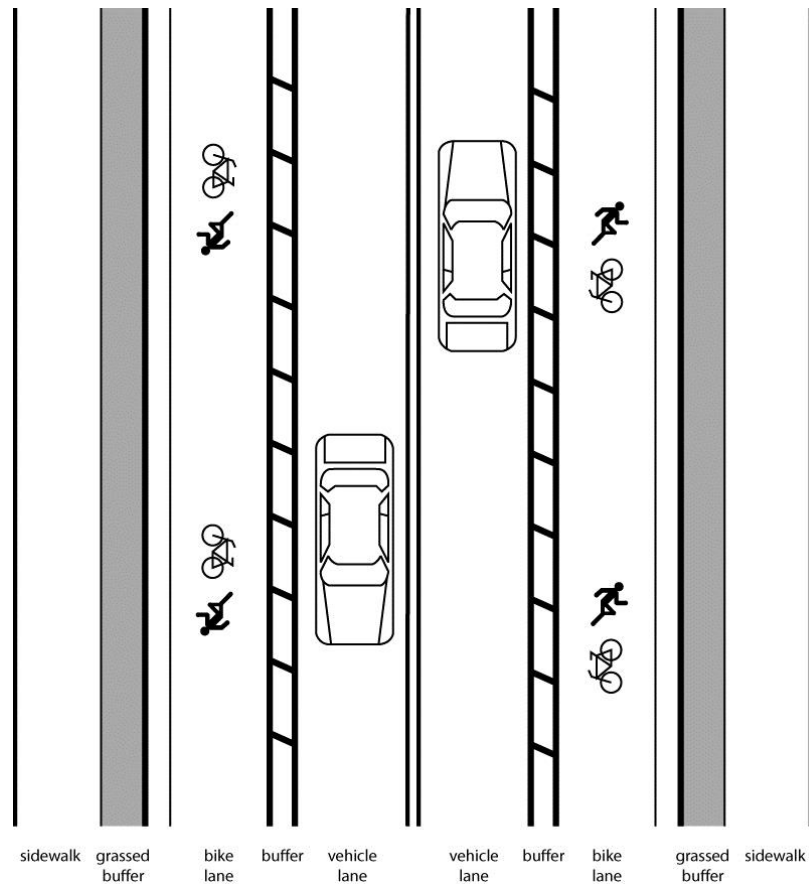


Figure 5.2 Sample runner-friendly street plan (not to scale)

Notes: The vehicle lane is separated from a shared runner and bike lane by a painted buffer. The buffer could also be made of raised pavement, safe-hit posts, bollards, or other vertical elements. The runner and bike lane could also be painted a different color from the vehicle lane. A sidewalk, preferably made of material less rigid than concrete, is separated from the street by a grassed buffer and a curb and gutter. This sample plan would provide runners with two safe options for running along the street, depending on their preferences.

5.5.2 Suggestions for alternative running surface materials

Regarding the running surface materials mentioned within the focus groups, alternative materials could achieve similar effects while providing additional benefits. For example, paving geopolymers over gravel, also known as soil stabilizer, could be an effective alternative to asphalt and dirt running surfaces. The manufacture and installation

of these polymers are less damaging to the environment than that of asphalt, and the surface remains solid during wet weather, unlike dirt surfaces. This fairly new technology also has some drawbacks (safety and temperature sensitivity during installation), but may hold future promise (Zhang et al. 1477, USDOT “TechBrief”).

Another asphalt alternative is bioasphalt or warm-mix asphalt, which in comparison to standard asphalt also reduces environmental impacts during manufacture and installation. In addition, bioasphalt may produce less heat island effect than standard asphalt (Jamshidi et al. 530).

Rubber sidewalk, made of recycled rubber, is an alternative to Portland cement concrete or asphalt surfaces. Runners may find its softer surface appealing and would be less-inclined to run in streets (Wang et al. 527).

Modular paving made of recycled plastic may also be an effective surface, provided that none of the modules protrude excessively and create tripping hazards. This would be an issue with any type of modular paving (Saikia and de Brito 386). And if these materials were used as a sidewalk material, concrete curbs and edging could still be used to contain the paving, since they are often difficult to give a clean edge.

5.5.3 Runner-friendly design for on-street bike lanes

In addition to alternative materials, certain design features could also help improve the running experience, especially some commonly-used bicycle lane practices. The participants who preferred buffers between their path and vehicle traffic could benefit from raised pavement dividers separating the lanes, from buffered lanes, and from safe-hit posts used in some places to separate bike lanes from motorized vehicles, all of which are current practices in bicycle lanes. However, raised-pavement lane dividers can

be a hazard for bicycle tires, unlike buffered bicycle lanes that are separated from vehicles lanes by two painted lane dividers continuous with the street surface.

Likewise, a common bicycle lane practice in Starkville, which consists of a single painted stripe between the bicycle lane and vehicle lanes, may not always provide a comfortable level of separation. Another possibility, with which some cities are currently experimenting, involves coloring the bicycle lane surface differently from the vehicle lanes. These cities' different lane colors are intended to increase the perception that the lane is for non-motorized transportation, and may further increase the lane's safety for runners. In short, all these aforementioned design suggestions mean that certain types of on-street bicycle lane installations can also improve an area's suitability for running.

5.5.4 Minimal-cost runner-friendly design

Some street design practices could improve the running environment at minimal additional cost to streets that would otherwise only accommodate vehicular traffic. For example, runners and cars could share the same lane (shared space) safely if the lane were sufficiently wide. As a specific example within this study, many of the participants felt safe running in subdivision streets that were thirty feet wide and with 25 mph speed limits. And an alternative to widening the road lane would be installing a road shoulder of adequate width and slope for runners, and especially if the shoulder were of an adequate surface material (maybe the same as the road) or gravel. Dirt would probably be less liked than gravel because its use is more dependent on the weather (because rain makes mud), and grass could hide tripping hazards until a cow path is worn through it. Another intervention that may be effective for existing narrow streets would be reducing the vehicular speed limit, since many of the participants disliked running near excessively

fast vehicles (shared space). Furthermore, roadsides in areas of lower pedestrian traffic could opt for gravel trails rather than concrete sidewalks.

These design options could be important for municipalities and private developments with limited budgets, which might otherwise forego physical activity-friendly design altogether if unaware of viable lower-cost alternatives. The current trend of increasing costs of construction materials and labor may result in increasing numbers of municipalities and developments with diminishing budgets, making the search for these cheaper alternatives all the more important. Still, by making efforts to implement these less-conventional physical activity-friendly practices, these municipalities and developments would then be able to advertise themselves as physical activity-friendly, which could be used as a major selling point in an era with increasing awareness of the importance of incorporating physical activity into daily lives.

5.6 Conclusion

The results of this study indicated that environmental features related to exercise goals, safety, enjoyment, and accessibility all affected where the study participants preferred to run. Within the broader context of the relationship between physical activity and the physical environment, the runners' preferences for physical activity facilities seemed to fall somewhere between those of pedestrians and bicyclists, with varying degrees of overlap based on individual differences. Without an additional study incorporating a larger and randomly generated sample, these results are not applicable to a larger population.

Within the current study's research topic, several other opportunities exist for additional research. For example, future research could follow with quantitative studies

that assess the importance of the variables generated within these focus groups. These quantitative studies could also explore the influence of these variables in greater detail, which would provide a more complete understanding of the research problems. Future research could also explore whether runners living in or from smaller communities have different route preferences than those in larger communities. Also, different demographic groups might have different preferences for where they prefer to run. Furthermore, the current study's findings raised the possibility that runners with different levels of experience have different preferences for running environments. Studies exploring these differences could help in developing physical activity-friendly environments targeting these specific populations.

5.7 Limitations

The current study's findings should be considered in context with its limitations. This study's limitations included those inherent to focus group research, qualitative research, and small sample sizes, and the demographic composition of the community in which the study was conducted.

One notable limitation was the small size of some of the focus groups. Because of last-minute cancellations, three of the focus groups had only three participants. These smaller groups were more sensitive to wider variations in group dynamics as each participant had more influence on the group discussion (Morgan 44). As a result, some of the focus group discussions may have been more a reflection of some participants' views at the expense of others.

Another limitation of this study was that many of the focus group participants knew each other prior to the study, and some of the participants knew each other very

well. The focus group literature recommended against placing friends or acquaintances in the same focus group session for several reasons. Otherwise, participants who are already friends could have endorsed each other's views, creating an imbalance of group opinion (Stewart and Shamdasani 97). Unfortunately, the study's small-city setting made it difficult to find many runners who did not know each other. In addition, anonymity was compromised because many of the focus group participants already knew one another (Stewart and Shamdasani 97), which may also have affected what the participants were willing to say during the discussions. In any case, it was unlikely that the discussion topic would have elicited sensitive information from any of the participants.

Yet another limitation was that the number of study participants in the current study was too small to be able to generalize the results to a larger population, which was a typical limitation for focus group studies (Morgan 44). In addition, the results may exhibit bias because most of the participants either had a college degree or were college students. In fact, most of the participants (64 percent) were college students, and all the non-college students had at least a bachelor's degree. However, this bias may be in line with previous studies, which have shown that people with less education and from lower socio-economic statuses have higher rates of physical inactivity (Oka 282, Giles-Corti and Donovan, "Socioeconomic" 601). Another limitation was the study's overwhelmingly white sample, despite recruitment efforts to people of many different backgrounds. As a result, the study results may not reflect the perspectives of people of different ethnicities or of different countries. Also, the study only recruited participants from a small university city in the southeastern U.S.; thus, the study may not account for runners' perspectives unique to other regions.

Furthermore, the nature of qualitative research and focus group research prevented the researcher from using the study's results to describe the views of the entire population of runners. Typical to qualitative studies, the researcher's biases affected every part of the study despite best intentions to avoid doing so. Also, the current study was the researcher's first experience conducting and moderating focus groups. As a result, the different focus group discussions may have been subject to inconsistent levels of moderator involvement as well as different levels of moderator bias.

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APPENDIX A
PARTICIPANT RECRUITMENT SCRIPT

Dear [individual or group being addressed],

I am a graduate student looking for volunteers to take part in my thesis research. I want to know more about what makes a street runner-friendly, and I'm looking for runners who would like to share with me their views on this topic. If you decide you would like to participate, I'll arrange a meeting on campus with you and five to seven other runners to talk about the topic together. This meeting would last about an hour, and that would be all that you would need to do for this study.

But if you don't mind more involvement in the project, you could instead run on a short running course here in Starkville that I have set up. Afterwards, you would discuss the course with some other people who have also run on that course. If you think you might be interested in participating, I can get you more information about the project. But first I'll need some information from you so that we can get in touch:

- Name
- Age (years)
- Contact information (email, unless you prefer to be contacted by your mailing address)
- Years of running experience
- In which part of Starkville do you most often run?

Any information you provide for this study will be kept strictly confidential. Only my thesis committee and I will have access to this information. However, please note that the records of this study will be held by a state entity and therefore are subject to disclosure if required by law. Research information may be shared with the MSU Institutional Review Board (IRB) and the Office for Human Research Protections (OHRP).

Thank you for your time,

Robert Jackson

Graduate Student
Department of Landscape Architecture
College of Agricultural and Life Sciences
Mississippi State University, MS 39762
662.312.7546 Phone
rj185@msstate.edu

APPENDIX B

COVER LETTER TO INTERESTED PARTICIPANTS



MISSISSIPPI STATE
UNIVERSITY™

DEPARTMENT OF LANDSCAPE ARCHITECTURE BOX 9725
MISSISSIPPI STATE, MISSISSIPPI 39762

Dear Prospective Participant,

Thank you for your interest in this study, which is one of the requirements for the completion of my graduate degree. In this project I am interested in researching the types of streets on which runners like to run. The findings from this project could be used in the future by city planners, city engineers, and developers to help make our communities more attractive places for outdoor exercise.

I would very much like your input about what makes a street runner-friendly, with a focus on your personal running routes. I am planning on conducting a focus group interview of six to eight people, which I will record with an audio device in order to have an accurate record of everyone's comments. The interview should last about an hour, and I will try to schedule it at a time and place that works best for everyone involved.

The next several pages are the informed consent information that the university requires I give you for participating in university-affiliated research. If you agree to participate in the study, you can sign the last sheet and return it to me when you get the chance. If you have any questions, please feel free to call me (662-312-7546), email me (rj185@msstate.edu) or write me. Thank you again for your interest in this project.

Cordially,

Robert Jackson

Graduate Student
Department of Landscape Architecture
College of Agricultural and Life Sciences
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APPENDIX C
INFORMED CONSENT SAMPLE FORM



Mississippi State University Informed Consent Form (You must be over 18 in order to participate.)

Title of Study: The built environment's influence on determining runners' exercise routes: findings from focus group discussions

Study Sites: Landscape Architecture Building (corner of Stone Blvd and Bully Blvd, behind Ballew Agricultural Information Science and Education Building), Mississippi State, Mississippi

Name of Researcher & University affiliation: Robert Jackson, Graduate student at Mississippi State Department of Landscape Architecture.

What is the purpose of this research project? The purpose of this research is to learn more about the types of street environments that runners prefer for their exercise routes. This study will also explore the effects of existing street environments on runners' choice of exercise routes.

How will the research be conducted?

If you participate in this study, you will be asked to take part in a group discussion with five to seven other people to talk about your experiences running on your regular exercise running routes. The audio of the discussion will be recorded to ensure accuracy of the discussion records. If there is anything else you would like to say but feel uncomfortable discussing in the group, feel free to talk with me in private afterwards. The discussion should last about an hour, and I will try to schedule it at a time that works best for everyone involved. The discussion will be in MSU's Landscape Architecture Building (corner of Stone Blvd and Bully Blvd, behind Ballew Agricultural Info Science and Education Building), and I will contact you with the meeting room location prior to the day of the discussion.

Are there any risks or discomforts to me because of my participation?

There is the risk that some of the other participants in your focus group discussion may speak about the discussion to others who did not participate in the group. I will remind everyone at the beginning and end of the discussion that everything that was or will be said should not be discussed outside the focus group. Beyond this statement I have no control over what participants may divulge to others outside the focus group discussion. However, I do not intend for the discussion to cover any sensitive information.

Does participation in this research provide any benefits to me or to others?

The findings from this study could be used by developers, city planners, or other policy-makers to make new and existing streets more runner-friendly.

Confidentiality

The audio record of the focus group discussion will be confidential. Only my thesis committee and I will have access to the audio recording and any written transcripts of the recording. The finished study will identify participants only by a number or letter, and any description of a participant will be worded in such a way that he or she cannot reasonably be identified in the study. Your contact information and any other identifying information will be stored on an encrypted excel file on the researcher's password-protected personal computer. As soon as the research finishes the phase of the study involving contact information and identifying information, this information will be permanently deleted. In the event that an audio recording of a discussion includes sensitive information of any type, it will also be stored on an encrypted drive.

There is a chance that your fellow focus group participants will speak about the discussion to others who were not in the group. I will make sure to tell all participants to respect each other's privacy and keep the discussion confidential. However, I do not intend for the discussion to cover any sensitive information. Please note that the records of this study will be held by a state entity and therefore are subject to disclosure if required by law. Research information may be shared with the MSU Institutional Review Board (IRB) and the Office for Human Research Protections (OHRP).

Whom do I contact with research questions? If you should have any questions about this research project, please feel free to contact me (Robert Jackson) at 662-312-7546 or rj185@msstate.edu. Since this is a student project, you may also contact my faculty advisor, Dr. Chuo Li, at 662-325-3012. For additional information regarding your rights as a research subject, please feel free to contact the MSU Regulatory Compliance Office at 662-325-3294.

What if I do not want to participate?

Please understand that your **participation is voluntary**, your **refusal to participate will involve no penalty or loss** of benefits to which you are otherwise entitled, and you **may discontinue your participation** at any time without penalty or loss of benefits.

Please take all the time you need to read through this document and decide whether you would like to participate in this research study.

If you agree to participate in this research study, please sign below. You will be given a copy of this form for your records.

Participant Signature

Investigator Signature

Date

APPENDIX D
THE DISCUSSION GUIDE

Good evening and welcome to our focus group session. Thank you all so much for taking the time to join us to talk about places where you like to run. My name is Robert Jackson, and I'm a grad student here at Mississippi State University, and I'm working on my master's degree in landscape architecture. I'll also be the moderator for this discussion, and help guide the talk.

You all were invited because you run for exercise here in Starkville, and I know that you all have a pretty good idea of the kind of places where you like to run and the places where you don't.

There are no wrong answers but rather differing points of view. Please feel free to share your point of view even if it differs from what others have said. Keep in mind that I'm just as interested in negative comments as positive comments, and at times the negative comments are the most helpful.

I'll use these results to help me finish my thesis. The findings here could be used to help city planners, city engineers, landscape architects, and other people to help make our towns more runner-friendly. There's already a ton of research about there about what makes a place pedestrian-friendly, but to my knowledge, there's not really anything out there about what makes a place runner-friendly. And it seems to me that a lot of times when I'm driving around Starkville, I see more people out running than walking, so it seems to be something important that someone should try to understand a little better.

You may have noticed that I'm recording the discussion. This is because I don't want to miss anybody's comments, and I can't write fast enough to record everything. Also, you can be assured of complete confidentiality—no one's name will be used in any report. And also, since I'm recording the conversation, we need to make sure that we only

speaking one at a time. Also, feel free to talk to one another—this isn't just about me speaking individually with each one of you.

Well, let's begin. Let's find out some more about each other by going around the table. Tell us your name and what you do here in Starkville.

Demographic Questionnaire: (They'll fill this out on a sheet of paper while we're waiting on everyone to arrive to the meeting)

- Name
- Age
- Race
- Number of years that you've been running

The Question Guide:

1. Tell us your name and what you do here in Starkville.
2. How did you get started running? (or "What's your main reason for running?")
3. Think back to some of your favorite places in Starkville to run. What do you like about these places? (Then I'll ask probe questions)
4. Think back to some of your least favorite places in Starkville to run. What were some of your experiences that made you dislike these places? (Then I'll ask probe questions)
5. Imagine you're in a new town and you are looking for a place to go for a run. What kinds of things will you be looking for? (Then I'll ask probe questions)
6. Out of all the things we've discussed, which are the most important to you?
7. Is there anything else on this topic that we haven't discussed, but you think should be mentioned?

Sample Probe Questions:

- What are the reasons for...?
- I don't understand...help me out?
- What made you do that?
- What really happened?
- Could you please explain more?
- Please tell me more about...?
- Can you give me an example of...?