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MOBILE INTERACTIVE FITNESS TECHNOLOGIES AND THE RECREATIONAL EXPERIENCE OF BICYCLING: A PHENOMENOLOGICAL EXPLORATION OF THE STRAVA COMMUNITY

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ABSTRACT

Technology is now embedded in many aspects of daily life. Over the past few years, fitness related smartphone applications have steadily grown in popularity. Despite the prevalence of technology in recreation and leisure experiences, the topic remains to be thoroughly examined from a qualitative interpretive viewpoint. The purpose of this phenomenological study was to understand and describe how cyclists use and experience Strava—a GPS enabled smartphone application that tracks bicycle rides and uploads the data to an online community of other users. Particular attention was given to user motivations, affordances of the technology, and notions of community.

After participant observation and in-depth qualitative interviews with 11 Strava users, the following five theme clusters emerged: (1) *King of the Mountain*, (2) *Ethical Dilemmas*, (3) *A Social Technology*, (4) *An Emotion-Laden Experience*, and (5) *An Augmented Experience*. In summary, this thesis offers an accurate portrayal of the lived experience of bicycling as mediated by the interactive fitness technology of Strava. The project concludes with suggestions for areas of future research, as well as implications for health practitioners and technology manufacturers.

*Key Words: Strava, Bicycling, Technology, Smartphone, Mountain Bike, Cycling, Recreation, Fitness*
DEDICATION

This master’s thesis is dedicated to all of the interview participants that made this project possible. Many participants sacrificed time out of their busy schedules to help make this project a reality. The cycling community is truly a great one.
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TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Research Overview</td>
<td>5</td>
</tr>
<tr>
<td>II. REVIEW OF LITERATURE</td>
<td>6</td>
</tr>
<tr>
<td>Cycling History</td>
<td>6</td>
</tr>
<tr>
<td>Technology and Fitness</td>
<td>12</td>
</tr>
<tr>
<td>A Brief History of Interactive Fitness</td>
<td>17</td>
</tr>
<tr>
<td>Technologies</td>
<td>25</td>
</tr>
<tr>
<td>Theoretical Perspective on Technology</td>
<td>29</td>
</tr>
<tr>
<td>Summary</td>
<td>31</td>
</tr>
<tr>
<td>III. METHOD</td>
<td></td>
</tr>
<tr>
<td>Epistemological Considerations</td>
<td>31</td>
</tr>
<tr>
<td>Research Question</td>
<td>34</td>
</tr>
<tr>
<td>Data Gathering: Qualitative Interviews</td>
<td>35</td>
</tr>
<tr>
<td>Data Gathering: Observational Research</td>
<td>38</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>39</td>
</tr>
<tr>
<td>Reflexivity and Validity</td>
<td>40</td>
</tr>
<tr>
<td>Conclusion</td>
<td>42</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td></td>
</tr>
<tr>
<td>Significant Statements in the Data</td>
<td>44</td>
</tr>
<tr>
<td>Theme 1: King of the Mountain</td>
<td>48</td>
</tr>
<tr>
<td>Theme 2: Ethical Dilemmas</td>
<td>57</td>
</tr>
</tbody>
</table>
Table of Contents (Continued)

Theme 3: A Social Technology ......................................................... 62
Theme 4: An Emotion-Laden Experience ......................................... 65
Theme 5: An Augmented Experience .............................................. 69
Conclusion ..................................................................................... 71

V. DISCUSSION AND IMPLICATIONS .............................................. 72
   Discussion .................................................................................. 72
   Limitations of this Study and Directions for Future Research ....... 90
   Implications of this Study .......................................................... 94
   Conclusion .................................................................................. 96

APPENDICES .................................................................................. 98

A: Images ....................................................................................... 99
B: IRB Expedited Informed Consent Document ............................ 100

REFERENCES .................................................................................. 102
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Selected Examples of Significant Statements of Strava Users</td>
<td>46</td>
</tr>
<tr>
<td>2.1</td>
<td>Example of Five Theme Clusters With Their Associated Formulated Meanings</td>
<td>47</td>
</tr>
</tbody>
</table>
CHAPTER ONE

INTRODUCTION

What was once a busy railway in Greenville, South Carolina has been converted into the city’s prized Swamp Rabbit Trail, a 17.5-mile long multi-use trail. Scott\(^1\) leisurely pedals his road bicycle along the mixed asphalt and rubber greenway, weaving around pedestrians and passing slower bicycles. Scott continues this leisurely rate while meandering across creeks and crossing larger highways, all the while being careful not to overexert himself. Slowly, he begins to pick up his speed, shifting all the way to his largest front chain ring. He is rolling at near top speed. Once Scott passes over Duncan Road, he is up, out of the saddle, in a full-on sprint down the trail. After two and a half minutes of sustained sprinting, Scott settles back into his seat while gasping for air. The remainder of Scott’s ride is uneventful. Once he pulls into the trailhead parking lot, Scott is quick to retrieve his iPhone from his form fitting lycra jersey pocket. He quickly tells his Strava application to stop recording and anxiously waits to see if his efforts paid off. Did he win the best time on the segment? Did he beat his own record? Did he set a new distance record?

In this thesis, I am concerned with the recreational experience of bicycling as mediated by the smartphone tracking application Strava. In the story presented above, this was Scott’s third time attempting to set a record. He stated, “I got too tired like, you’re, when you are doing it, and you are going too fast like you know, like that

\(^1\) Pseudonym. This is a dramatized story reconstructed from an interview I conducted with a road cyclist and Strava user.
throbbing sensation in your head, you are going too fast, no oxygen that’s what I got like, so I had to stop or else I would faint.” While Scott’s story is merely one account of several interviews that I conducted with road cyclists, I aim to examine how both mountain bikers and road cyclists experience bicycling with the use of this technology.

Communication scholars often refer to new media as “ubiquitous” (Lievrouw & Livingstone, 2002). New media, for the purpose of this study, can be understood as a blend of mobile, interactive, and networked communication devices. In this project I am examining a particular form of new media that I have begun to term interactive fitness technologies (IFTs). IFTs are wirelessly enabled technological devices that track and record user fitness data for uploading to an interactive online community of other users.

Lang and Lang (2010) describe the prevalence of new media by stating, “no one, not even those who scorn them, can altogether escape their influence” (p. 998). The mainstreaming of new media technology leads scholars to a dual view of these technologies. Often, emerging technologies are either promised to revolutionize human communication and daily life, or become a detriment to society. Buckingham (2006) agrees writing, “new technology is often invested with our most intense fantasies and fears. It holds out the promise of a better future, while simultaneously provoking anxieties about a fundamental break with the past” (p. 75). A large body of literature has developed that both explains and critiques the ubiquity of technology in everyday life and culture. Despite this large collection of literature, there remains a dearth of qualitative scholarship on how the technological development of smartphone fitness applications merge with a person’s experience of recreation, health, and well-being.
The sport of cycling is an excellent example of how technology meets health and recreation. Professional and amateur riders alike use anything from a helmet camera to smartphone GPS tracking applications. Whether road cycling or mountain biking—technology pervades the sport. This thesis is a qualitative phenomenological study of how mobile technologies mediate and alter the recreational experience of cycling, as well as how users perceive and utilize the affordances of the technologies.

It is important for scholarship to study technologies with an eye toward potential health benefits. In 2001, Surgeon General David Satcher famously declared that the United States suffered from an obesity epidemic, an epidemic that has only grown over the following decade (Willis, 2006). According to the National Center for Health Statistics (NCHS), more one-third of adults and 17% of children are considered obese. Obesity is caused by a lack of exercise and poor diet. Obesity can increase the risk of a number of health conditions, including hypertension and type 2 diabetes (NCHS, 2012). Countless studies have proven that cycling helps reduce the risks of various cancers, increases cardiovascular and cardiorespiratory health, and promotes weight loss (Oja et al., 2011; Lusk, Mekary, Feskanich, & Willett, 2010). Cycling can also contribute to overall well-being, including mental health (Barbour, 2013). Community-based and social marketing campaigns have attempted to target the obesity problem, however, Walls, Peeters, Proietto, and McNeil (2011) argue, “there is sparse evidence that even the most well-designed of such interventions are effective at addressing obesity, either weight gain or maintenance, and virtually none that they are sustainable in the long term” (p. 2). This technology could potentially fill a gap where traditional public health
campaigns have failed to properly motivate people to exercise. Given that cycling provides multiple health benefits, it is essential to study technologies that can help to combat obesity and promote overall well-being.

This project is much more complex than a simple use/effect study of mobile technology. I treat recent technological innovations in use by cyclists as a historically situated and socially constructed phenomenon. This view is in line with the social shaping of technology (SST) (MacKenzie & Wajcman, 1999) and social construction of technology (SCOT) perspectives (Bijker & Law, 1992). By employing these views, I am accepting that interactivity between cyclist and technology is non-linear, meaning the users do not simply adopt technology; they play a part in shaping it. The technological artifact of an IFT can also have different meanings for different groups.

The purpose of this phenomenological study was to understand and describe how cyclists use and experience Strava—a GPS enabled smartphone application that tracks bicycle rides and uploads the data to an online web platform of other users. At this stage in the research, I am concerned with how the introduction and use of these technologies alter the lived experience of recreation for groups of cyclists. Particular attention is paid to how users describe their motivations for use or disuse of the application. I chose to analyze the Strava application as opposed to other fitness applications, such as Map My Ride, for two reasons. First, Strava has a high number of users in the Southern United States—where the study was conducted. Second, my position as an avid Strava user benefitted the study. Being familiar with Strava not only made it easier to research, but allowed me to use my existing Strava profile to find participants for the study.
Research Overview

The purpose of this study is to investigate how users experience recreation when mediated by an interactive fitness technology (IFT). The IFT under study is Strava—a GPS enabled smartphone tracking application that uploads visual and numerical data to an online community for sharing, comparing, and competing with other users. The research question guiding this study is: What is the essence of experience of mountain biking with Strava?

The remainder of this thesis is comprised of four chapters. Chapter two is a review of literature related to the phenomenon under study. The literature review chapter entails: (1) cycling history; (2) technological developments that make interactive fitness technologies possible; (3) a brief history of interactive fitness technologies; and (4) the theoretical perspective of technology I utilize.

In chapter three, I specify my research goals and detail the methods I used for this research project. The first section of the methods chapter will situate this inquiry epistemologically, the second concerns the research question, and the third section details the methods of data collection and analysis utilized for this inquiry. In chapter four I present the five themes that emerged from qualitative interviews. Chapter five discusses the findings, limitations, directions for future research, and implications for various social groups.
CHAPTER TWO
REVIEW OF LITERATURE

This chapter provides an overview of the theoretical perspectives and related research that frame this study. This literature review also charts the merger of fitness and technology so as to better understand the state of the field and where my claims fit within this field. This research project, as well as literature in this review, is highly interdisciplinary. While some research is based in the communication discipline, connections can be drawn to the psychology field and business marketing fields. One could venture several different directions in charting the history of technology’s assimilation into the health world. I concentrate this review on literature surrounding technology, fitness, and the theoretical lenses used in this study. This chapter proceeds through the following sections: (1) Cycling History (2) Technology and Fitness, (3) A Brief History of Interactive Fitness Technologies, and (4) Theoretical Perspective on Technology.

Cycling History

In this first section, I begin by taking a brief look at the history of the bicycle. The historical section of this chapter details both road and mountain biking. This brief history serves to place cycling within a context of technological developments. Then, I cover some characteristics of the “experience” of road and mountain biking.

Beginnings. This thesis is focused on the recreational activity of bicycling, so I will first provide a historical account of the sport’s formation. The first common bicycle was introduced in Paris in the 1860s. This bicycle was the result of years of
experimentation with human powered transportation. Prototypes such as the velocipede, a kick driven cycle, helped lead to the “boneshaker”—a fixed gear primitive cycle (Herlihy, 2004). By 1896, more than a million bicycles were produced in the United States (Herlihy, 2004, p. 5). The development of the bicycle is so influential that Rosen, Cox, and Horton (2007) label it as “the most exciting and influential technological development of the nineteenth century” (p. 49). The bicycle represented many different things to people—a method of transport, a new skill to learn, modernity, social status, and a potential career as a professional cyclist (Rosen, Cox, & Horton, 2007).

In the 1920s technological developments such as freewheels, brakes, hub gears, and lights, as well as a drop in price, helped to increase the bicycle’s popularity. Over the next several years, the bicycle’s popularity fluctuated in the United States. While the bicycle remained popular in Europe, American’s often viewed the bicycle as a child’s toy. Today, there are many different types of cycling. For example, racing, utility, commuter, leisure, mountain biking, and cycle touring are just a few of the ways bicycles are utilized (Rosen, Cox, & Horton, 2007). In this study, I examine road cycling and mountain biking in particular. Throughout this thesis I speak of the act of cycling in terms of sport and recreation. To clarify these terms for the reader, I group cycling activities together in this way because I am examining both. Cycling can be both a competitive sport, as well as a recreational activity for fitness.

**Road cycling.** For the purpose of this study, I am defining road cycling as distance bicycling on paved roads, primarily for fitness rather than utilitarian needs. This definition purposely excludes urban commuters and leisurely neighborhood riding. Prior
to WWII, cycling in the United States was the most popular sport second only to baseball (USA Cycling, 2004). The sport became even more popular in the United States by the late 1960s, thanks in part to the ‘ten-speed boom.’ Having a lightweight and ergonomic bike with ten speeds allowed cyclists to cover greater distances in a shorter amount of time.

The discipline of road riding draws heavily from the spirit of competition, meaning the sport developed through competitive events. International road races such as the Paris-Roubaix World Championship, Olympic Road Racing, and the pinnacle of road cycling—The Tour de France, all lend great exposure to the sport (Tarr-Kent, 2011). USA Cycling, the national governing body for US bicycle races, seeks to promote the sport of road cycling through competitive events. The organization has 70,800 licensees with close to 90% of the members being male (USA Cycling, 2012; USA Cycling, 2013).

**Mountain biking.** The birth of mountain biking can be traced back to the 1970s counter-culture of San Francisco. Seeking an outlet from organized road racing, pioneers of the sport modified their road bikes into machines capable of riding the hilly terrain surrounding the bay area. Pioneers such as Gary Fisher and Joe Breeze would experiment on stock bicycles with different braking and gearing combinations until they found an adaptation to be more suitable to the terrain. These adapted and modified bikes were known as “clunkers” (Savre, Saint-Martin, & Terret, 2010). Off-road bicycle racing helped to advance the development of clunkers by testing the modifications in a competitive environment.
In 1978, the Marin County pioneers collaborated with another group of off-road cyclists in the mountainous terrain of Crested Butte, Colorado. According to Savre et al. (2010), “The two approaches were complementary and soon formed the foundations of the identity of the mountain bike: challenge, rivalry, and sharing the pleasure of nature in the mountains” (p. 1950). Gary Fisher, Charles Kelly, and frame builder Tom Ritchey opened the first shop where you could purchase a purpose-built mountain bike. In just two short years, production boomed from 200 units to 2,000 units and the bicycles became more accepted as a mainstream sport and recreational activity (Savre et al., 2010).

By the early 1980s two large Japanese companies, Shimano and Suntour, took interest in developing mountain bike specific shifting components and parts. The competition between the companies led to faster development of more reliable parts. All of the major American and foreign bicycle manufacturers got on board with the mountain bike craze and production boomed. From 1980 to 1990 the number of mountain bikes sold per year in the United States jumped from 300, to an astonishing 7,000,000, becoming the third most popular recreational sport (Savre et al., 2010, p. 1945). The rapid growth of the sport gave birth to multiple mountain biking magazines, organized off-road races, and more affordable bicycles (pp. 1957-1958). The welcoming of mountain biking into the 1996 Atlanta Olympic Games provided extensive exposure and helped to cement cross country mountain biking as a popular sport (Savre, Saint-Martin & Terret, 2009).
As such, mountain biking has evolved into a multifarious sport, engaging almost 40 million participants annually (International Mountain Bicycling Association, n.d). A survey conducted by the Outdoor Foundation (2013) indicates that when considered in combination, mountain, BMX, and road biking are second only to running and jogging as the most frequently participated in outdoor activity (pp. 4-6).

**Experience.** Both road and mountain biking encompass a different type of recreational experience. While offshoots of each genre of riding—freeride, downhill, trials, dual slalom, triathlons, and cyclocross, for example—each embody slightly different cycling experiences, this paper focuses on cross-country (XC) mountain bikers and road bikers.

Road cyclists in general are more concerned with structured and rigorous rides. These rides are experienced less for the sense of pure enjoyment and conducted with a more specific purpose, usually training for a race (Roop, 2010). Road riders also experience community, as Roop states, “the group ride is the cornerstone event that binds all aspiring racing cyclists” (p. 5).

The mountain biking experience stands somewhat in contrast to road cycling. Dodson (1996) states “a sense of freedom is often associated with riding—freedom from the hassles and stresses of everyday life as you become absorbed in the ride and focus on your bike, the trail, and your body” (p. 317). Others have described a similar feeling as “flow” (Taylor, 2011, p. 267). Feeling flow is characterized by intense concentration, immediacy, in the moment, and riding without time for conscious processing (Taylor, 2011). Flowy or flowing are also descriptors of trails that allow a rider to keep rhythm
and experience the feeling of “flow.” Some also ride mountain bikes to experience the “buzz” or “thrill” that accompanies higher risk recreation, while others simply desire to escape into wilderness (Taylor, 2011). Road biking and mountain biking share the experiential traits of self-testing and challenges. The two aspects differ slightly between the two disciplines. A road rider may be more concerned with reaching quantitative goals, whereas a mountain biker often strives to complete a technically difficult climb over roots and rocks (Roop, 2010; Taylor, 2011).

It is important to note that recreational experiences, beyond cycling even, should not be conceptualized in static terms. Hull, Stewart & Yi (1992) began looking at hikers’ experience patterns throughout a hike to probe into the dynamic nature of a recreation experience. After analyzing 90 hikers at 12 different points along the hike, they found that “hikers differ from one another in their on-site experience but cluster into distinct, homogenous groups” (p. 240). Similarly, I would suspect that experience patterns for cyclists would differ between climbs, descents, and scenic vistas, as well as on different types of rides overall and between people who are motivated to ride for different reasons.

I have provided a short history of bicycling for two reasons; to relate the role technology has played in cycling development, and to establish cycling as an activity worthy of study. First, by covering some of the user-led innovation within the cycling world I situate this study within a larger framework of technological developments. The “theoretical perspective of technology” section of the literature review will further detail how the early bicycle is a form of a socially constructed and shaped technology. Second, this introduction demonstrates that while cycling may not be as popular as team sports,
the activity still has a lengthy past and a significant portion of society engages in the activity.

**Technology and Fitness**

The purpose of this section of the literature review is to plot out the merger of technology and fitness, and to explain how Strava and this research project fit with the overarching conversations about the history of technology and fitness. This section provides brief historical information on mobile technologies because they are the backbone of Strava. Before jumping into the technological side of this project, I will explain my use of the term ‘fitness’ as compared with and against health or well-being.

**Fitness.** Throughout this report I am speaking of recreational experiences, health, fitness, exercise, physical activity and well-being. Often times in academic studies and public discourse these terms are confused with one another, or used interchangeably. Caspersen, Powell, and Christenson (1985) attempt to clarify the terms by defining fitness as, “a set of attributes that are either health or skill-related. The degree to which people have these attributes can be measured with specific tests” (p. 126). Caspersen et al. (1985) propose that fitness can be measured through body mass, flexibility, and muscular strength and endurance, to only name a few criteria. Since 1948 The World Health Organization has defined health as, “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1948). Therefore, health is more than just existence; it is living life to the fullest both mentally and physically. Others have criticized the WHO definition for being utopian, inflexible, and failing to take into account changing disease patterns and excluding those who have
no choice other than to simply cope and live with chronic disease (Smith, 2008; Saracci, 1997).

I conceptualize fitness similar to the WHO definition of health, but slightly different than Caspersen et al. (1985). Fitness can be understood as more than just being in good health. When I use the term ‘fit’ or ‘fitness,’ I am referring to a state of not only sound mental and physical health, but also the ability to carry out daily tasks and recreational activities with energy and vigor. To be ‘fit’ means engaging in physical exercise and activities that will lead to a better state of being.

**GPS.** The advent of portable technology is crucial to the operation of Strava. The ability “to Strava” would not exist without highly advanced and portable technologies. Several different technological developments such as wireless transmissions, radar, and cellular telephony, led to the mobile technologies that Strava relies upon. Perhaps one of the most critical of those is GPS. The tracking and mapping function of Strava owes a debt of gratitude to one crucial development—the satellite. The 20th century ushered in the age of space exploration, paving the way for satellite communications development. In 1957, the Soviet Union launched the first ever satellite, Sputnik I, which initiated a “space race” between the United States and the Soviet Union (Bonnor, 2012; Ilcev, 2010). This first satellite “marked the beginning of the use of artificial Earth satellites to extend and enhance the horizon for radio communications, navigation, weather monitoring and remote sensing” (Ilcev, 2012, p. 70). The U.S. Navy developed Transit in 1964, the first satellite based navigation system. In 1996 after a full 30 years of service the Transit system was switched off and operations began on the system we use today;
Global Positioning System (GPS).

GPS relies on space-based satellites to constantly relay a ground user’s position. When it was first developed GPS, was so accurate that errors had to be introduced into the calculations to prevent unauthorized and civilian users from having such precise technology. These artificial errors obfuscated the signal within 100 meters of the location—“adequate for navigation but not useful for weapon delivery” (Getting, 1993, p. 45). Today GPS is widely utilized by the military and civilians alike. Kushki, Plataniotis, and Venetsanopoulos (2012) attribute the widespread implementation to mobile computing:

The maturation of wireless communication and advances in microelectronics have given birth to mobile computing devices, such as laptops and smart phones, which are equipped with sensing and computing capabilities. The mobility of these computing devices in wireless networks means that users’ communication, resource, and information needs now change with their physical location. (p. 12)

Smartphone users now carry around GPS technology of a high enough quality that functions can move beyond a mere navigational purpose.

Cellular telephony. Indeed, one of the greatest mobile technology advances is the smartphone. The smartphone is so influential that in 2011 IEEE Spectrum, a leading technology industry publication, listed the smartphone as the top technology of the decade, followed closely by social media (Romero, 2011). Before discussing the implications of the smartphone, it is necessary to review the wireless networks that made the smartphone possible.
Wireless and mobile communication dates back well over a century, to when Guglielmo Marconi completed the first transatlantic Morse code transmission (Raychaudhuri & Mandayam, 2012; Kushki et al., 2012). By 1971, the first radio communications network was developed at the University of Hawaii (Seymour & Sheheen, 2011). In 1983, AT&T’s Bell Labs’ developed and implemented the first cellular telephone network in Chicago (Frenkiel, 2010). The name “cellular” was adapted as a reference to the 6-12 mile wide hexagonal shaped coverage areas used to divide up a larger service area (Wikle, 2002). The visual impact vast towers have on the landscape has led to opposition by citizen led groups. In some states cellular transmitters are hidden in artificial trees, cacti, flagpoles, church steeples and imitation grain silos (Wikle, 2002).

By 2005, third generation (3G) and fourth generation (4G) wireless service developments enabled greater computing ability and mobile Internet access (Raychaudhuri & Mandayam, 2012).

In 1993, IBM became the first company to introduce a smartphone—The Simon. The Simon was a bulky touch screen phone with a calendar, address book, calculator and fax capabilities. Following IBM’s release were several others such as the Nokia 9000 Communicator (1996), RIM Blackberry 6210 (2003), Palm Treo 600 (2003), and the Apple iPhone (2007), which is said to have “immediately obliterated the competition” (Romero, 2011, p. 30). Romero (2011) states that the smartphone is remarkable because it affords the ability “to carry the full contents of the Web in your pocket, as well as a telephone, a camera, a radio, a television, and a navigation system” (p. 28)
technology is said to have changed daily life over the past decade more than any other technology.

Web enabled phones have changed how people connect with one another. The smartphone user has several options for connecting with others that move beyond a simple phone call. By installing applications, commonly referred to as “apps,” users can perform many different tasks. Harty (2010) defines applications as “the software used by the user on the device . . . the application may be written to run on the mobile device or take advantage of existing software on the device such as a web browser” (p. 1).

One of the key differences between a smartphone and a regular cellular phone is the smartphone’s ability to access the Internet, and the ability to download and install applications. A smartphone application can do something as complex as provide driving directions—to something as simple as check a bank statement or provide mindless entertainment (“Smartphone,” n.d.). Some have even stated that smartphones could become cognitive due to advancements in sensor technology (Campbell & Choudhury, 2012). By 2009, the number of wireless communication technology subscribers worldwide reached 4.6 billion (Daim & Kim, 2010).

Strava is an example of application-based technology that is designed to utilize the features of a smartphone, as well as the GPS functionality of a Garmin GPS unit. A user engages Strava through not only his or her gadget, but also through an online web platform. The online web platform contains quantitative data about the user’s activity.

It is important to note that when speaking of all the aforementioned cellular telephone features, the reader should bear in mind that what the cell phone actually
means and does for the owner varies. For example, Wallis (2011) conducted an extensive ethnographic study of young migrant women in Beijing, China. Wallis investigated claims that a cell phone could provide new social and economic opportunities to the service sector workers. The study revealed that a cell phone afforded several different things between participants. Some used the phone for entertainment and networking, whereas others saw the phone as enabling employers to monitor and control their life outside of working hours. In a similar fashion, Castells (2009) asserts, “we know from the history of technology, including the history of the Internet, that people and organizations end up using technology for purposes very different from those initially sought or conceived by the designers” (p. 2). These examples of technology use are helpful to keep in mind while reading the theoretical perspective on technology section.

**A Brief History of Interactive Fitness Technologies**

By my definition, IFTs are wirelessly enabled technological devices that track and record user fitness data for uploading to an interactive online community. A large component of Strava and other interactive fitness technologies is tracking. The roots of tracking and recording fitness data can be traced as far back as the 15th century to the first mechanical pedometer, conceptually developed by Leonardo Da Vinci (Tudor-Locke, 2002). A pedometer is a device that records and measures steps taken—some advanced versions record energy expended and distance traveled (pp. 2-3). In 1965, the first pedometer became commercially available in Japan and was marketed as “manpo-meter” (p. 2). The pedometer has since developed into a more sophisticated device that is detailed in the mobile fitness section of this report.
Another of the first electronic technological innovations to couple with fitness activities is the television. “Stop, look, and listen!”—the four words opening *The Jack LaLanne Show*—started the in-home fitness television show boom. Jack LaLanne was the first person to have a nationally syndicated exercise show on television that encouraged women, the elderly, and athletes to workout with weights (‘Firsts—Jack LaLanne Official Site’, n.d.). This 50s television show featuring bodybuilder Jack LaLanne set the stage for fitness stars like Richard Simmons, Jane Fonda, and Tony Little. With the invention and widespread use of VHS came the in-home workout video. The mid-90s saw the rise of the 30 minute fitness show within the 7:00-8:00 a.m. morning primetime slot. Family Channel, ESPN2, FiTTV, and Lifetime all offered fitness programming around the clock. In 1996 FiTTV had over 11.6 million subscribers to their fitness programming (Lytle, 1997). Martial arts guru and Tae-Bo inventor Billy Blanks eventually moved from the tape format to a cable subscription format. For $3.99 one could receive 16 Tae-Bo workouts a month through his/her cable television (Riley, 2000).

Recently, popular music videos on the Internet have transformed into a new way to workout. The wildly popular music video for South Korean pop star Psy’s *Gangnam Style* has been adapted into a form of exercise for in-home or group class exercise (“Get Fit Gangnam Style,” 2012, n.a).

Technology is also being used in the video game world to promote fitness activity. As Nadler (2008) writes, “Across the United States, a veritably new health phenomenon is taking hold: Exergaming” (p. 28). A nice mash up of exercise and gaming, exergaming refers to technologies that incorporate physical activity into games.
Common exergames include Dance Dance Revolution, Wii Fit, virtual boxing, and stationary bicycles digitally linked to other bicycles for competition. Nadler (2008) predicts “in less than half a decade, well stocked gym classes could feature rows of TV-screen equipped treadmills on which students race against one another in a massive multiplayer world” (p. 29).

Utilizing Nintendo Wii fit technology, Jacobs et al. (2011) tested how effective the exergaming technology was on motivating five female college students to lose weight. Results of the study indicated that motivation to exercise could be increased by the use of exergaming technology and suggest implementation into the occupational therapy field (Jacobs et al., 2011). Recently, other scholars have found touted effects of exergaming may be overstated (Marcus, 2012).

**Recent innovations: Fitness Applications.** The type of interactive fitness technology this research report will study is what I call the “fitness application” or “fitness app.” Over the past few years, a multitude of apps have been developed to track and help users in their recreational and exercise activities. Apps have emerged for activities ranging from paddling and cycling to weightlifting and running. As of writing, the Apple App store holds 258 apps within the “health and fitness” category. *Market Research Insight* reports that, “Among consumers who have downloaded a health and fitness application, 51% chose a nutrition application while 36% reported downloading a fitness application for their workout regimen” (A Healthy Trend, 2012, pp. 10-11).

Most fitness apps differ in how the user interacts with them. Some apps are what I will term, for the purpose of this research paper, “static” apps. A static app’s main
characteristic is its ability to store user-inputted data and provide generic information to the user, but the app itself does not actually automatically track anything for the user. An example of a “static” app would be the bodybuilding.com weightlifting app. The user of the app can ascertain information from the app such as a database of exercises that cater to specific body parts, how to perform the exercise, and the repetition range they should perform to achieve desired results. The user also provides information to the app as a sort of logbook for what exercises they performed. This logbook proves useful when the user returns to the gym the next day or week. Calorie counting apps are another type of static app. The users input their daily meals and caloric intake, and the app also logs the users weight. Most of the “static” apps are confined to operating on a smartphone. The next section looks at how smartphone applications can more actively engage a user, and merge with an online community to qualify as an “interactive” fitness app.

There are a multitude of applications that can be operated via web platform, as well as through the smartphone. Most of these apps seamlessly connect with existing social media profiles, so that creating a new user profile is extremely simple. One such example of an online community merging with fitness technology is Fitocracy. Thum (2012) describes Fitocracy as a “social game that allows users to track, improve and expand their real-life physical fitness” (p. 41). The “tracking” part of the description refers to manually tracking and reporting data. This differs from the GPS tracking that characterizes Strava, which can be accomplished automatically by priming the app and synchronizing one’s phone with the Strava web platform. Thus we can distinguish Fitocracy as more of a “static” app with a built in social community aspect, and Strava as
a more thoroughly “interactive” app. Fitocracy users log points for completing exercise activities. After achieving so many points they are able to “level up,” which is similar to achieving a new level of a video game (Jacobs, 2012, p. 50; Thum, 2012). Users of the site can complete quests for more points, join groups, give encouragement, and converse with other site users.

Fitbit takes Fitocracy one-step further by incorporating additional automatic tracking hardware. To use this technology a user purchases the small Fitbit gadget that clips onto a user’s clothing. Jacobs (2012) describes Fitbit as a “soupied-up pedometer” (p. 50). The pedometer is not “smart,” in that it is not Internet or GPS capable, but it is able to track steps, distance, calories burned, stairs climbed, and even your sleep cycle.

Perhaps the most striking recent development in fitness technology is the 2013 Recon Jet sunglasses (jet.reconinstruments.com). Time Magazine technology writer Doug Aamoth describes the technology as “google glass for jocks” (2013, para. 1). The Recon Jet is essentially a microcomputer mounted to the bottom portion of a pair of polarized sunglasses. The device is Wi-Fi and GPS capable with a built in camera and speaker for capturing the user’s activity. A user can connect his or her smartphone with the device and run third party applications. Released in June 2013, a full list of supported applications is not yet available. However, the device will likely integrate with Strava because it is marketed to endurance athletes, particularly runners and cyclists.

Research studies have been conducted outside of the communication studies field that concern smartphone use in promoting health activities. Kratzke and Cox (2012) have looked at the way smartphone applications are being used in the health and medical field.
While not necessarily a cycling related article, their work still details relevant ways that healthcare professionals are using, and possibly will use, smartphone application technology (Kratzke & Cox, 2012). Kratzke & Cox also state that future FDA regulation of some 17,000 medical apps is likely (p. 81).

Fukuoka et al. (2011) found that health apps have the ability to initiate positive physical change in sedentary women. The researchers provided pedometers to a group of 192 inactive participants and then subdivided a random control group that used only pedometers. The remaining group had access to a smartphone app that provided activity goals, an activity diary, and immediate feedback for social support. Participants with the smartphone application would receive encouraging messages of varying intensity based on the amount of activity minutes logged. While the study did find that application use increased physical activity, the authors were careful to note the limitation that the pedometer “is unable to capture and record physical activity data from bicycling, swimming or yoga” (Fukuoka et al., 2011, p. 7). Other research studies found that diabetes patients were more likely to adhere to their medication plan when sent text message reminders over their smartphones (Vervolet et al., 2011).

One of the most recent smartphone enabled technological developments being tested in healthcare is sensor-laden clothing. A “smart shirt” is outfitted with electromyography and heart rate sensors in order to monitor stroke victims at-home rehabilitation programs (Farjadian, Sivak, & Roidis, 2013, p. 1). As the previous studies have shown, interactive fitness technologies can initiate positive health behaviors for the user. These fitness applications could hold certain implications for the field of health
Strava. This section will provide a description of the technology phenomenon being studied. Named from the Swedish word “to strive,” Strava is built to help cyclists and runners track their progress. According to Strava’s own website, “Strava lets athletes all over the world experience social fitness—sharing, comparing and competing with each other’s personal fitness data via mobile and online apps” (“About Us”, Strava Official Site, n.d.). The company is careful about disclosing exactly how many users they have, or their annual revenue, but in an interview with CEO and Co-founder Mark Hovrath on cyclingtips.com, Hovrath alludes that the company hopes to hit the million users mark soon (Strava—From the Beginning, 2012). Throughout the research report a distinction can be drawn between “user” and “subscriber.” The basic Strava application is free for “users,” a subscriber is someone who upgrades the app and pays for additional features, such as filtered leader boards, power analysis, and detailed heart rate analysis.

While Strava also allows users to track their runs, I narrowed my focus to the cycling aspect of the app. I restricted my inquiry to the cycling portion of the application for two reasons. First, given the time and resource limitations of this study, it is out of reach to investigate runners and cyclists usage of Strava. Second, I am more concerned with the subjective experiences of cyclists. A runner likely has different motivations for why they run, as well as experience patterns that differ from cyclists.

To better understand the Strava app, I will provide a brief synopsis of how a typical cyclist uses the app. There are two different devices a cyclist can utilize with Strava. The first, and most common method, is a smartphone-based application. The
second would be a designated GPS device such as a Garmin. When setting out on a training ride a cyclist will activate the Strava app so that it begins GPS recording where they ride. After the ride is completed Strava uploads the data to the user’s profile on the Strava website where the user can view his/her progress.

Once the data is on the website the cyclist can see if they have set a fastest time record on a particular stretch of their ride, or bested their own personal record (see Appendix A, Figure A-1). Other users within the online community create public or private segments from their ride. Segments are stretches of road or trail that others can see and compare their own performance against. The segments page shows a map and how the user ranks against other users who have ridden the same route. If a cyclist holds the fastest time on a given segment, they are crowned “King of the Mountain.” The Golden Gate Bridge Climb in Mill Valley California is the most popular segment, with over 23,000 cyclists recording a ride on this climb. Users can follow other users and accept cycling “challenges.” Challenges usually involve having the user complete x number of miles in x number of days and sometimes have a large corporate sponsor.

Examining the rhetoric of exercise, Rich (1996) states that “the story is that measurable success breeds more success…we become convinced that there are no alternatives to numbers,” valid points that I will examine when detailing my research questions of Strava (p. 266).

The Strava user has a profile that they customize with photos and information such as what type of bicycle they ride and what type of mechanical components they use (see Appendix A, Figure A-2). Users can follow other users to see how fast and far other
cyclists are riding. If a user notices a particularly commendable cycling accomplishment they can give “kudos,” similar to hitting the “like” button on other social networks. Several professional cyclists use Strava and have a large fan base of followers. An average weekend rider can see how their fitness level compares with that of a career cycling professional. This ability to follow users and interact with them leads me to use the user-to-user and user-to-system interaction definition. By its very nature Strava is a user-to-system form of interaction. Other technologies that are similar to Strava include Nike +, MapMyRide, Runtastic, and Cycle Tracker Pro.

**Theoretical Perspective on Technology**

The infiltration of technology into every aspect of daily life has caused several scholars to critique the role of technology in society, as well as how the communication field as a whole defines and frames technology. The smartphone and Strava are certainly not exempt from such critiques. The two perspectives of technology most relevant to this study are social construction of technology (SCOT) and the umbrella of social shaping of technology (SST). Before delving into SST and SCOT, I will briefly cover the opposing theoretical viewpoint—technological determinism.

Slack and Wise (2006) claim that discussions of new and emerging technologies are often highly optimistic, loading the technology with “revolutionary” hopes and promises (p. 141). This reflects technological determinism, or “the belief that technologies have an overwhelming and inevitable power to drive human actions and social change” (Lievrouw & Livingstone, 2006, p. 15). The social shaping of technology (SST) viewpoint places more agency and choice with a technology user (Mackenzie &
Wajcman, 1985). SST “emphasizes the importance of human choices and action in technological change,” meaning that I paid close attention to the human choice aspect when conducting this study (Lievrouw, 2006, p. 248). I viewed Strava users not as passive consumers of the technology, but as active participants in constructing what the technology means. Williams (1996) describes the field of SST theory as a “broad church” of approaches to technology. Within this church is the theoretical position I utilized for this report—social construction of technology (SCOT).

The SCOT approach was pioneered by Bijker and Law (1992), as well as Bijker et al. (1987). SCOT rejects the rigid linear timeline of design, sale, and consumption of technology. Instead, SCOT posits that technology is continually redesigned and reshaped by different social groups (Bijker, 1992). Fittingly enough for this study, Pinch and Bijker (1984) and Bijker (1997) use the example of the safety bicycle to demonstrate the principles of SCOT.

If asked to sketch a bicycle, most people would probably include the basics of two similarly sized wheels, pedals, rubber tires, seat, handlebars, and a chain. Bijker would argue that all of these elements, which we would now consider commonplace, are technological developments shaped through various social groups. The earliest versions of the bicycle, the dandyhorse and hobbyhorse, were both considered “running machines” because they were kick driven and had no steering mechanism (p. 23). Without brakes or air tires, these cycles proved to be a rough and sometimes unsafe ride. Strains and hernias were common amongst hobbyhorse users. The first bicycle accident is even recorded in 1842 when a hobbyhorse rider knocked over a child in the street (p. 25). The rider’s shoes
would also become muddy or excessively worn from pushing the hobbyhorse through muddy streets and walking paths.

To alleviate the muddy feet problem, several inventors experimented with raising the seat height and designing mechanisms to propel the cycle without a rider’s feet touching the ground. By 1868 the velocipede, or aptly titled “boneshaker,” gained popularity due to the large diameter front wheel. The front wheel could be propelled and steered by the user without muddying up their shoes (p. 29). Shortly after, the highwheeler, or “penny farthing” was developed. The penny-farthing’s wire suspended spokes helped to smooth out the rough ride of previous rigid spoke models. Bijker explains that various social groups led to the creation of the large diameter front wheel. First, the riders did not want to get their feet muddy. Second, bicycle racers wanted to go faster. On the fixed gear cycle, the only way to increase top speed was to increase the size of the wheel (p. 29).

Safety concerns of the high-wheeler bicycle were numerous. Riders would often fall and injure themselves attempting to mount the cycle. The height of the seat excluded elderly, women and disabled persons from being able to ride the high-wheelers. The fixed front gear brakeless design did not allow for coasting, causing many cyclists to be vaulted over the handlebars. Pedestrians disliked the high-wheelers because they were viewed as a nuisance that took up valuable roadways built for walking and carriages. Several incidents of pedestrian and bicyclist collisions were also reported. Over the next few decades, producers and users slowly advanced the technology of the bicycle. The air tire, chain drive, and smaller diameter wheels all led to the modern “safety bicycle” (p. 96).
The essence of Bijker’s argument is that several different social groups led to the creation and refinement of the modern safety bicycle. Bicycle producers, ordinary users, and “non-ordinary users” (pedestrians and those who wanted to ride a bicycle but could not) all had various motivations for altering or improving the design of the high-wheeler to the point that the safety bicycle was created. Bijker also offers bakelite plastics and the fluorescent light bulb as forms of socially constructed technologies.

While at times my descriptions of technology may come across as deterministic, I tend to align this research project more with the viewpoint of SST. The analysis and conclusion chapters of this thesis will use a largely SST-oriented frame for the analysis of Strava and its users. I detail the two viewpoints of determinism and SST because my research question revolves around “experience,” and these theoretical underpinnings could provide a way of explaining and understanding my findings.

It is important to note that SST is typically used to examine technologies over time. Bijker and Law (1992) utilized SCOT to historically trace the shaping of a technology. This thesis does not examine Strava from a historical angle. The technology is so new that it is not possible to trace the technology’s development over a long timeline. The SST and SCOT frameworks still help to guide my interpretations of the technology as open to change and user influence. This type of viewpoint is useful considering many studies of technology employ a diffusion of innovations approach (Cooper & Zmud, 1990; Park & Chen, 2007).

**Phenomenologies of technology.** Within this section I detail some studies that have used a phenomenological approach to study technology. The phenomenological
tradition of inquiry is useful for studying technology because it provides an often-overlooked description of the “lived experience” of using technology. Many studies rely on a linear and deterministic viewpoint of technology. These studies often employ quantitative measures to determine social or societal impacts. The phenomenological and social shaping viewpoint, on the other hand, provides an alternate method of investigating technology and society.

For example, McPherson (2002) conducted a phenomenology of websurfing. Her phenomenology reveals that the web develops a sensory experience of liveness, immediacy, and instant gratification. Kozel (2007) utilizes phenomenology to study the intersection of the body and interactive digital interfaces. In Sound Moves: iPod culture and urban experience, Bull (2008) examines the use mediation of audio technology in everyday life. Rather than examining the device itself, Bull is concerned with the experience of listening to an iPod and how this experience is transformed in different spaces. These phenomenologies of technology are important because they offer a unique understanding of the essence of experience of humans using technology. Many studies neglect to pay attention to the aspect of human choice and experience. Phenomenological studies fill this void.

**Summary**

This literature review chapter has covered several areas related to the phenomenon under study. First, I detailed the history of bicycling and paid careful attention to the development of both road and mountain biking. Second, I detailed communication technology developments and related how they make Strava possible.
Third, I explained the concept of interactive fitness technologies and described some technologies that typify an IFT. In the third section of the chapter we saw how the recent innovation of smartphone fitness applications can merge with a person’s health and fitness. Building upon our knowledge of fitness applications, section four vividly describes the IFT Strava—including how a user may utilize the app. The fourth section provided some theoretical perspectives of technology and suggests how they can be used to analyze data.

The remainder of this thesis scaffolds upon the topics covered in the literature review. One of the main takeaways for the reader is the neologism I have created—interactive fitness technologies, or IFTs. I posit that IFTs are wirelessly enabled technological devices that track and record user fitness data for uploading to an interactive online community of other users. The first few sections of the literature review served to detail the technological side of this prospectus, the second half of the chapter concerns the question I intend to ask about the IFT. In summary, most of the empirical research studies to date have focused on health apps in the medical field rather than fitness apps. Additionally, most studies have employed quantitative measures rather than exploring the first person lived experience of technology in recreation. Finally, no studies have examined Strava or other cycle tracking smartphone applications. The present phenomenological study is an attempt to address these gaps in the literature.
CHAPTER THREE

METHOD

In this chapter, I specify my research goals and detail the qualitative methods I used for this research project. The first section will situate this inquiry epistemologically, the second concerns the research question, and the third section details the three different methods utilized for this inquiry. Each of those three sections on research method will contain its own description of the methodological techniques I employed, my research procedure, and process of data selection and analysis. Within this section I clarify my position and values as a Strava user.

Epistemological Considerations

Qualitative methodology was the befitting approach to capture the intricacies of the phenomena being studied. Creswell (1998) demonstrates that there are eight strong reasons for proceeding with a qualitative approach to research. The next few paragraphs will detail that my research fulfills many of Creswell’s criteria. First, my research is looking broadly at Strava and asking “how” and “what” questions (p. 17). Second, my topic is in need of exploration. Creswell states: “choose a qualitative study because the topic needs to be explored” (p. 17). As of writing, there is very little published research on smartphone and GPS sport and recreation applications. Similarly, other qualitative scholars have touted the importance of ‘mapping’ when there is scarce information about the phenomenon (Markula & Silk, 2011). Given that the IFT Strava is a relatively new phenomenon, rarely known outside the community of cycling, it is essential to map the terrain of this subject. While a complete exhaustive look at all of the different
relationships is beyond the scope of this paper, I intend for my results to help shed some light on the emerging field of technologies I am beginning to term IFTs.

Third, I am using qualitative methodology to present a detailed view of my topic. My methods of in-depth interviewing and report writing will provide a detailed look at the phenomenon. Fourth, Creswell posits that qualitative studies are especially appropriate for studying individuals in their natural setting. This method section will detail how I conducted several interviews in the participants’ natural setting.

**Interpretivism.** For this study, I am accepting and using the paradigm of interpretivism. An interpretive approach to this research project “serves to preserve the form and content of human interaction” (Keyton, 2001, p. 63). The interpretivist view privileges “deep understanding of human actions, motives, and feelings . . . knowledge of social realities emerges from the interdependence of researchers and researched” (Lindlof & Taylor, 2002, p. 11). I am qualifying this research study as interpretive because I employ interpretive methods, and my research question seeks to understand meaning and experiences from the user viewpoint. Further, I view reality and knowledge as a social construction perpetuated through actions and communication specific to particular groups.

**Phenomenology.** I align this study with the phenomenological tradition of inquiry. The method of phenomenology relies heavily on the writings of Husserl (1967; 1970). According to Creswell (1998), a phenomenological study “describes the meaning of the lived experiences for several individuals about a concept or the phenomenon” (p. 51). Along the same lines, Lindlof and Taylor (2011) also emphasize that
phenomenology seeks to “understand social action from the actors’ point of view” (p. 35). More specifically, this thesis combines elements of a Moustakas (1994) transcendental and van Manen (1990) approach to phenomenology.

I combined the two approaches for several reasons. A reader should view my approach as this: Moustakas helped structure my analytical technique, while van Manen’s method was useful for interpreting the data. The van Manen approach is fitting for investigating lived experiences. However, this approach lacks a set structure and procedure for analyzing data. Moustakas’ (1994) approach, on the other hand, provides a more structured approach to analyzing data that fits best with my study. The concepts of “horizontalization” and developing “clusters of meaning” that Moustakas promotes helped me to arrive at accurate lived experience descriptions (Creswell, 2013, p. 82). Second, Creswell (1998) remarks that some phenomenologists utilizing a Moustakas approach attempt to “bracket” prior experiences so as not to taint interpretations (p. 52). I feel it is naïve to think one can fully bracket an experience with a phenomenon; however, in the following paragraph I will detail my subjective position as a Strava user. The reflexivity and validity section contains a full report of my personal experience with cycling and Strava.

Throughout the research process I remained objective while at the same time acknowledging my subjective position as a Strava user and cyclist. My closeness and general interest with the research phenomena became paramount to providing rich descriptions and understanding subtleties. Considering the degree of knowledge and involvement in cycling and Strava that I already held, I had a ‘leg up’ going into the
study. The cycling jargon and slang alone is enough to befuddle a researcher not already familiar with the sport. In fact Roop (2010) claims, “this technical terminology creates an independent cycling lexicon that an experienced cyclist could interpret easily and reflects the depth of ones experience within a cycling community” (p. 19). Overall, I feel that my position as a Strava user and cyclist helped me to capture the essence of experience for the study participants.

The term Verstehen, developed by Dilthey and later clarified by Weber, guided the interview and observation stage of this study. Verstehen can be understood as an attempt at empathic understanding, or understanding through first person perspective (Lindlof & Taylor, 2011; Tracy, 2013). Applying the Weberian concept, I sought to understand how the individual user experiences Strava in relation to the recreational experience. It was essential for the observational and interview portion that I understood the phenomenon from the user’s standpoint.

Research Question

Because this project is guided by the tenets of an interpretive phenomenological approach, I treated the research question as a broad guide for the study. In keeping with van Manen’s approach to phenomenology, I am not treating the research question as a problem to be solved, but rather as a question of meaning to be inquired into. According to van Manen (1990), the chief question phenomenology poses is “what is this or that kind of experience like?” (p. 9). Therefore, the product of this phenomenological study is not theory, but rather, it offers plausible insights into the essence of experience. The crux of my project centers on how users experience recreation as mediated by Strava. There
are multiple ways in which I will be investigating how the user experiences the recreational experience of cycling. However, the following singular research question provides a broad starting point.

RQ: What is the essence of experience of mountain biking with Strava?

**Data Gathering: Qualitative Interviews**

**Participants.** For this study, I was only interested in participants who have experienced a particular phenomenon; I therefore employed criterion sampling. My sample consisted of 11 participants with two being female and nine being male. Four participants identified as exclusively road cyclists, three participants were strictly mountain bikers, and four cyclists identified as both road and mountain cyclists.

Obtaining the perfect sample was a very difficult task given the time limitations of this study, and the lack of monetary incentive for the participants. Therefore, I studied those who met the following minimum criteria: the participant must be a cyclist, road or mountain, and reside in the Southern United States. I did not discriminate between an avid user and a beginning user, or a completely new user, because I was fortunate to obtain anyone for my sample due to previously mentioned constraints. Gender, occupation, age, and background were goals of the sample and not requirements of the sample for two reasons. First, even if the sample were not composed entirely of a similar group in respect to age, gender, road or mountain, etc., the results would still help to answer the proposed research question. Secondly, the typical mountain biker is male. Finding a perfectly gender-balanced sample was extremely difficult; therefore, I make sure to elaborate on the implications of a non-balanced sample in the limitations section.
Results from this study, although based on a narrow participant group, still prove useful as a preliminary exploration of a broader research trajectory into Strava effects.

The selection process for participants in this study was based on a convenience and snowball sample. I populated a list of people I knew within the cycling community that use Strava. I recruited until I had five Strava users willing to participate in the study. A recruitment letter, as well as IRB expedited informed consent letter, was prepared and given to potential participants (see Appendix B). To add variety to my sample, I set up a table at the popular local mountain biking trailhead. The Issaqueena trailhead within the Clemson Experimental Forest provided a prime location to recruit participants. Several dozen bikers began and ended their ride at this trailhead.

I also strategically placed myself at other trail locations where I could easily recruit participants for my study. I visited the extensive trail system at Paris Mountain State Park in Greenville, South Carolina. I set out onto the Paris Mountain trails with my cycling hydration backpack loaded with IRB informed consent documents and two audio recorders. After riding the main loop, I paused at the top of an arduous 1.2-mile long winding climb. At this popular rest stop many mountain bikers would pause for rest gasping for air or chugging water. Many cyclists would start a conversation with me about the trail’s features, bikes, weather etc., which provided an excellent opportunity to screen and recruit them for my study.

The bicyclists that comprise my sample represent many different age groups, occupations, and riding styles. Participants self-identified as strictly road riders, dedicated triathletes, or competitive cyclists, whereas others claimed to be recreational cyclists.
Occupation and life experiences of the participants ranged from retirees and unemployed—to engineer, teacher, and news reporter. The initial participants, as well as those at the various trailheads, referred me to a snowball sample of 7 more participants. On several occasions I would approach a potential participant to inquire about having them participate only to find they did not use Strava. Several times this potential participant would say, “oh, you should talk to my buddy Bob, he uses that thing all the time.” I would either have them pass along my information to their friend, or I would join them before a group ride to conduct a quick interview. The participants were a mixture of road cyclists and mountain bikers, with two being female and nine being male.

**Field Interviews.** Field interviews are minimally structured ways of obtaining information through discourse that moves beyond the simple question answer format (Keyton, 2001). I utilized field interviews not only to gather deep information, but also as a preliminary exercise when first meeting with a participant to gather basic demographic data and screen that they met my criteria of being a Strava user. The field interviews were informal in nature so as to relax the participant. This type of field interview is considered an informal conversational interview, a situational conversation, and also described as “the most informal, spontaneous form of interview” (Lindlof & Taylor, 2002, p. 176). Interviews and observation were conducted over a 5-week time span at multiple sites. Some interviews were conducted at the trailhead or parking lot, whereas others were at a local Starbucks or Clemson University campus location. Interviews lasted between five and 25 minutes and continued until no new themes or insights emerged. While this was an informal interview, I took the measure of audio recording interviews. The
observational research methodology section will discuss the limitations of audio recording and field note writing when engaged in active participant observation.

**Data Gathering: Observational Research**

My degree of participation fell somewhere between participant-as-observer and observer-as-participant, as outlined by Lindlof and Taylor (2002). The participant-as-observer role is characterized by an open acknowledgement of research interests and participation in the group or activity being observed. This is in contrast to that of the complete participant whose research interests are not made public (Lindlof & Taylor, 2002). The observer-as-participant is not as deeply embedded as the participant-as-observer, which doesn’t allow for deep descriptive data gathering; however, the observer-as-participant “can efficiently sample a relatively large number of incidents, time periods, persons or groups” (Lindlof & Taylor, 2002. p. 149).

Working from a participant-as-observer role I observed and interviewed within the settings that participants use Strava, which ranged from two lane paved country roads, which road cyclists tend to ride, or to rugged off road terrain favored by mountain bikers. There were various timeframes within which I wanted to conduct observation. I primarily observed Strava use right before, during, and immediately following a ride. Strava users can view segments on their smartphone before they ride, as well as view their progress following the ride. This mobile viewing affordance meant participants would often view their progress roadside or trailside immediately before or after activity.

Participant-as-observer meant there were situations where I joined the Strava user on a bicycle ride. In instances where I rode with participants I interwove field interviews
and observation. The taking of detailed notes, or operating a recorder, while riding a bicycle was not possible; therefore, I crafted field notes from memory of what I observed during participation. In all cases, I began composing formal field notes within two hours of the end of a ride. The field site of observation was therefore inclusive of homes, offices, roads, trails, parking lots, and trailheads.

**Data Analysis**

While I embrace both the van Manen (1990) and Moustakas (1994) approach, I rely more on the structured data analysis methods advanced by Moustakas. I will be using Creswell’s (2013) simplified version of the Moustakas approach. The raw data as recorded were transcribed verbatim for each individual interview. The transcriptions were in the form of Microsoft Word documents stored in a secure folder on the hard drive of the principal researcher’s computer. The transcripts of all 11 interviews were read several times in order to obtain an overall feeling of them. I then “horizontalized” the data by generating a list of significant statements (p. 193). These significant statements were not repetitive and did not overlap with the same content. A particular meaning was formulated and associated with each significant statement. In this stage of the research it was crucial that the meanings generated were not severed from the original text. I remained reflexive in assigning meaning by constantly reviewing assigned meaning against verbatim significant statements.

These significant statements were then organized into “meaning units,” or theme clusters (p. 193). The meaning units were used to write a textural description of the participants’ experience of cycling as mediated by Strava. A “structural description,”
which provides the setting and context that the phenomenon occurred, was then created (p. 194). Both the textural and structural descriptions were woven together to create an exhaustive paragraph that communicates the essence of the participants’ experience of Strava.

**Reflexivity and Validity**

Any good research project, whether quantitative or qualitative should employ some form of check to insure the results are credible. While qualitative scholarship is not subjected to the same measures of reliability and validity that quantitative researchers use, research in the interpretive paradigm should conduct research with “rigor” (Golafshani, 2003, p. 602).

Many phenomenological studies employ bracketing, or “epoche” in an attempt to set aside previous experiences with a phenomenon (Creswell, 2013, p. 80). A researcher brackets experiences so that he or she can perceive a phenomenon as openly as possible. To practice this concept, “the researcher begins with a full description of his or her own experience of the phenomenon” (p. 193). As I stated earlier, I find it near impossible to *completely* bracket previous experiences, but as a form of rigor I detail my previous experiences as a Strava user. My personal experience with Strava is as follows:

The first time I ever recall hearing about Strava was while browsing the rules section of a local mountain bike race website. The rules page indicated that Strava users would be penalized by five seconds on the time trial portion. Strava being a completely foreign word to me at the time, I was prompted to research what Strava was. Soon after, I downloaded the application to my iPhone and regularly
recorded my mountain and road bicycle rides. I experienced a feeling of accomplishment at being able to view my total distance traveled. Eventually, I began to create segments and compare my results with others’ segment times. When I had more time to devote to athletics I was able to hold one or two records at the local Issaqueena trail. I continue to use Strava to this day. However, I am not competitive with other users for records. I mainly use Strava to track my distance and calories burned.

I maintain that complete bracketing of prior experience is not entirely possible. I hope that the previous passage will attempt to allay concerns as to the rigor of my approach.

In keeping with this need for rigorous, credible research, I sought a senior faculty member well versed in qualitative inquiry as an added measure. The senior researcher served as an external checker throughout the initial research design stage. I also used a member validation technique throughout the study wherein I showed participants preliminary theoretical hunches, as well as more conclusive accounts of research. Utilizing different methods also adds validity to my findings through triangulation. In data triangulation a researcher employs several different methods of research to improve confidence in findings. My research wove together both qualitative interviews and participant observation in an attempt at data triangulation.

I also engaged the research practice of reflexivity. As a researcher it was important for me to be aware of my constantly evolving role between the field, participants, and research, especially during observation. I was constantly aware of the Ten Lies of Ethnography (Fine, 1993) and made conscious efforts not to become too
obtrusive or imprecise. The member check described earlier helped to add reflexivity, but I practiced other reflexive methods as well. Going into the study I informed participants of exactly where I stand in relation to the phenomenon being studied. What I mean by this is that interview participants were aware that I use Strava.

Creswell (2013) proposes five standards of evaluation that can be applied to phenomenological research. Does the author convey the philosophical tenets of phenomenology? Is there a clear phenomenon to study? Are there set procedures used for data analysis? Is the overall context and essence of the experience for the participants clearly communicated? And lastly, is the author reflexive? The “epistemological considerations” section of this chapter addresses Creswell’s first concern. The introduction and literature review build a strong case for a phenomenon worthy of exploration. The next two results and discussion chapters demonstrate that I fulfill Creswell’s last two standards.

**Conclusion**

Each qualitative method previously listed served a distinct purpose in helping this study to interpret the phenomenon of Strava. Qualitative interviews and participant observation guided by a phenomenological approach helped to either discredit those theoretical hunches or develop and bolster them. Ultimately, this study will provide new insights into how technological developments mediate not only the recreational experience of cycling, but a person’s sense of motivation as well.
CHAPTER FOUR

RESULTS

This chapter presents the results of my phenomenological research. Per the method described in the previous chapter, meaning units and theme clusters that emerged through analysis of collected data are presented. I generated a list of significant statements from 11 verbatim interview transcripts. The following five theme clusters emerged from the significant statements: (1) King of the Mountain, (2) Ethical Dilemmas, (3) A Social Technology, (4) Emotion-Laden Experience, and (5) Augmented Experience.

Theme 1 will show that participants experienced an overall feeling of motivation. Motivation is manifested through competition, comparison, and self-testing. Theme 2, Ethical Dilemmas, clusters around behaviors that are ethically questionable. These behaviors are not always as clear-cut as forms of cheating found in other sports. The behaviors ranged from data manipulation to pursuing a segment trophy without riding the full route. Users are beginning to develop standards for what is considered ethical Strava use, but most participants viewed the activities with amusement.

Theme 3, A Social Technology, is built around the user experiencing increased sociability. This theme takes into account notions of community tied to Strava. This community is often defined as a serious group of cyclists. Many users described meeting people because of using the application. Theme 4, An Emotion Laded Experience, emerged after participants frequently talked about Strava using emotional language. While not every participant experienced the same emotion, all participants used emotional language to describe the lived experience of cycling with Strava. Further, the
emotional language was not only in reference to the application but descriptive of experiences afforded by the application, such as winning or losing trophies. Lastly, theme 5, *Augmented Experience*, details how users are benefitting in some way by using the application. Many participants spoke of ways that the technology helped them to record and track progress. Some claimed the experience was more fun. Others benefitted by finding new routes or trails to ride.

**Significant Statements in the Data**

Before jumping into verbatim quotes to illustrate each theme, I provide two tables to help the reader understand how I inductively moved from significant statements into theme clusters. Table 1 displays a list of example significant statements and their formulated meaning. Table 2 displays the formulated meanings that were clustered together to create the “meaning units” or themes (Creswell, 2013, p. 193). The chapter then proceeds by expanding upon each theme. Each theme section contains selected portions of verbatim interviews that help to illustrate that theme. Finally, the results section concludes by weaving together both the textural and structural descriptions to capture the essence of the participants’ experience of Strava.

The following two tables are examples of significant statements and formulated meanings. The left column of Table 1 includes significant statements taken verbatim from transcripts, and the formulated meanings are provided in the right column. These significant statements are not organized into themes at this point. The significant statements in Table 1 represent a wide variety of quotations from the interviews. No preference is given to most frequently occurring formulated meaning. In other words, the
The table is not organized by prominence, frequency, or alphabetization. The table is simply meant to help show the reader how I moved from interview, to formulated meaning, to theme cluster. Table 2 is an example of the five theme clusters and their formulated meanings. Not all of the formulated meanings found in Table 1 will appear in Table 2. For example, the formulated meaning of “shared experience” listed in Table 1 transfers over to the Social Technology theme cluster in Table 2, whereas the formulated meaning “Strava augments experience” does not transfer over to Table 2. Similarly, many of the formulated meanings found in Table 2 will not be located in Table 1.
### Table 1: Selected Examples of Significant Statements of Strava Users

<table>
<thead>
<tr>
<th>Significant Statement</th>
<th>Formulated Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like to be jealous a little bit.</td>
<td>Strava use is emotional</td>
</tr>
<tr>
<td>Just a tool to make my riding experience uh just a little more enjoyable</td>
<td>Strava is a tool for cyclists</td>
</tr>
<tr>
<td>If it’s a good ride it’s a pressing need</td>
<td>Strava use is emotional</td>
</tr>
<tr>
<td>I don’t bring a map with me anymore</td>
<td>Strava augments experience</td>
</tr>
<tr>
<td>They really scope out the zones and try to outdo everybody else</td>
<td>Competition</td>
</tr>
<tr>
<td>I wanna, I wanna beat people</td>
<td>Competition</td>
</tr>
<tr>
<td>You kinda figure out new places to ride</td>
<td>Finding new routes</td>
</tr>
<tr>
<td>I’ll just save my legs until the certain part comes up</td>
<td>Saving for competition</td>
</tr>
<tr>
<td>It helps me push myself.</td>
<td>Strava helps motivate</td>
</tr>
<tr>
<td>I’m like a fat kid with candy man I’m like ‘Dude, how’d I do? I think I went really hard on this part right here. It’s only my second best? Effort!’</td>
<td>Strava use is emotional</td>
</tr>
<tr>
<td>It’s also a way to meet people.</td>
<td>Meeting new people</td>
</tr>
<tr>
<td>If you’re trying to go hard and then you see it was like your best time that feels pretty cool.</td>
<td>Strava use is emotional</td>
</tr>
<tr>
<td>You can keep checking every once in a while to see if anyone beat you and then and go out and try to get it back</td>
<td>Competition</td>
</tr>
<tr>
<td>It gets to the point where everybody knows, you know, Bob is the man on those or Bob had help.</td>
<td>Quantifying others results</td>
</tr>
<tr>
<td>I can appreciate my rides more by going back to Strava and just seeing where I rank</td>
<td>Users compare with others</td>
</tr>
<tr>
<td>We can definitely bind somewhat from our experiences with strava</td>
<td>Shared experience</td>
</tr>
<tr>
<td>It pushes me to get me on the bike and ride</td>
<td>Strava helps motivate</td>
</tr>
</tbody>
</table>
Table 2: Example of Five Theme Clusters With Their Associated Formulated Meanings

<table>
<thead>
<tr>
<th>Theme 1: King of the Mountain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living for the KOM</td>
</tr>
<tr>
<td>Saving for competition</td>
</tr>
<tr>
<td>Competition</td>
</tr>
<tr>
<td>Striving to improve</td>
</tr>
<tr>
<td>Seeing others progress</td>
</tr>
<tr>
<td>Taking another step</td>
</tr>
<tr>
<td>Measuring success</td>
</tr>
<tr>
<td>Maybe I can do it faster next time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Theme 2: Ethical Dilemmas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data manipulation</td>
</tr>
<tr>
<td>Physical cheating</td>
</tr>
<tr>
<td>Drafting</td>
</tr>
<tr>
<td>Quantifying others’ results</td>
</tr>
<tr>
<td>Getting help</td>
</tr>
<tr>
<td>Shortcutting a full ride</td>
</tr>
<tr>
<td>Sense of what is “fair”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Theme 3: A Social Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>A serious group</td>
</tr>
<tr>
<td>Meeting new people</td>
</tr>
<tr>
<td>Recognized from Strava</td>
</tr>
<tr>
<td>Opens the door</td>
</tr>
<tr>
<td>Shared experience</td>
</tr>
<tr>
<td>Widespread use</td>
</tr>
<tr>
<td>Following others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Theme 4: An Emotion-Laden Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressing need</td>
</tr>
<tr>
<td>Addiction</td>
</tr>
<tr>
<td>Depression</td>
</tr>
<tr>
<td>Indifference</td>
</tr>
<tr>
<td>Surprise at accomplishment</td>
</tr>
<tr>
<td>Joy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Theme 5: An Augmented Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhances the experience</td>
</tr>
<tr>
<td>Finding new routes</td>
</tr>
<tr>
<td>Repurposing the familiar</td>
</tr>
<tr>
<td>Training partner</td>
</tr>
<tr>
<td>A tool for the user</td>
</tr>
</tbody>
</table>
Theme 1: *King of the Mountain*

Strava users described the experience of Strava as one of motivation. This theme cluster represents motivation as being influenced by competition, comparison with others, and self-testing. Competition, comparison, and self-testing are sub-themes underneath the larger theme cluster of *King of the Mountain*. It is important to note that motivation was the common theme to all participants, but not all users felt motivation through competition, comparison, and self-testing. A consistent question posed to participants pertained to their own classification of their riding style. Participants frequently self-defined with words such as “casual rider,” “enthusiast,” “serious,” “intermediate,” and “competitive.” One older mountain biker classified himself, stating, “I’m a recreational enthusiast . . . I’m hooked, but I’m not hardcore.” These different classifications are important to bear in mind when reading through the following theme clusters and sub-themes.

While some users thrived off of competition with other riders, other participants merely wanted to compare their current ride times against their previous ride results. When one road cycling participant was asked why he initially started using Strava, he was quick to reply, “I wanna beat people. [Chuckle] And I wanna get the KOM [“King of the Mountain” record for a section of a ride]—umm, so I really downloaded it for that.” Another person stated, “When I’m not riding I get to see my friends and see how they rode too. So that’s pretty awesome for me. Like, Jeff [name changed] and I have an ongoing thing for Knollwood Road on Cleveland Park.” Someone else, a road cyclist
who identified as a more leisurely rider, relayed that he downloaded Strava to compare his past results, stating, “I just wanted to see if I was getting better.”

The next three sections will detail competition, comparison, and self-testing. It is important that I explain that, while these appear as separate sections, many participants were motivated by one, two, or a combination of all three themes. I begin with the sub-theme of competition.

**Sub-theme A: Competition.** Consistently, both road and mountain biker participants felt motivated by competition with others for segments or other data. This theme represents competition for “things” generated by Strava. These “things” are trophies, KOMs (King of the Mountain), and favorable rankings on the leaderboard. While it is competition for things, it is still competition with others. The remainder of this theme section will detail how there are intricate relationships between competition with others and comparison with others. Typically, the Strava users who classified themselves as more “serious” riders were the ones who were motivated by competition with others. The following examples are illustrative of those who are motivated through competition.

One mountain biker who held a coveted KOM trophy felt motivated to regain his trophy after losing it to a faster rider. The enthusiasm in his voice and body language was evident as he described maintaining the KOM on a particularly challenging segment. I questioned him further after he indicated that he had lost the KOM trophy. I note that while the participant described the lost KOM scenario using motivational language, I was the one who actually introduced the keyword of motivation.
[Researcher]: So, when you see people that, maybe they got your KOM, does
that motivate you or…

[Participant]: Um, yeah. Yeah, yeah it does. You try to . . . [pause] . . . yeah,
I’m pretty competitive [laughs].

Another competitive road cyclist pushed himself to physical limits in pursuit of a lost
KOM trophy:

I was actually number one for a while on the swamp rabbit trail, and one of the
stretches I saw on Swamp Rabbit Trail and then I got beaten. I tried about two
more times and I got cut in the same time . . . And I couldn’t beat it so…

[Chuckle] . . . well after the third time I got too tired like, you’re, when you are
doing it, and you are going too fast like you know, like that throbbing sensation in
your head, you are going too fast, no oxygen that’s what I got like, so I had to
stop or else I would faint.

In some instances, participants would scout out the segments beforehand. One Strava user
described a group ride where the segments were scouted beforehand:

I’ve gone out to Paynes Creek and, you know, know that I can keep that, the
higher average than the leader, so we’ve gone out and just, you know, blasted
through a lap and taken it [the KOM] and then taken it easy for the next one.

An interesting tactic that the more competitive participants mentioned was the act of
strategically saving energy in order to take a KOM trophy or place favorably in the
rankings. In some instances a rider will ride at a leisurely rate and then “go all-out” when
approaching a segment. A previous textual analysis of popular press articles about Strava
revealed that other authors have termed this practice “Strava-cide,” (Vanderbilt, 2013) because a rider deviates from his or her regimented training ride just to capture a KOM. Several participants described situations that were consistent with this practice:

You kind of like save your energy and like okay I know there is a Strava route coming up and I’m going to like, “Save, Save, Save.” And then like go crazy and then be dead [Chuckle].

At times I’ll just save my legs until the certain part comes up. For instance, Knollwood road. I’ll just absolutely kill it on that spot and just kind of go easy on the rest.

It kind of gets into this thing where it needs to be a rest day, but you know, you know, you’re feeling good for this one little segment, you know it’s there. So, yeah, you’re going to hit it hard, even though you should be resting.

There’s a couple times on the Swamp Rabbit when I was on it and I knew where the sections started and where the section ended and I would just fly.

The person who made the final statement in that set was clear to state that he only did this “once or twice ever,” and it usually “wasn’t a concern” for him. It is difficult to determine why this user offered this further qualifier. Perhaps other Strava users hold a negative view of committing Stravacide.

I gleaned some interesting information from one of the participant observation sessions. While on a relatively mild climb up a gravel fire road at Issaqueena Trail, I asked the mountain biker, “So, do you remain conscious that Strava is currently recording
right now in your backpack, or . . .?” The participant responded that he really did not think about it much. Later in this same ride, he brought up the topic of a Strava segment he knew of that we were currently riding on. I probed further into why he thought about the segment when he is normally not conscious of Strava. He stated, “it’s sort of an unconscious thing until it becomes conscious.” I gathered that certain portions of a trail can trigger a rider to remember that they are on a Strava segment—a section of road or trail that a rider can win a trophy for—and push harder. A similar phenomenon is illustrated in the following statement: “you kind of have this thing in the back of your head where it’s like ‘I need to pick it up.’ I know, ya know, I know what my time can be.” Several participants described that they did not actively and constantly think about Strava, but they remained vaguely cognizant of the technology’s presence. What I mean by vague cognizance is that users did not actively and constantly think about Strava. Instead, certain things would prompt the user to remember that Strava is recording. For example, if a rider takes a rest break and wishes to view how many miles she has ridden thus far she will likely look at the Strava application. After viewing her mileage she may be prompted to ride further.

While this sub-theme is motivation through competition, participants frequently distinguished “friendly competition” from other sorts of competition. Cyclists stated, “It’s all kind of in fun and games. It’s competitive but knowing [laughs] that I’m just, uh, going to be out here riding for fun in the end.”

Sub-theme B: Comparison. Several participants described a need for comparing their results to others. While some users simply wanted to see how they stacked up to
other riders, other participants were in awe of how many miles another user could log. I keep this sub-theme separate from self-testing and competition. The sub-theme of comparison is strictly looking at comparison with others. There is an aspect of comparison in the self-testing sub-theme (comparing past ride results), but for my purposes the comparison sub-theme only encompasses comparison with others. The sub-theme of comparison does overlap slightly with competition. The act of comparing results to others can create a form of competition. For this thesis, the reader should realize that all of the sub-themes underneath the larger motivation theme cluster have slight interconnections. The discussion section will expand on these interconnections.

The quotations below, from study participants, exemplify talk that defines the second sub-theme:

“Every now and then I’ll just be like ‘Uh, where am I? Where am I amongst my friends?’ But I always check where I am with other peeps.

I find it motivating cause they’re—much, most people I follow are much better bikers than I am.

There’s this one dude who goes 120 miles a day on a daily basis, doesn’t matter the weather its kind of motivating cause its like man, I’m happy If I got like 15 miles once a week, and this dude is going 120 a day!

It’s just kind of fun to see you know, if you are going hard how you can stack up to other people.”
Let’s say I do a segment and I’m trying to get the KOM. Whether I get it or not, where, I kind of fit in that hierarchy, what effort I put forth and, and where, you know, is it my first fastest time or, you know, a third fastest. And, and then comparing myself to other people and when they did it, when I’m doing it.

The last statement in this set is an excellent example of the overlap with the competition sub-theme. He states that he is trying to win a KOM but whether he wins it or not he is still able to compare his results to other results. This is a case of a user being motivated through both competition and comparison.

Many participants stated that seeing their results and ranking alongside that of other riders would motivate them to ride more. One participant who is an avid road and mountain biker, and member of a university cycling team stated, “So, when I’m out on a trail and I get back, I see that someone has the higher time, I know that I can push it to that.” One might think that comparing yourself to someone with a better time might cause self-doubt or discourage more riding. None of my participants indicated this feeling. After comparing their results to others, some participants did claim to experience a little bit of jealousy. A mountain biker described how he would compare his rides with one of his friend’s rides. This friend “stepped it up” and started riding over 200 miles a week. I asked the mountain biker how he felt after seeing the increase in mileage: “Umm, jealousy. [Chuckle] But I don’t know, I don’t have the time to do that so, yeah, like, you know, how many hours could I do I just don’t have the time.” This participant was jealous of the amount his friend was able to ride, but he was sure to qualify that he would like to ride that much if he had time. A female triathlete told me that she liked to be a
little bit jealous when seeing other people’s results. The emotion of jealousy overlaps some with Theme 4: *An Emotion Laden Experience*. One of the reasons I have grouped the sub-theme of comparison as disparate from competition is in relation to the context of participant responses. Yes, some users would compare results and then compete to beat another user. Other users simply compared and were motivated to ride more, but not necessarily motivated to ‘one up’ another person’s results.

**Sub-theme C: Self-testing.** Other riders were not as concerned with comparing their results to others or competing for segments. Self-testing is characterized by either challenging oneself to improve upon past results or setting a goal. A rider could test oneself by comparing his or her own times or by simply reflecting on how he or she felt on a current ride versus a previous ride. Some participants would utilize the technology to set goals for themselves:

It pushes me to get me on the bike and ride, if there was a day that I really didn’t want to ride, but I haven’t had too many of those, but you know, maybe I just didn’t feel 100% I still wanna do it just because I have got a goal set and I wanna make for the year and if you start laying out you don’t meet your goals.

I don’t, I try not to go out just to claim one [a segment or KOM], but it is fun to kind of set that as a goal, especially when you’re riding solo.

Almost all participants, regardless of how they self-classified, indicated that they were motivated by comparing their current ride times against their previous ride times.
Even if you don’t break any other records you break your own record and that was just kind of a motivating factor was just seeing um how you got a high score or whatever ride you just did.

I go back and I look, you know, and compare. Especially if I ride the same route and if I feel like I really done good this time I’ll back up and just see if it compares to being a better ride than some of the before rides.

I use Strava to go back and look and see how I did on rides, and then compare it to previous rides.

I kind of gage my fitness over time by being able to go back and look at what I did like a year ago.

You always wanna know like how you did, like if you did better than last time or you know, or how many calories you burned.

Some riders detailed that they are less concerned with performance metrics. These riders gauge workouts by comparing with past rides. However, they differ in that they mainly judge their progress based on how they feel.

I’m 50 years old . . . and I’m riding with guys, you know, with 25 and 30 year olds and they are just blowing by me and they are blowing all the way up Paris, you know, all the way up hill and you know, I don’t care if I stop one time, but I look for you know, like, “Okay, can I ride all the way?” I might wanna take this
step to say, “Yeah, hey this time I rode it all the way up and didn’t stop and all of that.”

I’m mainly looking for I guess how long it takes to complete segments but not to see how fast I can go, to see more or less how I improved as far as not having to stop and rest on strenuous or long rides. This theme stands separate from comparison. While users are comparing to past results, they are solely comparing to their own results. A few participants did not even follow other Strava users. This means that they are not even able to see other results to compare their times against. The self-testing theme encompasses just what it states, testing yourself against previous ride times.

**Summary of theme 1.** Theme 1, *King of the Mountain*, is comprised of the sub-themes of competition, comparison, and self-testing. Theme 1 is the most complicated theme out of the group of five because of how closely related some of the sub-themes are to one another. Many participants were motivated by a combination of all of these sub-themes. In contrast, some riders were only motivated by self-testing and did not care to compare themselves to others or compete for segments. The four themes that follow this first large theme are more clear-cut and without sub-themes.

**Theme 2: Ethical Dilemmas**

Frequently, participants indicated that there were some activities on Strava that were still open to debate in terms of what is considered fair play. The first person I interviewed brought to light the idea of controversial activity within the Strava community. He stated:
Some people are way into it, and like some guys I’ve ridden with will, you know, have a segment in mind and then go out there with a couple of people so that they’re like kind of team time trialing it, but only one of them has their Strava going [laughs].

I will explain a little bit about road bicycling to help make sense of the previous quote. Groups of road cyclists typically ride in a single line formation. The cyclist in the front of the formation bears the most wind resistance and everyone behind that rider is caught in a “draft” that allows them to keep a high speed. The front rider rotates out periodically so that someone with “fresh” legs is up front. This allows the group to maintain an overall higher speed average. This tactic can be utilized to collect KOMs. Basically, a group of riders will work together to make sure one rider will win the KOM. To do this, the front of the pack riders will rotate out of front formation, allowing the Strava rider to draft off of them for a fast time. My first interviewee clarifies, “So, he’s trying to get a faster time, but he’s getting people to help him, but it doesn’t show up on there [on Strava]. That goes around a lot.”

The other large area of ethically questionable activity concerns manipulating the data on the website. The following participants provided examples of various ways to manipulate data:

One of the guys that rides out here said, he told me, and he was kind of laughing about it, but it was somewhat funny. Um, that he came out here and wanted to create a segment on a certain section of trail and, and, felt like he rode it, you know, very well and had the KOM. So, when he created that segment my name
popped up first, [laughs] as the KOM so he just kept shortening the segment until [laughs] he was the KOM and I no longer was the KOM.

There is a website digitalepo.com and you can upload a DPX file and tell it how much faster you wanna be. You can increase it by percentage and then it saves to file and you can upload to Strava and you are 10% faster, 20% faster, whatever faster you wanna be.

A mountain biker indicated that there are also physical practices that are viewed as illegitimate, including “cutting”:

Cutting… yeah. Running stop signs, running red lights, um, crossing lanes on down hills. You know, like there’s [routes such as] Caesar’s Head, Sassafras, Upper Springs, you know, people will cut into the other lane. On trails, basically, and it’s the same way when you’re racing cross country [mountain biking], if it’s not taped off, people are gonna cross the trail. You know, cut a corner, move a log, go around a tree through a turn so you’re not going as wide, that kind of stuff, just to cut time.

I have known some people I think they have had it on in their car and they have gone up it and kind of like got up top [on the leader board], not like first but like done a good enough time so they are second or whatever.

Some participants stated that riders would only go after a small segment within a much larger route, instead of riding the full route. This activity is of an ethically questionable nature because the rider attempts a segment with “fresh legs.”
I hear that there are some people that will only go to the zone with fresh legs and, uh, they haven’t ridden the 50 miles and they try to conquer the King of the Mountain. Now, I have no interest in doing that.

I know people who go out to Issaquena just to try to get the KOM on Collar Bone, and they’ll ride like a mile and that’ll be their whole ride. I interpret this practice as different from “Strava-cide” which was described in the competition sub-theme. The previous participant describes a practice where someone does not endure the full ride or route. There are segments at the top of very difficult climbs, where it is reasonable to expect that anyone attempting that segment has completed the challenging portion leading up to that point. The participant related that the less ethical Strava user may skip the difficult section and tackle the segment before he or she is exhausted and depleted of energy.

I classify this theme as an “ethical dilemma” rather than outright cheating because of the way users perceived the actions. Some activities are clearly cheating, while the legitimacy of other activities are still being negotiated. While actions, such as cutting the course, or using a car to win KOMs, were viewed as cheating, Strava users typically spoke of the other behaviors (drafting, shortening segments, etc.) with amusement rather than contempt—or simply accepted it as part of the experience. One self-classified “serious” road rider commented on drafting, “It’s kind of unfair for the people who are going by themselves like me. Umm, but again if I was the person who made that record like I would say, it was legitimate [chuckle].” Some accepted these behaviors as part of the sport, “I think that just comes with the territory that’s, I think it just tells you like
that’s why you get good or that’s why you should make friends and draft with them, I think its just part of cycling itself.” Other riders stated, “So, you know, [laughs] it’s like just, it’s a bit, you know on the ironic side and funny,” “some of the remarks that I've heard is more comical, you know, hey you know that guy, all he lives for is getting his KOM [laughs],” “There is always gonna be those losers out there you know… [Laughter].” One user offered that the technology should have a way to account for people drafting, or hitting segments with fresh legs. He claims, “It’s interesting I guess. I wish somehow that it would take account for that, but there’s no way to really . . . I don’t know, it kind of takes the fun away from it.”

As of writing, the Strava technology cannot detect all of the forms of cheating and unethical activities described previously. While the technology cannot yet account for unethical activity, one participant claimed that amongst the Strava community, users would temper other people’s results if they were suspected of engaging in such ethically questionable activities:

Well, some people will—it’s not cheating—but some people are like uh-oh, so and so has that segment, but he ‘had help’—type thing. Well, they’re not really annoyed, but they’ll still throw it out there to kind of quantify their effort versus the other guys.

In this last example we see that the participant is clear to state that drafting is “not cheating” but cyclists still wish to provide a context for their results.

**Summary of theme 2.** This theme is centered around activities that are considered unethical. Unethical activities ranged from attempting to take a segment
without enduring a full ride, to manipulating data to move higher in the rankings. Norms of conduct have yet to be established among Strava users that clearly regulate what constitutes ethical Strava use. The discussion chapter of this thesis will expand upon the ethical nature of this theme and how these practices lead to a socially shaped technology.

**Theme 3: A Social Technology**

Rather than exclusively labeling this theme *Community*, I chose to title the theme *A Social Technology*. In keeping with phenomenological practices, the goal is to emerge with a shared experience among participants. While many participants spoke of an *actual* Strava community, not all participants felt as though they were members of a community. The common experience, however, is one of increased sociability.

Most participants indicated that Strava has created its own form of community or facilitates social interaction. The community is not something that every participant embraced or was a part of, but almost all acknowledged that community exists. Many participants would bring up the term community well before I posed any questions about community. The large overarching theme is community; however, participants’ descriptions of the community were somewhat varied.

One of the more prevalent descriptors of the community was that of a “serious” group of people. One road rider I spoke with stated that he initially used Map My Ride as a tracking application. When I asked him why he switched to Strava, he claimed, “Map My Ride’s not that serious, it’s just people there . . . The community for Strava is so much more serious.” This user made a clear distinction between the Strava cyclists and “just people.” Other users echoed this description:
It’s one of those things where people that use Strava consider themselves, like, I guess, serious cyclists and kind of know what it's about.

One of the concluding questions I asked every participant was for them to loosely define, in their own terms and using a few words or sentences, what Strava means to them. This question frequently invoked notions of community. One rider stated, “The community who’s always looking to go faster.” This participant’s answer sums up the ethos of Strava. While not every participant wanted to “go faster,” all are seeking to improve in some way.

While scouting for interviews at the local trailhead, I only came across two people who had never heard of Strava. Most everyone had heard of Strava, and even if they did not use it, they still held an opinion of it. Many participants that I interviewed commented on the popularity of Strava:

Everyone in the area who rides, basically, uses it either on their smart phone or on their Garmin.

I would say almost everybody that I come in contact with if they mountain bike you know, if they do it on a regular basis they know Strava.

Only reason I use Strava is cause basically everyone uses it. You know, it’s kind of like Facebook, but it’s, you know, you share your rides with everyone.

Several participants detailed ways in which Strava afforded new forms of sociability. This sociability was present on the online platform, but most spoke more of face-to-face social situations that Strava helped to facilitate. For example, a prevalent situation users
encountered was meeting people that they recognized from Strava. A user may follow someone he does not know, but more often he would recognize a name from a leaderboard rather than following him or her. A user does not have to follow a person to see their username listed on a segment leaderboard. The following selections exemplify the social nature of Strava:

It’s also a way to meet people. You see them on the, on the, uh, leader board all the time, and all of a sudden, you’re riding with them one day. It’s kind of cool.

I met a couple people out and about who I actually followed on Strava and then I saw them in person. Um this one lady . . . she came up to me and she says “Hey I follow you on Strava” and I say, “I follow you on Strava” that was it [Laughs].

I can’t say I follow anyone but I recognize names and when I do meet them and that gives us a conversation piece, you know it kind of opens up the door and you say ‘oh yeah I seen you on Strava’ and we can definitely bind somewhat from our experiences with Strava, so it does open some doors you know as far as socializing with other bikers.

Some users felt like the community was not exclusive, or created by, Strava. In other words, Strava did not create a community of bicyclists, it merely supports a group of cyclists that have always been around. One mountain biker stated, “I think the community is more in the group here and then that carries over to Strava,” while a triathlete claimed, “I’m not sure that the community wouldn’t be there without Strava” [emphasis added].
Summary of theme 3. This theme has shown how the experience of using Strava is one of increased sociability. Many cyclists meet other users that they recognize from the web platform and bond over the shared experience of using Strava. There is a loose form of community surrounding Strava, but it is not a definitive community that every user is a member of. Lastly, the application has proven to be popular among both road and mountain bike groups.

Theme 4: An Emotion-Laden Experience

When speaking of the experience of Strava, participants would consistently invoke experiencing different emotions. I have titled this theme An Emotion-Laden Experience because many participants described certain feelings and emotions they experienced using the app. While not every participant experienced the same emotion, all participants used emotional language to describe the lived experience of cycling with Strava. After speaking with one female participant about why she enjoyed the cycling experience, I asked, “And you use Strava as well?” She was quick to respond, “Yeah, I’m addicted to it.” I asked a follow up question to investigate why she used such a strong word like addiction:

[Researcher]: What makes you say addicted?

[Participant]: Because it’s like if you go on a ride and you don’t record all that you did, you feel like you are missing something you know.

[Researcher]: So, what it, would you still go on a road ride, go mountain bike without it or?
[Participant]: I mean I would, yes, but I feel like I would be missing something [Chuckle].

While not everyone characterized or defined Strava as addictive, almost all expressed some form of emotional attachment to the technology or experiences facilitated by the technology. As a researcher in the interpretive paradigm, the close readings of interview transcripts allowed me to interpret some language as emotional. The *emotion-laden experience* theme should not only be understood as an attachment to the technology itself, but rather it should encompass emotions invoked by the affordances of the technology. For example, the ability to hold records, win trophies, or simply examine past ride results, were all described with emotional language. The emotions experienced are not singular and common to each and every participant. Users experienced delight and joy at some points of the experience. In other situations they felt a little “bummed out.” After asking a participant how often he used Strava, he explained:

Every time, [pause]—and I get really bummed out if I don’t, it’s almost like if a tree fell in the woods, and no one was there to hear it did it actually happen, and if I forget to hit record its like oh I never really went on a bike ride, it never happened.

Another team cyclist spoke of a similar ethos, “there are a few guys in the club who say ‘if you don’t post it on Strava, you didn’t ride.’ So there is kind of a push to use it more.”

Many participants were excited to review their results. The anticipation of waiting to see if they won a trophy is bound up as part of the experience of using Strava. When
users do not place in the rankings, win a KOM, or break their own record, they experience mixed emotions. One cyclist spoke of reviewing his post-ride results, “I'm like a fat kid with candy man I’m like ‘Dude, how’d I do?’ I think I went really hard on this part right here. It’s only my second best effort!” This user’s tone of voice conveyed emotions ranging from excitement and anticipation, to a hint of slight disappointment at discovering only a second best effort. Similarly, another participant stated, “It’s kind of a bummer, especially if I think that I did good, then I look at it and I didn’t do good at all.”

Many users detailed that when they first begin using Strava, they set many PRs (personal records). After extended use of the app, their record-setting rides become less frequent. A road cyclist spoke of the emotion tied to not setting PRs:

[Participant]: I love hitting PRs, it’s nice. But what sucks is after you ride for a while and you never hit PRs.

[Researcher]: How does that make you feel like?

[Participant]: It’s depressing [laughs].

[Researcher]: Because you, at first you were getting them, and then now you gotta work harder? Or?

[Participant]: Yeah. But that’s the nature though. That’s what timing yourself, [extended pause] you can’t get away from that.

Strava affords the ability to filter and sort your results by age, weight class, and gender. A road cyclist detailed his emotions after applying a filter to his results; “I did age a couple of times and I did male and female a couple of times and that got really depressing . . .
the girls were beating me on some spots.” This same rider then leaned close to the recorder’s microphone and clarified, “I’m not sexist by the way!”

Another cyclist who participated in both road and mountain biking spoke of a “pressing need” to review results:

When I get home it’s usually one of the first things I do . . . If it’s a good ride it’s a pressing need. If it’s a so-so ride it may be a day or two before I actually look and upload but it all depends on the ride and uh the distance of the ride to how strong a ride it was to, [pause] . . . some rides I can’t wait to get home to upload them.

But users were not always disappointed after reviewing results. Some participants expressed an urgent need to review results, and the joy at discovering a new record:

Aww man the second I’m done I hit stop and then I hit finish and I Just wait there and see if I got any trophy’s then um, If I got any I’m like ‘yeah!’

Ah, sometimes it’s kind of cool, especially if you’re going—if you’re trying to go hard and then you see it was like your best time that feels pretty cool.

I have gotten like good rankings and I’m like, “Oh, my God how did that happen!” [Laughs] You know, so you kinda like feel better.

Most participants would express an emotion, such as depression or joy, but then indicate that they were not that concerned about the results. For example, riders stated, “I’m never really like legitimately upset about it or, um, it’s not the same as like an actual race,” and “maybe I can do it faster next time, but that’s probably the fastest I could do it at the
time, but I don’t base my skills off of what Strava gives me.” Other riders tempered their emotions tied to trophies: “I mean I’ve won a bunch and I’ve lost them to friends and stuff, it’s not that big of a deal;” “the segments, those are kind of fun and novel but, not, not really why I’m on Strava.”

**Summary of theme 4.** Whether it is joy, depression, accomplishment, or contentment—all users indicated that the experience of cycling with Strava is one laden with emotion. The discussion section will relate the emotional nature of Strava back to the theme of motivation, as well as discuss the relationship between the emotions experienced/expressed and the frequent descriptions of technology as “just a tool.”

**Theme 5: An Augmented Experience**

Language that described Strava as a “tool,” or “training partner,” was very common among all participants. Some participants clearly stated that Strava was a tool; others would mention ways that the technology supplemented their cycling experience. One cyclist personified Strava: “It kind of helps you as a training partner almost.” Others described Strava as a tool: “I think Strava to me is just a tool to make my riding experience, uh, just a little more enjoyable and recordable;” “I think it’s just another training tool and for me it is, it’s an ability for me to record over time and save it.”

Significant statements that were grouped into this theme cluster were regularly centered around “helping” the user in some way. One participant, who said she frequently gets lost on trails, told me she has called up her friend to have him look at Strava on a desktop computer, then relay to her directions on how to find her way back to the trailhead. A different cyclist discussed similar circumstances. “If I happen to get lost or
something on a ride, I pull up the ride I’m trying to ride that I’ve ridden in the past and find my way back [laughs].”

Often, participants indicated that Strava afforded them access to new trails, routes, or new ways of riding familiar routes:

There is no question that having that ability to take another step, because if you are riding the same trail, for me like, one of things like I feel like bored with a trail the next thing I start to do is look for lines that are more difficult.

One thing that I have gotten I would say new thing is like new routes. So, like you, so you know, and you can see like the route that you did. Well, when you look at the end you can see counter routes tailing off a bit that are Strava routes. So, next time you will take a new route and you kinda figure out new places to ride.

I guess the biggest, um, change to my riding from riding with Strava is like people I follow I can see like a course they did. So, I can find new places to ride easier.

Overall, participants benefitted in some way from using the app. One avid road and mountain cyclist spoke of the experience before and after using Strava, “I probably rode 8 months without Strava, and I probably rode as much then as I do now, but you know I can appreciate my rides more by going back to Strava and just seeing where I rank.”

Another participant felt like his rides were more fun when using Strava, “I would not have as much fun if I didn’t have that. Mm-hmm. Well, especially for road.”
Summary of theme 5. The *Augmented Experience* theme is built around the idea that the technology supplements the experience of bicycling. The results of this study have shown that cyclists who use the technology do so because it adds something to the overall experience for them. Some users appropriated the technology as a way to find new routes or to lead them out of trails if they were lost.

Conclusion

Using phenomenological research methods, this study has charted the essential characteristics of experience for cyclists who use Strava. Their shared experience is marked by motivation, ethical dilemmas, socialization, emotion, and an augmented experience. Per Creswell (2013), I provide a summative characterization of the essential qualities that I interpreted regarding participants’ experiences of cycling with the IFT Strava.

**Summative description of the Strava cycling experience.** Specifically, the experience of cycling with Strava is marked by an overall motivation to improve in some way. This motivation is manifested through competition with others, comparison with others, and self-testing. The affordances of Strava have created an augmented experience for the user. Cyclists’ perceive the technology as helping them in some way. Cyclists’ often exhibit an emotional attachment to the technology or to the experiences facilitated by the affordances of the technology. The technology promotes sociability and community among users. And lastly, users are beginning to navigate ethical dilemmas associated with using the technology and navigating norms of behavior and membership in the perceived community.
CHAPTER FIVE
DISCUSSION AND IMPLICATIONS

The previous chapter detailed the five themes of (1) *King of the Mountain*, (2) *Ethical Dilemmas*, (3) *A Social Technology*, (4) *An Emotion-Laden Experience*, and (5) *An Augmented Experience*. This chapter weaves together a discussion about the five themes that ties back to literature review topics. I begin this chapter by discussing how Strava fits the model of a socially constructed technology. This section revisits the social constructivist viewpoint and applies it to Strava. I also introduce the concept of affordances to help understand the results. In the following section, I combine motivation, socialization, and emotion into a large discussion of all three themes. The third section is devoted entirely to a discussion of the *Augmented Experience* theme, and ties in another scholar’s findings on ‘experiential degradation’ in recreational activity. The limitations and directions for future research section acknowledge shortcomings of the present study. The chapter concludes with the implications section, wherein I detail practical applications for the results of this study.

**Discussion**

An *socially constructed technology*. In this study, participants who use Strava experience common themes of motivation, ethical dilemmas, increased sociability, multiple emotions, and an augmented experience. Many of these themes are influenced and shaped by the users. According to a social constructionist viewpoint, “technologies are continually remade by the things users do with them” (Lievrouw & Livingstone,
Strava certainly exemplifies a technology that users have helped to shape. Strava, by nature, is a very social technology. It is built around other users. If the technology did not connect with other users you would be left with a simple tracking application. Having connections to other users facilitates the themes of competition with others and comparison with others. Perhaps this is part of Strava’s popularity. Where other interactive fitness technologies track only the owner’s data, Strava affords competition and comparison amongst peers. If Strava’s popularity is indeed due to comparison and competition, then this likely means people with a more competitive personality will excel using the technology.

Strava is still a relatively new technology. Social shaping and construction effects are much easier to examine over a lengthier timeline. While it is hard to predict the long term “shaping” that this technology will undergo, there are some indicators that users are playing a hand in what the technology becomes. The affordances—detailed in the next section—intended by the manufacturer are shaped and manipulated by the user in ways that are less deterministic. Interviews and observation elicited some social shaping practices. These practices were not prevalent enough throughout the sample of participants to compose a large theme cluster, however I feel these practices still deserve a mention below. The theory of affordances provides an interesting framework for understanding the behaviors presented in this thesis.

**Affordances.** Before detailing technological affordances, I will establish a basis for understanding affordances. An affordance is a theoretical construct created by psychologist James J. Gibson. Gibson (1979) states, “the affordances of the environment
are what it offers the animal, what it provides or furnishes, either for good or ill” (p. 127).

Objects in our world hold some type of use value for a person. For example, a brick could afford more than just construction material; the brick could afford throwing, bashing, anchoring, or propping a door open. Gibson even describes geographical features such as a cliff as being “fall-off-able” (Scarantino, 2003, p. 950).

William W. Gaver advanced and applied Gibson’s affordances to the technology world. Gaver (1991) utilized affordances “as a way of focusing on the strengths and weaknesses of technologies with respect to the possibilities they offer the people that might use them” (p. 79). For example, Gaver (1991) denotes that a button appearing to protrude from a computer screen signals to the user that the button affords pressing.

Interactional affordances are also taken into consideration when designing technologies (Martin et al., 1997). Bradner, Kellogg, and Erickson (1999) appropriate the term as a way of looking at interactivity in social media networks. They deem that some networks have properties that facilitate interactivity, which they term “social affordances” (p. 153).

I am using the theory of affordances as a way to conceptualize and understand the results of this study. The SST approach and theory of affordances go hand in hand. I am looking at Strava and how the user interacts with the technology as an open and evolving process rather than a written and structured process. I pay particular attention to manufacturer intended affordances versus user negotiated affordances. Hutchby (2001) refers to technological artifacts in a textual sense that the user must interpret:

The writers of these technology-texts may seek to impose particular meanings onto the artifact, and to constrain the range of possible interpretations open to
users. Users, by contrast, may seek to produce readings of the technology-text which best suit the purposes they have in mind for the artifact (p. 445).

Hutchby (2001) further explains how technologies such as the telephone were designed and marketed with a specific purpose in mind, but were co-opted by users for different purposes than originally intended. The following paragraphs illustrate situations in which Strava users appropriate affordances of the technology for their own purposes.

Some users describe a practice of reviewing and reliving recorded rides by cleverly naming the data file. When a user stops recording, Strava will by default name the ride “morning ride,” “lunch ride,” or “afternoon ride” depending on the time of the day. Users have the ability to change the name of the ride to anything they want. One participant states:

I’ve seen a lot of taking keywords out of maybe something they’ve seen from the ride or some sort of experience from it and naming it in that way, so it kind of, when you’re looking back through it, uh, you kind of remember that ride almost as like a scrapbook.

It is hard to say if the technology manufacturers intended for users to treat the technology as a scrapbook of experiences, but this type of activity will likely help shape what the technology becomes.

Another practice with naming rides concerns quantifying and justifying efforts. A cyclist may name the ride in a creative way that will hint to others that this was not his or her best effort. Presumably this is done so that if another cyclist views his or her profile
the other person can gauge their effort against physical, emotional and environmental limitations. As an example of this a participant claims:

I have read ‘slow ride to the docks’ or something like that [as the title of someone else’s ride], you know, just to kind of, but at the same time, they’ll say that, and they’ll get like the, you know, ‘county line sprint’ [a segment KOM] or something, you know, some segment, even though it’s their ‘easy ride.’

In this example, a cyclist named his ride something to let others know it was an “easy” ride. However, this person still managed to claim a KOM record. I have seen similar practices in my own reading of others’ Strava profiles. A user will name a ride in a way that lets his or her followers gauge his or her effort. For example, I have seen “ride with the girlfriend,” “two trees down,” and “GARMIN RESET MID RIDE!” I have also seen users title a ride based on their physical feelings or abilities that day, such as “sick,” or “Squats Day.” In this last example, the user indicates that they likely did squats, a strenuous leg and core workout, before going on a bicycle ride. I would not be surprised if future versions of the Strava platform account for this activity. For example, a future version may allow you to indicate your overall motivation level that day, or classify the ride as an easy, moderate, or strenuous effort. One online exercise-log program has already implemented a similar feature. Bodybuilding.com’s BodySpace profile, a social network for tracking weight lifting progress, fat loss, etc., allows users to log their motivation level from one to ten and include a brief status update (bodybuilding.com).

Theme two, Ethical Dilemmas, is also a great exemplar of how Strava has been, and will continue to be, shaped by various social groups and their formation of norms for
use of this interactive fitness technology. First, users are still navigating what it means to be an ethical Strava user. Participants view activities such as using a car to claim segments, or cutting trail corners to be clear forms of cheating, whereas other activities are viewed as humorous or harmless. These dilemmas will likely shape what the technology becomes. After a participant informed me of digitalepo.com, I searched for more information on the website. The participant was correct in stating that digitalepo.com allows cyclists to “juice” their data for a faster time. The site is cleverly named after erythropoietin, the drug many professional athletes, including Lance Armstrong, have been banned from organized racing for using (Petersen, 2013). The digitalepo site appears as a parody of Strava, which they lambast as an “obnoxious street racing website” (www.digitalepo.com).

Some cyclists are beginning to find ways to spot digitalepo cheats. By closely examining the speed and heart rate charts, some users have found a way to determine if someone has used the performance enhancing website (Thompson, 2013). Strava users are encouraged to flag this form of cheating. Lance Armstrong, the seven time Tour de France winner who openly admitted to using drugs throughout his career, remains a prominent athlete on the website with over 15,000 followers. In an interview with Bloomberg, Strava CEO Mark Horvath stated, “We want to be careful not to become a police state . . . We are not going to say who can use Strava and who can’t” (Buteau, 2013, para. 2). The article explains that Strava users have mixed reactions to Lance Armstrong’s continued usage of the website. This type of scenario will likely help to socially construct what the technology becomes. Although a KOM trophy ultimately
holds no monetary value, users will likely become upset if an athlete who uses
performance-enhancing drugs captures their trophy. A more concrete example of ethical
dilemmas leading to changes in the technology follows.

The ethical dilemmas revealed in this study are concerned with what it means to
be an ethical Strava user. However, this is not the only form of ethics tied to the world of
Strava. Participants rarely mentioned the potential hazards of using the technology, but a
previous textual analysis of popular press articles about Strava revealed that there have
been cases of people using the technology in an unsafe manner. In 2010, William Flint
was reportedly killed after striking a car while speeding down a hill in Berkeley,
California. It is alleged that Flint was attempting to reclaim a KOM trophy on a segment
that ran the length of the hill (Vanderbilt, 2013). Strava has since implemented measures
to control dangerous activity. Segments that are deemed hazardous can be flagged for
removal. Users of the website, as well as Strava staff, flag segments for bad GPS data,
suspected motorized assistance, and mislabeled data (e.g. a bicycle ride accidentally
listed as a run). A user can no longer set goals on segments that are on a steep downhill
grade.

I offer these brief examples as a way of conceptualizing the technology as open to
social shaping and construction. Cyclists titling a ride as a way to either scrapbook a ride,
or as a way to qualify their effort, could play a role in shaping what the technology
becomes. I suspect that the technology will become much more social in the future by
allowing direct messages, chat, and photo/video sharing. The dangerous activities
associated with Strava have already influenced later versions of the technology. As I
mentioned earlier, the timeline is too short right now to say with certainty what influence relevant social groups will have on the technology of Strava. I do feel that I can state with certainty that adoption of Strava has not followed a linear and determined path of acceptance.

**Motivation, Socialization, and Emotion.** Perhaps the most significant aspect of this research is that Strava users clearly and inarguably experience motivation to cycle more. To begin, I will expand upon the motivating factor of Strava. My interpretation is that other themes are interconnected with motivation. Competition, comparison, and self-testing have the clearest connections to motivation. Nevertheless, I posit that emotionality and increased sociability *could* be tied into a person’s motivation. All three of these themes, and the associated sub-themes of competition, comparison, and self-testing, likely play a part in creating an overarching experience of motivation.

**Motives.** One of the underlying questions of this inquiry concerns motives and how the IFT Strava shapes, is shaped by, and/or fits within a person’s motives. Linking how motivation fits with technology mediation is an arduous task due to the numerous theories available. The psychology field has developed theories of motivation related to work, organization, and sport. This section of the discussion will briefly cover some of the basic overarching ideas related to motivation rather than pursuing just one theory of motivation. In particular I borrow from theories that emphasize the communicative dimensions of motives and motivation.

C. Wright Mills (1940) defines motivations as “accepted justifications for present, future, or past programs or acts” (p. 907). Put simply, motivation is characterized by how
a person rationalizes their actions. Mills views motives as social phenomena that can be interpreted and explained. Mills’ view of motives can help to make sense of the first theme.

Two prevalent concepts throughout the interdisciplinary literature of motivations are intrinsic and extrinsic motivations. Reiss (2012) uses a child’s desire to play baseball simply for the enjoyment of the game as an example of intrinsic motivation, or motivations from within. Conversely, offering a form of compensation or external reward for playing baseball exemplifies a form of extrinsic motivation. Vroom (1964) proposed the expectancy theory of motivation, which shares similarities with extrinsic motivators. While the theory is comprised of four constructs, I am focusing on the construct most germane to this project—valence. Valence is focused on how a person evaluates possible outcomes of a situation. A person will weigh the importance, attractiveness, desirability, and anticipated satisfaction with outcomes when deciding a course of action (Van Eerde & Thierry, 1996).

Psychological theorist David C. McClelland (1961; 1973; 1978) developed “needs theory” throughout several publications. This theory is also known as “three needs theory” and “acquired needs theory.” Needs theory claims that a person has one of three dominating motivational drives in life. The three drives are: achievement, affiliation, and power. People are characterized by which category they fall into. An achievement oriented person strives to complete tasks; an affiliation motivated person favors collaboration, goes with the group, and wants to fit in; the power motivators seek control and wish to be in charge (Kerr, 1997). These notions of intrinsic vs. extrinsic motivations,
as well as McClelland and Vroom’s constructs can help to make sense of the data gathered during observation and interviews.

Just as with recreational experiences, it is important that “motivations” not be viewed in “static” and “purely psychological” terms. Motivations are adaptable, often cultivated through discourse and the persuasive nature of outside factors. I treated motivations throughout this study as subjectively defined by each individual participant.

The data from this thesis revealed that motivation is achieved through both intrinsic and extrinsic motivators. For example, one participant claimed, “It’s competitive but knowing [laughs] that I’m just, uh, going to be out here riding for fun in the end.” This user is likely experiencing a mix of intrinsic and extrinsic motivations. He is extrinsically motivated by the reward of winning a segment, while intrinsically motivated by an innate desire to ride his bicycle.

**Community and interactivity.** The interactivity that Strava fosters helps to create the Strava community. This interactivity also promotes the socially shaped nature of Strava. As Castells (2009) claims, the more interactive the technology is, the more likely it is that users will become the producers of the technology. It is helpful to look at established definitions of interactivity.

One of the critical elements of interactive fitness technologies is interaction. As McQuail (2005) states, “The single most defining feature of ‘new media’ is their degree of interactivity” (p. 558). Interactivity allows for a two-way communication flow between a medium and user, or between users of the same network, and is often a more efficient means of communication (McQuail, 2005). McMillan (2006) is careful to
scrutinize: “It is also important to realize that interactivity means different things to different people in different contexts” (p. 205). The three different types of interactivity are classified as user-to-user, user-to-document, and user-to-system (McMillan, 2006). User-to-user interaction is communication between two users through a communications media such as e-mail, Skype, forums, and any other computer technology allowing communication.

The idea of the user interacting with media and promoting social interaction with others is far from a new concept. *Winky Dink and You* (1953) was one of the first shows to emerge in the incipient field of interactive television. The show had children across the U.S holding a vinyl overlay to the television screen where they would trace connect the dot puzzles, draw things, and solve puzzles (Ingram, n.d). Scheimer (1994) details two instances of radio being utilized interactively to promote community ties. The 1983 *Concert on Bicycles* had 130 radio listeners strap portable radios onto their bicycles and synchronously ride around a lake taking in the mass broadcast. The 1991 *Talk-Back Piano* event had community members control a piano by calling in voice commands over the phone. Three telephone lines allowed listeners to control harmony, pitch, and tempo through a MIDI controlled piano. The result was an amalgamation of vocals and sounds generated by listeners (Scheimer, 1994). Kortti (2011) studied the role of Finnish television in social life from the late 1950s to the mid 2000s (Kortti, 2011). By analyzing people’s memories of early television the author was able to conclude that television has undergone several changes in how viewers interact. The television initially served as a shared viewing experience that affected a person’s sense of time and place, however, as
audiences fragmented and the Internet boomed, there became less communal viewing and
more online social interaction related to television content (Kortti, 2011).

Xu and Yan (2011) also explore the idea of the shared viewing experience stating,
“Television can offer a sense of togetherness. Watching events live on television . . . one
could picture numerous viewers watching the same show simultaneously around the
world, thus feeling a ‘shared universe’” (p. 189). In order to determine if television
viewing actually creates a feeling of community, the authors created a survey and scale to
test feelings of community. Results of the study found that viewers preferred a television
show based on how it would connect them socially with their peers. Xu and Yan (2011)
were clear in differing their study from parasocial interaction, which studies how viewers
feel connected to a real or fictitious character on television. In summary, their study
found that feeling connected to other television viewers is a true phenomenon that can
“facilitate conventional and virtual communication and enrich a sense of community near
and far” (p. 203).

The future of shared viewing of content and interactivity is still being explored.
Mate and Curcio (2009) of the Nokia Research center studied a proposed model of
Mobile Interactive Social Television, or MIST. Through the use of voice, data, and text
user-to-user interaction MIST would potentially allow users to “create an experience of
watching together by providing its participants a common shared context” (p. 116). As of
this writing, the concept of MIST has remained a demo technology.

I argue that Strava functions similarly to television. As the previous studies
revealed, people feel connected and part of a social community when discussing or
watching television. The Social Technology theme of this study details that the experience of Strava is one of increased sociability. While Strava users are certainly not passively watching television, they are interacting in person, as well as on a web platform, and this gives them a shared experience.

**Online communities.** Strava users revealed that there is a form of community tied up within the experience of Strava. To place the results in conversation with existing ideas of community, I provide some essential concepts related to community. Community is an “idealized form of human association in which the members share boundaries of space, identity and interaction . . . typically a largish and enduring social group based on residence, but can also be formed on the basis of some other significant identity” (McQuail, 2005, p. 551). This definition is firmly rooted in a traditional understanding of community. McQuail (2005) notes boundaries of space and residence, as well as other significant identities as characteristic of the traditional community. With the emergence of “new” media, claims are often made about the unitizing and community forming potential of the technologies (Jankowski, 2006). Radio, television, and finally the Internet, have all faced praise and critique as the vehicle that will build community. Because an online community is a component of Strava, I structure this literature review section around theories of community on the web.

In his 1987 article, Howard Rheingold was among the first to define “virtual community:”

A virtual community is a group of people who may or may not meet one another face to face, and who exchange words and ideas through the mediation of
computer bulletin boards and networks. Like any other community, it is also a collection of people who adhere to a certain (loose) social contract, and who share certain (eclectic) interests. (p. 3)

In response to Rheingold’s definition, Van Dijk (1998) defines virtual community as “communities which are not tied to a particular place or time, but which still serve common interests in social, cultural and mental reality ranging from general to special interests or activities” (p. 40).

In *The Internet Galaxy*, Manuel Castells (2001) studies influences of the Internet on larger societal issues. Castells takes a critical approach to Rheingold’s idea of the virtual community (p. 117). Castells responds to highly optimistic claims that that the Internet will usher in a new era of free and open communication, as well as claims that the Internet leads to social alienation and isolation (Castells, 2001). Using several prior research studies to support his claim, Castells states, “the body of evidence does not support the thesis that Internet use leads to lower social interaction and greater social isolation” (p. 124). He further argues that virtual community, as proposed by Rheingold, is based on an inaccurate understanding of community. Community in Rheingold’s definition is based more on cultural components, spatial ties, and material support. Castells adopts the definition of community as proposed by Barry Wellman, “Communities are networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity. I do not limit my thinking about networks to neighbourhoods and villages” (Wellman, 2001, p. 127). Castells concludes that new technology has created what he calls “the network society,” where multiple
varying online networks “become forms of ‘specialized communities;’ that is, forms of sociability constructed around specific interests” (pp. 132-133).

One of the main differences to take notice of is the de-emphasis of spatial ties in online communities, as opposed to the traditional offline community. All of the scholars previously discussed declare that the members of the community share special or eclectic interests. This previous section covered different definitions and ways of thinking about communities and interaction.

At the intersection of online communities and interactivity is social media. New media scholars boyd and Ellison (2008) define social networking sites as:

Web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site. (p. 199)

This view of social media treats it as a complex system wherein definitions of community and interactivity overlap and are nearly interdependent upon one another. Social media is commonly used to describe how users interact with one another, usually over an Internet connection. Facebook, Myspace, Google +, and Linkedin are forms of social media that allow chatting, sharing content, and constructing a profile, just to name a few of the features. Linkedin is typically viewed as a more professional, career related, version of the prior three. The micro-blogging site Twitter allows users to send out under 140 character tweets to their lists of followers. Users of Second Life and Sims interact with
one another and live out lives through virtual avatars: “Avatars can be made to look like almost anything you want, you can change your sex, physical attributes, and be clothed or not” (Descy, 2008, p. 6). Usually Second Life and Sims interactions remain virtual; however, in some instances relationships can be continued offline (Lynn, 2007).

Many of the authors previously discussed emphasize a “significant identity,” (McQuail, 2005, p. 551) or “specific interests” (Castells, 2001, pp. 132-133). In this study, the special interest of users in the community is based on their enjoyment of Strava. When defining community, some scholars established that users “adhere to a certain (loose) social contract” (Rheingold, 1987, p. 3). This “loose” social contract is easily witnessed in the Strava community. For example, theme two Ethical Dilemmas is a perfect example of a “social contract” that is not fully formed among members.

Consolvo, Everitt, Smith, and Landay’s (2006) study, Design Requirements for Technologies that Encourage Physical Activity, provided early indicators of technology features that promote activity. After linking an Omron pedometer to a Nokia phone, the researchers qualitatively analyzed participants’ motivation levels. The authors concluded that future designs should support social features. They state, “because participants were sharing activity level and progress toward their goal with buddies, they felt pressure to make their goal, beat a buddy, or not have the lowest step count” (p. 463). The pedometer study provides interesting conclusions about motivation, particularly considering it is from the pre-smartphone era. Similarly, the present study on Strava has shown that this interactive fitness technology is linked to an experience of increased sociability. Considering other research has shown that social interactions increase motivation, then it
is possible that the sociability of Strava could factor into a person’s motivation. A future study could examine and measure precisely whether or not the social nature of Strava leads to increased activity.

The sub-theme of comparison to others is not exclusive to the Strava community. Ploderer, Howard, and Thomas (2008) qualitatively analyzed the bodybuilding.com online BodySpace community for amateur and professional bodybuilders. After interviewing 13 bodybuilders, the authors determine that bodybuilders conduct upward comparisons, downward comparisons, and comparisons with people on a similar level. The participants stated that these comparisons helped to motivate them to achieve goals. This thesis did not present findings on downward comparison. However, participants frequently indicated that they compared with others or were in awe of how much another person was able to ride.

One interesting observation of the research is how theme 4, *An Emotion-Laden Experience*, and theme 5, *Augmented Experience*, intersect. Participants refer to Strava as “just a tool,” or “just another tool,” yet there is a certain degree of emotion tied to use of the app. Although it is just a tool, many users feel as if they are missing something if they do not use it when riding. This emotional attachment to technology could be utilized in an effort to increase user motivation.

The main takeaway of this section is that Strava motivates. Theme 1 of the results section, as well as the first part of this section, establishes a clear link between increased motivation and Strava use. The previous section has demonstrated ways in which sociability and emotionality could be linked to motivation.
**Augmented experience.** When initially designing this study, I wanted to examine traditional recreational experiences versus technology-mediated recreational experiences. As stated in the introduction to this paper, scholars tend to hold a dual view of technologies. Buckingham (2006) states of technology, “It holds out the promise of a better future, while simultaneously provoking anxieties about a fundamental break with the past” (p. 75). One of my first interview questions asked participants to describe their history with cycling. I would follow up this question by having them detail what it is about the experience that they enjoy. Throughout the interview, participants spoke of the experience in terms of benefits rather than losses. Therefore, results of this study do not indicate that the technologically mediated experience is vastly different from the traditional experience of recreation. Yes, the technology does augment the experience, but is not replacing or changing the traditional experience. For example, one should note that tracking a bicycle ride is not a new experience created by Strava. One participant, who had been mountain biking since 1996, detailed how his group of riders would track their progress and compete:

> We used to have our little stopwatches and we’d, you know, we had our little time trials set up. It wasn’t as public . . . that was before Strava, or, smart phones, or anything like that. And yeah, we have a log and a record.

This same rider clarified, “So, with the Strava you just hit play and go ride, don’t have to worry about doing anything else.” If anything, it made recording the activity less troublesome. So the ‘augmented’ experience shouldn’t necessarily be understood as
something entirely new that did not exist before. The experience is not characterized by a “fundamental break with the past” that Buckingham (2006) details.

Other researchers who studied recreational experiences have found differing results. Senda-Cook (2012) analyzed hikers’ perceptions of “authentic” recreational experiences within Zion National Park, Utah. What her study revealed is that many hikers described what she termed “experiential degradation” (p. 130). Senda-Cook defines this as, “the perceived loss of an expected experience” (p. 130). Hikers felt that things such as paved trails, people running down steep trails, other hikers not properly yielding, etc., negatively impacted the experience of recreating in Zion. None of the participants I interviewed indicated anything in line with an experiential degradation. In fact, the technology was described as doing the exact opposite. The directions for future research section highlights areas of research related to the core experience of bicycling.

Limitations of this Study and Directions For Future Research

There are certain limitations and directions for future research that should be addressed. The first limitation I have come to discover concerns the sheer size of this project. For example, there are so many aspects to the world of Strava that it is difficult to adequately cover all of them. In keeping with a Moustakas (1994) phenomenological approach, I asked only a few broad general questions regarding experiencing the phenomenon. This allowed the participants to freely discuss their experiences. At times I provided light guidance to certain subject areas. Very few participants brought up the topic of interactions on the online platform. Not a single participant mentioned the ability to give ‘kudos’ on the online Strava platform. The study still succeeds in that it provides
the lived experience of using Strava, but I believe that a future study would benefit from closer analysis of the web platform. Do online interactions, such as giving ‘kudos,’ intersect with or influence motivation? In a similar vein, none of the participants delved into the area of cross-platform ride sharing. By that I mean that the inquiry did not provide insights into reasons for sharing Strava rides onto other social media platforms such as Facebook and Twitter.

Furthermore, this study was relatively broad in that it focused on anyone who used Strava. Future research could further parse down the sample size to various groups of users. As detailed in the results section, many users self-identified as serious, recreational, and enthusiast. It could be beneficial to conduct a study with a narrow group of participants—examining only highly competitive road cyclists who ride several times per week or recreational cyclists who only cycle occasionally, for instance. I feel that segmenting groups of users in this way would reveal much more specific results. Along similar lines, I did not have a gender-balanced sample of participants. The methods section of this thesis detailed the difficulties in finding a perfectly gender balanced sample. Nevertheless, the results from this study are more generalizable to all cyclists who use Strava.

A prominent direction for future research that I plan to pursue is tracing a non-user’s journey into fitness tracking. What characterizes a non-user’s cycling experience? How, if at all, is the experience altered or enhanced after beginning use of the technology? Will similar themes of motivation, ethical dilemmas, emotion, sociability, and enhancement be revealed? A more rigorous approach, possibly with additional
quantitative measurement methods, could be implemented to track motivation throughout use of the technology.

The cycling history section of this paper provided a description of the core experience of mountain biking. The experience is marked by a sense of freedom, immediacy, and riding without time for conscious processing—often described as “flow” (Dodson, 1996; Taylor, 2011). Some riders seek higher risk experiences for a “buzz” or “thrill,” while others desire to experience nature (Taylor, 2011). This thesis is mainly concerned with the experience of cycling with technology. However, some participants described the experience using language matching academic descriptions of the traditional mountain biking experience:

I like it cause it’s risky, right? You don’t have time to think about the—you just have to like, go over all the obstacles, right? You don’t have time to think about them. And if you think about them, you probably fall.

Riding through the woods is really hard to beat. Just the freedom of being able to, you know, zip out in the middle of nowhere within 20 to 30 minutes.

A future study could closely examine the core experience of mountain biking as it applies to a specific group of riders who do not use Strava. In the discussion section, I posit that Strava augments the experience of cycling and does not lead to experiential degradation. I think useful insights could be gained from comparing and contrasting Strava users vs. non-users’ core experiences. Do both Strava users and non-users experience sensations of freedom, flow, and thrill? In order to proceed with this future study, one would likely
need to move away from the phenomenological approach and begin to embrace more targeted questioning.

As the results revealed, Strava is thought of as “just a tool,” yet there was no shortage of emotion tied to using the application. This begs a question of other fitness-related interventions. Are there emotions tied to other fitness programs, including technologies? Were people emotionally tied to an 8-minute Abs video workout? Are users also “addicted” to calorie counting apps? It was never the aim of this phenomenological study to specifically examine if sociability and emotion lead to increased motivation. However, what this study does offer is an accurate description of the lived experience of using Strava. This experience is characterized by increased sociability and emotion. Therefore, a gap has formed in our knowledge of this interactive fitness technology. Does increased sociability and emotional attachment to the hardware of Strava, or the experiences afforded by the technology, lead to increased physical activity?

At this point it is still speculative of this study to conclude exactly which workout incentives were/are addictive. Where research could steer is looking at which types of technology create these emotional ties. The better understanding we have of technology within recreational experiences, the better we can use the technologies to promote overall health and well-being. Technological developments continue to intersect experiences of recreation. In the paragraph below I provide one example of a recent fitness application that attempts to address motivation and personal accountability.

One of the latest fitness apps on the market, GymPact, attempts to motivate the user through financial loss or gain. Users input their credit card information and create a
pact regarding how many times they want to workout that week. The user then creates a wager of how much money she will have to payout if she does not meet a workout goal. If the user meets her goal then she receives money into her PayPal account. This money is funded from other users who did not meet their workout goals (Cohen, 2014). GymPact provides an example of a direct attempt at motivating people to exercise. While this is an example of just one fitness application, it is important to continue studying Strava and other fitness applications with an eye toward how they mediate persons’ motivations and experience of fitness/recreation.

**Implications of this Study**

The IFT Strava provides a unique exemplar of technology merging with experiences of recreation, health, and well-being. Public health policy makers, as well as fitness technology manufacturers and designers could benefit from reviewing the results of this study. Given what this study has presented about increased motivation, perhaps the most logical application of the research is to address the obesity and health crisis facing the United States. The challenge moving forward is to understand which social groups respond to which motivators, while at the same time remaining aware of ethical dilemmas the technology can help create. Additionally, extrinsic and intrinsic motivations should be taken into consideration when designing new technologies or creating public health campaigns.

Cycling helps reduce cancer risks, increases cardiovascular and cardiorespiratory health, and promotes weight loss (Oja et al., 2011; Lusk, Mekary, Feskanich, & Willett, 2010). Cycling can also contribute to overall well-being, including mental health
(Barbour, 2013). This study has shown that Strava users in particular are motivated to cycle more. Interviews with cyclists also corroborated claims of the health benefits of cycling:

It’s fun, it’s relaxing, it’s clean, and you are not polluting the air um, and it’s and it takes care of your stress and then you just forget about everything.

I felt like there was always a challenge of something to accomplish. So, it’s like always something to get better at some you know, either fitness or technical riding or something like that.

It’s just a good way to get out and, you know, explore stuff a little bit faster than just running or hiking. Um, so health and just kind of getting outdoors.

You stay in good shape, stay strong, feel good about yourself.

Public health campaigns aimed at motivating people to exercise could benefit by implementing a technology that increases motivation. The problem lies within figuring out which specific themes or aspects of the experience are motivating to which social groups. This is no easy task. Perhaps no better example exists of this than an interaction I had with what I perceived to be a relatively leisurely cyclist. While at the trailhead, one of my other interview participants referred me to a friend of his and told me that it was her first day riding off-road, and that she mostly rode on paved trails. When I observed her bicycle and gear setup I was somewhat shocked; her bike was of a lower quality, department store variety—hardly the bicycle one would expect to see getting ready to tackle a formidable mountain bike trail full of roots and rocks. Once the interview began,
she indeed stated that she was a leisurely cyclist. At this point I thought she was probably an occasional user of Strava, but she was quick to state, without any prompting, that she was “addicted to it.”

I was a bit surprised. Here was someone I thought to be a casual Strava user telling me she is addicted and is motivated to ride more. For her, motivation came through comparison with past results and viewing the calories she burned. The point of this story is that health campaign managers and fitness technology developers alike should understand the various factors that motivate relevant social groups. Whereas the spandex-clad, competitive road rider with a tricked-out $5,000 sub-20 pound carbon fiber bike may find motivation through competition, others may be motivated by personal goals and self-testing.

I approached one potential interview participant as he unloaded his mountain bike at the local trailhead. Like many I spoke with, he was familiar with Strava but did not use the technology. He stated that he would like to use the app, but his employer was a member of an insurance company that used their own form of tracking. Plan members received reduced premiums for recording their healthy activities. Perhaps insurance companies, tech manufacturers, and health professionals should explore the consolidation of these motivations, affordances, practices, platforms, and the like.

**Conclusion**

I began this phenomenological exploration of Strava by explaining the importance of studying technological applications that could potentially address the obesity epidemic facing the United States. I have reviewed a plethora of multidisciplinary
literature around the topics of technology and fitness, interactive fitness technologies, and theoretical perspectives on technology. In the methodology chapter, I detailed my interpretivist phenomenological approach to data gathering and analysis. After participant observation and in-depth qualitative interviews with 11 participants, five theme clusters emerged. In chapter four, I used vivid examples to detail the five theme clusters of (1) King of the Mountain, (2) Ethical Dilemmas, (3) A Social Technology, (4) An Emotion-Laden Experience, and (5) An Augmented Experience. Lastly, in this chapter I discussed what all of the themes mean, and offered limitations and directions for future research.
Appendix A

Images

Figure A-1: Strava Data and Map.

Figure A-2: Strava Profile
Appendix B

IRB Expedited Informed Consent Document

Information about Being in a Research Study
Clemson University

Strava Usage Study

Description of the Study and Your Part in It

Dr. Brenden Kendall and Roth Smith are inviting you to take part in a research study. Dr. Kendall is an assistant professor at Clemson University. Roth Smith is a graduate student at Clemson University, running this study with the help of Dr. Kendall. The purpose of this study is to learn more about how cyclists use and talk about the smartphone/GPS application Strava, as well as similar technologies. Smith anticipates interviewing approximately 10 individuals and observing rides with approximately 3-5 individuals.

You are being asked to participate in a one-on-one interview with Roth Smith, or an interview combined with an observational experience. This interview will be audio recorded, and the file will be stored on the researchers’ password-protected computers. If you opt to participate in the interview alone, your participation should take approximately 20-40 minutes.

If you choose to participate in the observational research, Roth Smith will accompany you on a bicycle ride where you use Strava. He will observe your interaction with technology and occasionally ask questions of you. You will schedule the ride according to your availability and ride preferences (regarding, for example, duration, distance, difficulty). If you allow it, observation may occur during ride preparation and normal post-ride activities.

There is no cost or compensation for participating in this study.

Risks and Discomforts

The risks or discomforts to you in this research study are minimal. We do not anticipate a risk to you when participating in the one-on-one interviews.

If you participate in the observational research, the risks and discomforts to you should not be any different than typical group rides using the Strava technology. You will determine the location, duration, distance, and difficulty of the ride to be taken for the purposes of observation. Bicycle riding is an inherently dangerous sport. No compensation or coverage of medical treatment will be provided for you should you be injured during or because of the ride.
Possible Benefits

We do not know of any way you would benefit directly from taking part in this study. However, this research may help us to understand how technology is utilized during recreation and leisure experiences.

Protection of Privacy and Confidentiality

We will do everything we can to protect your privacy and confidentiality. We will not tell anybody outside of the research team that you were part of this study or what information we collected about you in particular. Audio recording of your interview will be destroyed no later than one year after completion of the study; we anticipate that the study will be completed in late May 2014. If publication of this research occurs, a pseudonym will be used in place of your real name. Research documents will be stored on the researchers’ password protected computers and file-sharing systems. Transcriptionists or other hired assistants will sign non-disclosure agreements.

Choosing to Be in the Study

You do not have to be in this study. You may choose not to take part and you may choose to stop taking part at any time. You will not be punished in any way if you decide not to be in the study or to stop taking part in the study.

Contact Information

If you have any questions or concerns about this study or if any problems arise, please contact Dr. Kendall at Clemson University at brendek@clemson.edu or 864-656-5255.

If you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-6460 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC’s toll-free number, 866-297-3071.

Consent

I have read this form and have been allowed to ask any questions I might have. I agree to take part in this study.

Participant’s signature: ___________________________ Date: __________________

A copy of this form will be given to you


A Healthy Trend -- the rapidly expanding digital health and fitness market. (2012). *TWICE: This Week in Consumer Electronics,* , 10-12.


Proceedings from *IEEE International Conference on Rehabilitation Robotics.* Seattle, WA.


Get fit gangnam style; YouTube sensation's distinctive dance moves inspire copycat workout routines and classes. (2012, September 25). *The Toronto Star*


