IT’S A MAN’S WORLD: FEMALE STUDENTS IN A MALE-DOMINATED
LEARNING ENVIRONMENT

A Thesis

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in

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by

Rory Elizabeth Gillingham

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Rory Elizabeth Gillingham

Approved by:

__________________________________, Committee Chair
Geni Cowan, Ph.D.

__________________________________, Second Reader
Edmund W. Lee, Ed.D.

______________________________
Date
Student: Rory Elizabeth Gillingham

I certify that this student has met the requirements for format contained in the University format manual, and that this thesis is suitable for shelving in the Library and credit is to be awarded for the thesis.

________________________________________, Department Chair
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Graduate and Professional Studies in Education
Abstract

of

IT’S A MAN’S WORLD: FEMALE STUDENTS IN A MALE-DOMINATED LEARNING ENVIRONMENT

by

Rory Elizabeth Gillingham

Brief Literature Review

The researcher reviewed Bandura’s (1986, 1999) social cognitive theory, Gottfredson’s (1981, 1996) theory of circumscription and compromise, and Eccles’s (1987) model of educational and occupational choice. People choose a career based on several factors, including self-efficacy, interest, and whether the career fits with their self-concept.

Statement of the Problem

The purpose of this study was to understand why female students would choose to study vehicular repair, a traditionally male subject, in an overwhelmingly male learning environment. By understanding their motivations and challenges, the researcher hoped to make it easier for future women to study this subject and to encourage more women to consider the automotive field.

Methodology

An online survey was distributed to current female students of the Technical Mechanic School, as well as to the alumnae. Eighteen current students and 12 alumnae
answered the questionnaire. Additionally, the researcher interviewed 11 of the current students using open-ended questions for more anecdotal information.

Conclusions and Recommendations

Most of the students expressed either love of the subject matter or the ability to make a good living as reasons for studying automotive, diesel, and collision repair. Many were introduced to the automotive field at an early age or through their high school shop program. They believed very strongly in their ability to succeed in this field regardless of naysayers, whether in their family or in their classrooms. Encouraging females’ interest in cars and trucks at an early age may be the key to more female technicians in the future.

Geni Cowan, Ph.D.

Date
DEDICATION

This work is dedicated to my family: to my sister and my brothers who have been my role models – for better or for worse – my whole life. I especially want to thank Renee for suggesting eight years ago that if I didn’t like what I was doing, I could move to California. If not for her love and concern, I certainly would not have started down the road that has led me here.

When you have a mother who reviews spelling words with you every morning at breakfast and corrects your grammar from the time you begin speaking, or a father who goes back to college in his 40s to earn his MBA (driving three hours round-trip to class) and who works a second job so you can go to a private high school, you learn early that education is not just a priority but a lifelong pursuit. Mother and Dad, I can never thank you enough for all your unconditional love and support.

This work is also dedicated to the badass women who inspired, and are the subjects of, this thesis: the female automotive, diesel, and collision students. You have so much drive, fearlessness, and swagger to do what you do every day. I admire you, and I thank you.
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First and foremost, I must thank my cohort. You ladies (and gents, from time to time) are some of the greatest people I have ever had the pleasure of suffering with, and I am certain I would not have finished without your encouragement and wisdom. You are brilliant, talented, and caring souls who will improve the state of higher education or wherever your careers take you. I would specifically like to thank the following people:

- Brenda – If being a superstar of academia ever becomes boring for you, you know you can get a job as a cruise director. Thanks for making our cohort a family.
- Maria – You are the only person who can make a skit about risk management enjoyable. I cannot wait for your first movie.
- Sally, Raquel, and Vanessa – Without having you on “The Inside” at Sac State, we all would have missed numerable deadlines, used the wrong forms, enrolled in the wrong classes…I could go on. You kept us on the right track.
- Venesha – Our honorary cohort member, your timely e-mails literally saved me from tears more than once in the last three years. You deserve a long vacation and a raise.

I have to thank Dr. Cowan and Dr. Lee for not giving up on me and my thesis. Thank you for your guidance and thank you for not making me meet you on campus.

I want to thank my place of employment (which shall remain nameless to protect the subjects of this thesis) for allowing me to study our students and for your tuition-reimbursement policy. Specifically, thanks to Adrian Cordova, Jennifer Whalen, and
Tess Dubois-Carey for all your help. I truly believe in the importance of a vocational education because of the good work we do every day.

Some friends ask how school is going or encourage you to do your homework; mine wager on whether I am going to hit my deadlines. I’m not sure what the odds were that this thesis would be approved, but I hope you made the right bet. Thanks, especially to Leslie, for the countdowns, the posters, the cards, the nagging, the knowing looks, and excluding me from social invitations so I wouldn’t be tempted to take time off from writing.

Finally, I have to thank the Sisters of Saint Benedict and the Sisters of Providence who have taught me since kindergarten and continue to care about me and my education, even though I graduated from their institutions long ago. Their passion for education – specifically, educating women – is the reason this thesis exists.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dedication</td>
<td>vii</td>
</tr>
<tr>
<td></td>
<td>Acknowledgments</td>
<td>viii</td>
</tr>
<tr>
<td></td>
<td>List of Tables</td>
<td>xii</td>
</tr>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Overview</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Definition of Terms</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Significance of the Study</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Organization of the Remainder of the Thesis</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>REVIEW OF RELATED LITERATURE</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Social Cognitive Theory</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Theory of Circumscription and Compromise</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Model of Achievement-related Choices</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female Role Models</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Women in Male-Dominated Programs</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Rationale for the Study</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>METHODOLOGY</td>
<td>23</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Tables</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demographics</td>
<td>31</td>
</tr>
<tr>
<td>2. Relocation</td>
<td>32</td>
</tr>
<tr>
<td>3. Education Prior to TMS</td>
<td>32</td>
</tr>
<tr>
<td>4. Education at TMS</td>
<td>33</td>
</tr>
<tr>
<td>5. Females in the Industry</td>
<td>34</td>
</tr>
</tbody>
</table>
Chapter 1

INTRODUCTION

Overview

In the United States, women comprise almost half the workforce and are now found in nearly every occupation available (U.S. Department of Labor, 2010). Despite the inroads made by the American working woman, some occupations continue to be male bastions; as of 2009, less than 2% of all people employed as automotive, diesel, and collision repair technicians were women. Additionally, women make up 57% of the students in higher education, but the number of females pursuing a degree in science or technology is disproportionately small. Though the numbers have increased for women seeking engineering, medical, and other high-level science degrees, women in technology-based vocational courses for trade and industry subjects comprise only 7.7% of credential-seeking students (U.S. Department of Education, 2008a).

Vehicular-repair technicians earn wages close to or higher than the national median wage. It is an occupation whose growth is equal to that of the national average and for which there are always openings (U.S. Department of Labor, 2011). Women account for half of all new car purchasers and over half of all customers who take their vehicles to a repair shop (Women-Drivers.com, 2012, 2013). So why are there not more women pursuing this career? There is growing research on females studying male-dominated subjects such as medicine or engineering at colleges and universities, but there
is very little information on females pursuing their education in traditionally male subjects at vocational or technical schools.

Innumerable factors lead people to choose a career for themselves. Most theories evolve from the idea of self-efficacy, a belief in one’s ability to generate a desired outcome (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). People will not pursue careers in which they do not feel they will be successful. Gottfredson (2002) proposed that as children age and progress through certain stages, they eliminate potential careers from their possible choices. The older they become, the more careers they exclude based on experience, society, and the way they see themselves (Gottfredson, 2002). How people see themselves and their abilities is one of the biggest deciding factors in choosing a career. If one does not believe in their own ability to be successful in a certain field, they are not very likely to pursue a future in it (Bandura et al., 2001).

Statement of the Problem

This study was conducted to determine the motivation, challenges, and obstacles faced by female students pursuing an education in vehicular repair, a field characterized by a long-standing gender disparity. By understanding these female students and their experiences, the researcher hoped it could lead to an easier road for future female students in their position as well as more female students pursuing this career.

The purpose of this study was twofold: (a) to identify what factors lead female students to enroll in a vehicular-repair program at a vocational school in Northern
California and (b) to increase the limited research regarding women in technical vocational education.

The goal of the study was to understand the reasons females pursue an education in a male-dominated field, the obstacles and complications they face, and whether they would encourage other women to follow in their footsteps. Specifically, this study addressed the following research questions:

1. What motivates a female to pursue an education in a male-dominated field?
2. Why would a female want a career as an automotive technician, specifically?
3. What obstacles do females face in their attempt to pursue an education in a male-dominated field?

The answers to these questions were varied because, although they all shared an interest in cars and trucks, these females came from different parts of the country with disparate experiences, backgrounds, and support systems.

**Definition of Terms**

The following terms and definitions apply to this study:

Male-dominated Learning Environment

A classroom, department, or school where the majority of the students are male

SMART

The internal student database at TMS
STEM

The subjects of science, technology, engineering, and mathematics

Vocational School

A school teaching the skills of a specific job, without teaching other basic subjects such as math and language skills

**Significance of the Study**

There has been quite a bit of research regarding female students studying traditionally male subjects in high school, at the undergraduate level, and beyond. However, there is very little research regarding vocational education in the United States, and even less regarding women at vocational schools. In the past 20 years, there has been a concerted effort to increase female enrollment into STEM programs at every level, and it has been successful. While women are making strides in these male-dominated fields in the white-collared world, women represent only a small portion of blue-collar workers (U.S. Department of Labor, 2009). The goal of conducting this study was to add to the dearth of research on this subject as well as discover what drew female students to a male-dominated subject like vehicular repair. The researcher hopes the findings of this research can be used to recruit more females to study automotive, diesel, and collision repair.
Organization of the Remainder of the Thesis

This thesis is organized into five chapters. Following the introduction of Chapter 1, Chapter 2 provides a review of the academic literature available regarding women studying male-dominated subjects as well as a theoretical framework explaining how women in particular choose a career path. Chapter 3 explains the research process, and Chapter 4 describes the results of the research. Chapter 5 provides a summary of the study, deductions made about the subject, and recommendations for future research.
Chapter 2

REVIEW OF RELATED LITERATURE

Introduction

Chapter 2 provides a review of the literature related to educational choice, women’s career development, and career self-efficacy. Specifically, this chapter focuses on the process students use to choose the direction of their education, which ultimately leads to their career. The purpose of this study was to identify factors leading female students to pursue training and a career in vehicular repair, a field characterized by a long-standing gender disparity. By discovering the motivations and challenges faced by these females, the researcher hoped to decrease the struggles for future students and encourage a greater female enrollment in this subject. Additionally, the researcher hoped to contribute to the minimal amount of research available regarding women in vocational technical education. The researcher reviewed Bandura’s (1986, 1999) social cognitive theory, Gottfredson’s (1981, 1996) theory of circumscription and compromise, and Eccles’s (1987) model of educational and occupational choice. Additionally, the researcher provided research regarding females studying male-dominated programs.

Social Cognitive Theory

To understand why students select a specific career path, one must first understand why anyone does anything. According to the social cognitive theory, human
behavior is influenced by both internal and external forces acting and reacting upon each other (Bandura & Davidson, 2003). Bandura and Davidson (2003) called the basis for Bandura’s theory the triadic reciprocal causation, defined as when the personal, behavioral, and environmental elements interact and influence each other in a bidirectional manner. Reciprocal causation explains that humans are agents in their own lives operating on their own behalf but are also acted upon by their environments, which can include their physical and social surroundings as well as interactions with other people. For the most part, people’s environment is imposed upon them; they cannot change buildings, trees, or even society to conform to their wishes. However, people have control over how they react to their surroundings. They can dictate where they go, with whom they interact, and what they do (Bandura et al., 2001).

**Self-Efficacy**

The tenet at the core of social cognitive theory is self-efficacy, a belief in one’s ability to generate a desired outcome (Bandura et al., 2001). To be able to persevere in the face of obstacles, one must have a high level of self-efficacy. Because of this, self-efficacy in specific subject matters is closely aligned with career development. According to Wender (2004), self-efficacy is one of the best predictors of a person’s career success. People will not pursue a career if they do not believe they can be successful in it. While they might be interested in a certain career, if they believe it to be outside their capabilities, they will not consider it as a valid option (Bandura et al., 2001).
Even today, there is a large gender gap when it comes to career options. Women still are not pursuing careers in STEM fields or those traditionally held by men (Bandura et al., 2001). Research shows women have a low level of self-efficacy regarding quantitative activities and other abilities related to nontraditional or male-dominated occupations (Bandura et al., 2001; Juntunen, 1996). Hackett (1995) proposed women’s low self-efficacy regarding technical problem-solving skills directly relates to the small number of women in technical vocations. For many women, this low self-efficacy eliminates a large number of occupational choices. Subsequently, the lower the career self-efficacy expectations, the less career exploration will be attempted (Sullivan & Mahalik, 2000). Conversely, those with higher perceived self-efficacy will not just consider a much wider array of career possibilities but will academically prepare themselves for many different vocational options (Bandura et al., 2001).

From where does one attain self-efficacy? How does a young girl come to believe that although she is good at math, she probably could not become an engineer? Why does a teenage boy know he would make an excellent doctor? Bandura (1986) explained there are essentially four sources of information from which one attains this knowledge of oneself:

1. **Enactive Attainment**: This is the most persuasive source of information when assessing one’s efficacy because it is based on actual experiences. Frequently doing well in a certain subject or activity reinforces one’s high self-efficacy, whereas consistent failure will lower it. After multiple successes, one poor
performance would not derail one’s belief in oneself but might cause one to look at other present conditions that could have caused the failure (e.g., illness, the weather, the performance of others around you, etc.)

2. *Vicarious Experiences:* Another way to gauge one’s efficacy is to see someone else perform a task and compare their outcome with what one would imagine one’s own outcome to be. Such evaluation can vary greatly depending on how similar or different the person performing the vicarious act is to oneself or if someone has prior experience in that particular activity.

3. *Verbal Persuasion:* A pep talk is a common form of verbal persuasion. Coaches, parents, and other supporters will attempt to talk a person or a team into believing they can accomplish something, trying to increase their self-efficacy. (Conversely, opponents or detractors might use verbal persuasion to create self-doubt, thus causing someone’s self-efficacy to diminish – think of the opposing team yelling at a player on the free-throw line.) While a positive message might work, if it does not, the coach or other influencers could lose all credibility and could even weaken the person’s perceived self-efficacy.

4. *Physiological State:* Knowing oneself does not mean strictly relying on one’s mind but includes being able to read all of the body’s signs. A woman might break out into a cold sweat before public speaking, causing her to question just how efficacious she is at public speaking. Similarly, a man might perceive he is
able to run long distances, but when his body begins to ache or he has trouble breathing, he may begin to rethink his efficacy when it comes to marathons.

People’s feelings of efficacy are constantly in flux. With every day, every interaction, and every reaction people encounter, their opinions of themselves change and grow. One of the earliest experiences humans have of testing their efficacy is as young children. When a baby cries, a parent typically responds to the baby’s need for food or hygiene. As the child grows older, the toddler understands he can not only get a reaction from his parents but can change the entire mood of the room with just his cries alone. According to Bandura (1986), “Efficacy experiences in the exercise of personal control are central to the early development of social and cognitive competence” (p. 415).

As a child’s social sphere grows, the influence of peers begins to play a much more important role. Peers can include siblings as well, depending on birth order and the number of years separating the siblings. Peers can provide important modeling behavior, especially if the peer is competent or skilled in an activity. Children tend to gravitate toward peers with similar interests, which can lead to an over development in self-efficacy in one interest to the exclusion of others. For example, if a young boy likes playing soccer and only hangs around the kids on his soccer team, he may have a high level of self-efficacy when it comes to soccer. However, he will have no idea of his abilities at baseball, which could lead to a belief of low self-efficacy in baseball.

School, of course, is one of the main agencies for developing self-efficacy. School is where a child’s knowledge and skills are always being tested, assessed, and
compared to other children in their class or those who have come before them. Essentially, school is one giant evaluation and it can make or break a child’s self-efficacy. For high-achieving students, school can be a place to reinforce their feelings of self-efficacy. For students who struggle, school may not only fail to provide them with a proper education, but “all too often it undermines the very sense of personal efficacy needed for continued self-development” (Bandura, 1986, p. 416).

**Fortuity**

Additionally, social cognitive theory also allows for luck or chance to play a part in the events shaping people’s lives. Fortuity can influence life’s most important decisions, such as a spouse or career, often through the most insignificant of situations (Bandura, 1999). However, luck or chance does not equate with uncontrollability. Bandura (1986) believed these encounters were part of the outside environment exacting its influence. As an agent in one’s own life, how a person reacts to these encounters can have just as much affect as the encounters themselves. According to Bandura (2001), “People also make chance work for them by cultivating their interests, enabling beliefs and competencies” (p. 12).

For example, a young girl might be interested in working on cars because her neighbor asked her to help him one day while babysitting her. What if he was not babysitting her that day? What if her family had moved to a house on a different street? What if the young girl chose not to help the neighbor but to play with her dolls instead? If any one of these scenarios played out, this young girl may never have seen under the
hood of the car and may never have developed an interest in cars, let alone taken the steps required to pursue a career in the automotive field.

**Theory of Circumscription and Compromise**

Adults often ask children, “What do you want to be when you grow up?” Even at a very young age, it is expected they have given this question some thought. With the thousands of possibilities from which to choose, how do young people make this decision? Gottfredson (2002) developed the theory of circumscription and compromise to explain that as children age they remove more and more careers from the list of potential options; even as they learn of new careers, they make judgments about these based on their self-concept, previous experiences, gender roles, and societal observations.

There are four stages of circumscription, or a winnowing of career choices, through which children progress.

1. *Orientation to Size and Power* (ages three to five): This is the age where children realize they cannot be animals or fictional characters when they grow up. They start to understand what it means to be an adult and begin recognizing adult roles in occupations. They also begin to gravitate toward same-sex peers and identify with same-sex adults.

2. *Orientation to Sex Roles* (ages six to eight): At this stage, children see things in black and white. They are usually very set in their thinking about gender roles. They see their own sex and perceived same-sex occupations as preferable and do
not accept cross-sex behavior. Because of perception, they have already declared many occupations off-limits.

3. *Orientation to Social Valuation* (ages 9 to 13): Children at this age are much more aware of society and their place in it. They become cognizant of what careers are considered socially acceptable by the adults in their lives and for their social class. More realistic career options reveal themselves as children’s skill and intelligence levels are compared to those of their peers by parents and teachers.

4. *Orientation to the Internal, Unique Self* (age 14 and above): During this time in their lives, children are figuring out the self they present to the public. They are trying to differentiate between their own values, hopes, and aspirations and those of their parents. The process includes discovering which occupations might fit in with the person they are becoming. Of course, they have already limited their options in earlier stages, so they will select from only those careers deemed acceptable by their younger selves.

Self-concept is how people view themselves; this can encompass everything about a person including their looks, personality, character, social status, talents, and limitations (Gottfredson, 2002). People make decisions every day based on this self-concept, even if it is inaccurate. According to Gottfredson (as cited in Cochran, Wang, Stevenson, Johnson, & Crews, 2011), “People seek occupations that (a) are congruent with their self-image and (b) reflect their knowledge of different occupations” (p. 413). Just as people have ideas of themselves, everyone has an idea or stereotype of certain occupations and
how those who practice these occupations live. Gottfredson (2002) rated many different occupations based on several different characteristics including masculine and feminine and prestige. According to these ratings, an auto mechanic is considered only less masculine than a miner and a construction worker while also being one of the lower prestige occupations (Gottfredson, 2002). Children are able to discern these maps early in life, although their opinion continues to evolve as they grow older. They are also able to figure out which career is compatible with their own self-concept. Once they have been told or figured out that a job is too masculine or beneath them socioeconomically, they are unlikely to ever consider it as a viable choice for a career.

Hannover (1998) proposed that the career a person chooses is based mainly on interest and self-concept. Hannover saw self-concept and interest as interconnected and often influencing each other. Just as a girl who finds she enjoys sports might adjust her self-concept, so may a girl who sees herself as a tomboy develop an interest in more traditionally male activities to emphasize this fact. Such facts help explain why as girls discover their femaleness, their interests change and their self-concepts change. Hannover explained pubescent females have less interest in math, science, and other technological subjects, but females in a coeducational setting exhibit such preferences less so than those in a single-sex setting. By distancing themselves from more male-identified interests, they emphasize their growth into womanhood possibly to attract the attention of males in their classes. Females in a single-sex setting have no need to do this because there are no males to attract (Hannover, 1998).
The compromise portion of Gottfredson’s (2002) theory explains that as children grow older they will begin to let go of some of their ideal career choices in favor of less desirable options for a variety of reasons. “Compromise is adjusting aspirations to accommodate an external reality” (Gottfredson, 2002, p. 100). When making these compromises, students are considering their own vocational interests as well as the prestige level and traditional gender roles of the occupations. If a student wants to become a doctor, but realizes he can only afford two years of school, he might consider compromising and becoming a registered nurse instead. Such a career choice would fit into his allotted timeframe, but it might not fit his other criteria, depending on his reasons for wanting to be a doctor. Was it an interest in medicine and a desire to help people? If so, nursing might be an acceptable compromise. If the student values the prestige of being a doctor, he might not be willing to compromise that level of cachet to cross over into a traditionally female occupation. Additionally they must consider their location, educational opportunities, and family responsibilities and expectations. A student who lives in the Bronx may find few nearby educational institutions teaching winemaking, and it may not be feasible for her to move to Northern California to study at one of the many schools that do offer these courses. She would need to compromise and choose an option practical for her location and personal situation.

The most well-meaning parent may tell their child, “You can be anything you want to be,” but in reality, this is not true. Innumerable factors affect career-related decisions beginning from birth and continuing through college and beyond. Everyone
making these choices has some sort of preconceived notion, limitation, or expectation with which they must contend.

**Model of Achievement-related Choices**

In studying gender roles and women’s educational and occupational choices, Eccles (1987) created a model of achievement-related choices (see Appendix A) that proposes to explain why men and women make the decisions they do and why these decisions are often vastly different from each other. The model helps illuminate the many influences contributing to how a woman makes career-related decisions. Eccles (1987) believed achievement-related choices are based on a person’s probability to succeed in these endeavors and that people make decisions about their education and careers based on how successful they think they will be in that particular field or subject of study: again, their self-efficacy. Such decisions are influenced by many outside factors, such as any possible external or societal barriers or roadblocks to their success (Eccles 1987). A female might want to be a mechanic or a firefighter, but if she feels she will face harassment or have to fight discrimination, she may not feel enjoying the work is an even tradeoff for the obstacles she faces.

The beliefs people hold about themselves have been molded by their experiences in related situations and by their own interpretation of these experiences. Eccles (1987) called this cognitive mediation. If a girl gets an A in her high-level math class but
believes it is because of her hard work rather than an innate math skill, she may not consider herself suited for a math-related career.

One of the features of Eccles’s (1987) model is the perceived field of options. An individual will not choose from every possible career or field of study but will instead select from what is perceived to be an inventory of possibilities. Some options are not considered because an individual is not aware the possibility even exists, while others may be geographically or logistically impossible. Additionally, there are many options an individual will not consider, both consciously and subconsciously, because they do not fit into traditional gender roles (Eccles, 1987).

Eccles’s (1987) model illustrates that parents and others within the inner circle have an effect on several different aspects of the decision-making process. Parents may have removed certain occupations from the pool of worthwhile options, either by blatantly forbidding it (“No child of mine will ever be a tattoo artist!”) or with more subtle verbal clues (“Being a mortician sounds creepy to me.”). Parents can also use financial influence over their children by offering to pay tuition for certain majors or schools or refusing to pay for others (Eccles, 1987). According to Mastekaasa and Smeby (2008), “The family and the peer group have been found to be important influences on educational choices” (p. 191). An individual’s friends and peers may also influence achievement-related choices in positive or negative ways. According to Nawaz and Gilani (2011), “Friends and peers not only offer new ideas and provide job information, they also exert pressure to conform when making choices” (p. 34).
Eccles’s (1987) model considers other factors in explaining how educational and occupational choices are made. When deciding what career path to follow, most people consider whether they will enjoy the work they would be doing. Even if a person has a capability for chemistry, he or she may not want to work in a lab all day. Another consideration is how much of their time will be consumed by the career. Someone who wants a nine-to-five job with weekends off should rethink becoming a doctor or a nurse.

Eccles (1994) pointed out that success and achievement mean different things to different people, especially to men and women. From an early age, male and female career goals can vary greatly, especially when factoring in family-related goals (Eccles, 1994). A woman might turn down a promotion, which would seem counterintuitive to a man in her position. If he sees climbing to the highest rung on the ladder of success as the ultimate goal, then her decision may seem crazy. But if she sees balancing her career and her family as the ultimate goal, then it might be a good idea to turn down a job if it requires a lot of travel or excessive amounts of her time.

**Female Role Models**

A role model is someone whose behavior or actions can serve as an example to others (Pleiss & Feldhusen, 1995). According to “Tradeswomen, Now and Tomorrow” (as cited in Shewring, 2009), one of the challenges women face in male-dominated careers is the lack of role models. As stated previously, Bandura (1986) saw vicarious experience as a source of self-efficacy information. Role models provide an excellent
opportunity for learning by vicarious experience. According to Bandura (1986), “Seeing or visualizing other similar people perform successfully can raise self-percepts of efficacy in observers that they too possess the capabilities to master comparable activities” (p. 399). Research indicates role models impact career choice beyond the notion of self-efficacy (Quimby & DeSantis, 2006).

While men can and do serve as role models for women in these situations, same-sex role models offer women a future view of themselves. In fields where women deal with negative gender stereotypes, female role models can make a significant difference (Richman, vanDellen, & Wood, 2011). Additionally, female role models can assist women in furthering their professional development (Ulku-Steiner & Kurtz-Costes, 2000). A study by Green and Stitt-Gohdes (1997) indicated role models are especially important when women choose non-traditional careers. According to Milgram (2011), “Women and girls need to see female role models in the workplace that look like them – over and over and over again” (p. 5).

Women in Male-Dominated Programs

Women working in traditionally male fields were rare in the United States until World War II when women were needed in factories and airfields to fill in for men fighting overseas. Approximately 3 million women worked in these traditionally male positions, not only to help the war effort, but also to earn a wage much higher than was possible in most traditionally female occupations (National Park Service, 2004).
In the 1970s and 1980s, women were entering the workforce at a very high rate, but they continued to work in traditionally female occupations such as teaching, nursing, and administrative positions (U.S. Department of Labor, n.d.). The United States began to push for more women in the traditionally male STEM fields and, to some extent, they have been successful. Initiatives through the National Science Foundation and the Department of Education have helped increase the number of women pursuing advanced degrees in these fields (Starobin & Laanan, 2008). In 1958, women accounted for less than 1% of doctorates in engineering. In 2006, that number was 20%. Additionally, over half the doctorates earned in the life sciences in 2006 were earned by women (Burrelli, 2008). However, men currently outnumber women in STEM fields in schools and in the workplace, whereas women outnumber men in teaching, social work, and the social sciences. The problem with this gender gap is the traditionally male occupations offer higher wages and more opportunities for advancement than traditionally female occupations (DiDonato & Strough, 2013).

While women are encouraged to enroll in male-dominated programs, Steele, James, and Barnett (2002) proposed two explanations for their reluctance to do so: sex discrimination and stereotype threat. If a woman believes there is a possibility she will be discriminated against in the future, she is less likely to choose that career (Eccles, 1987). Working as the only female in a workplace can be intimidating and even scary, depending on the climate allowed by those in charge. Stereotype threat was defined by Steele et al. (2002) as “an uncomfortable feeling that arises when people are at risk of
confirming a negative stereotype in the eyes of others” (p. 46). A woman who makes an error at work can usually correct it and move on, but when you are the only woman in the office doing a job traditionally done by a man, you may have just confirmed why women should not be doing that job in the first place.

During the late 1970s, President Carter enacted federal regulations encouraging women to train for manual trades in the construction industry (Eisenberg, 2013). The initiative failed miserably and today, along with automotive technicians and the mining industry, the construction industry employs the fewest women of all careers in the United States (U.S. Department of Labor, 2010). While there has not been an outcry for women to become automotive technicians, as cars become more computer-driven, the push for women in STEM will become relevant to the automotive industry.

**Rationale for the Study**

Choosing a subject to study, and ultimately a career, is one of the most important decisions a person will make in a lifetime. The literature exposed some common threads explaining how a person comes to this decision. Self-efficacy is at the root of Bandura’s (1986) social cognitive theory. Because females often have low self-efficacy in historically male subjects, they do not often pursue these as a career. Gottfredson (1981, 1996) proposed that, from any early age, people make judgments about careers and how they would fit with their own self-concepts. As people age, they reject possible careers because of their own experiences or because of the way society views these careers.
Additionally, Eccles (1987) explained that not all careers are seen as viable for many reasons, including family obligations, geographic limitations, and monetary constraints. Role models can provide a possible look into the future, especially for women working in non-traditional careers (Green & Stitt-Gohdes, 1997).
Chapter 3

METHODOLOGY

Introduction

The purpose of this mixed-methods study was to understand the motivation of female students to study a traditionally male subject in a male-dominated learning environment at a technical school in Northern California. The researcher hoped to increase female interest in the subject matter and, more specifically, female enrollment at the school by comprehending the challenges and obstacles as well as the inspiration and encouragement of these students in the form of family, friends, cultural biases, and popular media.

Although there is increasing data on women studying STEM and other traditionally male subjects at two-year and four-year schools, there is little to no research on females studying manual trades or females studying at proprietary technical schools. The researcher attempted to answer the following questions:

1. What motivates a female to pursue an education in a male-dominated field?
2. Why would a female want a career as an automotive technician, specifically?
3. What obstacles do females face in their attempt to pursue an education in a male-dominated field?

Chapter 3 includes information on the population and sample of the study, data collection procedures, data analysis procedures, and the limitations of the study.
Research Design

Setting of the Study

The location of this study was a technical mechanics school specializing in automotive, diesel, and collision repair (hereafter referred to as TMS). TMS is located in a large metropolitan city in Northern California. It is one of 10 TMS campuses of this publicly traded company throughout the United States. While the original campus has been teaching students for almost 50 years, the Northern California campus opened in 2005.

At the time of this study, the current population of the Northern California campus was approximately 1,400 students, of which 96% were male. The student body was comprised of 46% Hispanic, 42% White/Caucasian, 5% Asian, 3% African American, and 1% Native American/Pacific Islander. Three percent of the students refused to respond to the request for their ethnicity (SMART, 2013).

Design of the Study

This study used a two-fold approach to gather information from the participants: an online survey designed to gather basic demographic information and a one-on-one personal interview intended to collect more individual, anecdotal information.

Population and Sample

The population for this study was female students or graduates of TMS’s Northern California campus. The sample for this study was 11 female students during
May of 2013 as well as 30 female students and alumnae of the Northern California campus of TMS.

**Data Collection Procedures**

Following the requirements set by the Institutional Review Board at California State University, Sacramento, the researcher received the proper approvals from the school to complete the study using human subjects. The researcher also received authorization from TMS’s Director of Accreditation and Regional Vice President to use TMS students as research subjects and to use TMS’s internal student database and report system (*SMART*, 2013) to gather information. Upon approval, the researcher requested a female-student report from *SMART* (2013), which listed all active female students for a particular campus. There were 33 students on the list.

All students on the list were sent a request to attend an optional meeting in an unused classroom. Two identical meetings were held, one for the morning class session and one for the afternoon class session. The researcher described the purpose of the meeting: the research study being conducted, the thesis being written, and the eventual degree being earned. The researcher explained there were two components to the study: (a) a computer-based survey asking basic questions about their demographics, backgrounds, and histories (see Appendix B); and (b) a one-on-one interview asking more in-depth, open-ended questions about their families, experiences, and reasons for attending the school (see Appendix C). Both components were strictly voluntary and students could do one or the other, both, or neither.
If the students were interested in completing the interview, they wrote their names on a list with their phone numbers and whether they would be comfortable communicating with the researcher via text message. The computers in the room were turned on and the Internet browser was opened to the survey’s website on SurveyMonkey so the students had time to complete the online survey prior to returning to class. They were also given the option of completing the survey on their own and each student was given the survey URL for this purpose.

Some of the students were not able to attend either session, so a pull slip was sent to the students asking them to come to the researcher’s office at their convenience. They were given the same information given to the students at the meeting, as well as the survey URL. They were also given the option of completing the surveys at the student computers located in the researcher’s office.

Because of the small number of active female students on campus, the researcher chose to contact female graduates of the campus as well. Because there is no report available in *SMART* (2013) containing the data, the researcher pulled a report of all campus graduates from the first graduating class until April 2013. Each female student was highlighted and male students were deleted from the report. If the name did not give clear indication of belonging to a female, the student was cross-referenced in the demographic information screen in *SMART* (2013) where gender was specified. There were 101 female graduates on this report and 99 of them had an email address. The 99 alumnae were sent an email explaining the research and requesting their participation (see...
Appendix D.) Although there were five alumnae who expressed interest in participating in both aspects of the research, none of them were ever interviewed.

Text messages were sent to students who expressed an interest in being interviewed to set up interview times. The interviews were completed during the students’ lunch periods, prior to the start of their classes, or immediately after their classes were completed. At no time was their schooling interrupted to facilitate the interview process. The interviews were completed over a two-week period in private offices or conference rooms with closed doors. The students each read and signed the consent waiver (see Appendix E) prior to beginning the interview. A digital recorder was used to record the interviews, but no written notes were taken. While each student was asked a prepared set of questions, the researcher asked improvised follow-up questions as appropriate and when necessary to fully understand the answers given by each student. The interviews ranged in length of time from 4.5 to 20 minutes. Ultimately, 30 electronic surveys were completed and 11 students were interviewed.

**Instrumentation**

Two different questionnaires were used: one for the electronic survey distributed via SurveyMonkey and another for personal interviews. Both sets of questions were field tested on classmates and coworkers of the researcher.

The electronic questionnaire focused more on gathering demographic information about the female students but also asked about their education history, females in the automotive industry, and if they relocated to attend the program. Specifically, the
The electronic questionnaire consisted of 16 questions, the first of which asked whether the student consented to be part of the study. The questionnaire consisted of multiple-choice and fill-in-the-blank (age, hometown, etc.) questions. Questions 2, 6, 8, and 9 asked the respondents to provide demographic information that might be useful to the researcher. Questions 3, 4, 5, 7, 10, 12, and 14 inquired about the respondents’ previous educations and future plans. Questions 11, 13, 15, and 16 asked the respondents to answer questions regarding other women in the automotive field.

The one-on-one interviews asked open-ended questions to encourage the respondents to share more information on the subject. The interviews focused on the following areas of inquiry:

1. Beginning of interest in the subject being studied
2. Challenges and supports in attending TMS
3. Education and career history and options
4. Other women in the field

Questions 1 and 2 required respondents to consider where their interest in the subject matter began and why they chose to study at TMS. Questions 3, 4, and 8 asked the respondents about their education and career histories. Questions 6 and 7 inquired about the support they did or did not receive from friends and family when they decided to attend TMS. Questions 5, 9, 10, 11, and 12 probed the respondents regarding their experiences and opinions of other female students as well as women in the industry.
Data Analysis Procedures

The intent of this study was to gather and analyze data to determine the motivation of female students to study automotive, diesel and collision repair and to pursue a career in those fields. The process of data analysis involved the search for commonalities and recurring themes across the responses of the sample population. These findings were synthesized into percentages and comparable statistics to more easily understand the experiences of the respondents.

Limitations of the Study

This study was specific to those female students attending a proprietary technical school in Northern California who were studying automotive, diesel, and collision repair. Findings from similar students at one of TMS’s other campuses in another part of the country could be quite different. Also, female students studying a similar subject at a two-year college, or who pursued their education via the military or other means, or female students studying another traditionally male subject (construction, engineering, mining, etc.) might have different experiences or responses. Because of the small sample size used, it was difficult to come to accurate, far-reaching conclusions for all women studying male-dominated subjects.
Chapter 4

RESULTS AND DATA ANALYSIS

Introduction

Chapter 4 presents the data collected, survey findings, and interpretation of the data. The data from both the electronic surveys and the interviews are included in this chapter. Both the surveys and the interviews focused on the following topics:

1. Demographics
2. Beginning of interest in the subject being studied
3. Challenges and supports in attending TMS
4. Education and career history and options
5. Other women in the field

The electronic survey consisted of 16 multiple-choice or short-answer questions while the interviews consisted of 12 open-ended questions.

Presentation of Data

In this section, the results of the electronic survey are presented, followed by the results of the interviews.
Results from Electronic Surveys

Table 1 indicates the age and ethnicity of the respondents. The vast majority was under the age of 25, and while there were quite a few different ethnic backgrounds represented, nearly half the respondents were white.

Table 1

Demographics

<table>
<thead>
<tr>
<th>Age Range</th>
<th>%</th>
<th>Race/Ethnicity</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-20</td>
<td>50</td>
<td>American Indian/Alaska Native</td>
<td>7</td>
</tr>
<tr>
<td>21-25</td>
<td>40</td>
<td>Asian</td>
<td>3</td>
</tr>
<tr>
<td>26-30</td>
<td>10</td>
<td>Black/African-American</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic/Latina</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White/Caucasian</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple Races/Ethnicities</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prefer Not to Respond</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2 illustrates the distance the respondents had to relocate to attend the Northern California campus of TMS. The respondents were asked if they relocated to attend TMS and, if so, from where. The researcher used Google Maps to calculate the mileage from the respondent’s home town to the campus.
Table 2

Relocation

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 miles or less from campus</td>
<td>33%</td>
</tr>
<tr>
<td>Already lived in the area</td>
<td>17%</td>
</tr>
<tr>
<td>251-750 miles from campus</td>
<td>17%</td>
</tr>
<tr>
<td>Commuted between 50-100 miles</td>
<td>7%</td>
</tr>
<tr>
<td>751-2000 miles from campus</td>
<td>13%</td>
</tr>
<tr>
<td>2,001 or more miles from campus</td>
<td>13%</td>
</tr>
</tbody>
</table>

**Education history.** Table 3 details the educational history of the respondents prior to attending TMS. Almost all the respondents graduated from high school, while several had taken some other college courses.

Table 3

Education Prior to TMS

<table>
<thead>
<tr>
<th>Secondary Education</th>
<th>Postsecondary Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Diploma</td>
<td>90%</td>
</tr>
<tr>
<td>GED</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Associate’s degree</td>
</tr>
<tr>
<td></td>
<td>Some college courses</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>67%</td>
</tr>
</tbody>
</table>

Table 4 reveals the number of classes each respondent had taken, if they were a graduate, and the program studied. Since each class lasted three weeks, it can be determined how long the respondents had been students at TMS. Nearly one-third of respondents were students who had been on campus approximately one year, while over...
one-third were already graduates. Nearly all programs on campus were represented by the respondents, except for Diesel & Industrial Technology, and no one program outnumbered any other program.

Table 4

Education at TMS

<table>
<thead>
<tr>
<th>Number of Classes Completed</th>
<th>%</th>
<th>Program Studied</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>10</td>
<td>Automotive</td>
<td>27</td>
</tr>
<tr>
<td>6-10</td>
<td>17</td>
<td>Collision Repair</td>
<td>27</td>
</tr>
<tr>
<td>11-20</td>
<td>30</td>
<td>Automotive/Diesel Industrial</td>
<td>23</td>
</tr>
<tr>
<td>21+</td>
<td>3</td>
<td>Automotive + Elective</td>
<td>17</td>
</tr>
<tr>
<td>Graduate</td>
<td>40</td>
<td>Automotive/Diesel Industrial + Elective</td>
<td>7</td>
</tr>
</tbody>
</table>

**Females at TMS.** Table 5 answers some questions relating to females at TMS and in the auto industry in general. Fewer than one-third of respondents were aware of a female working in the industry prior to attending TMS. Such a statistic is quite significant when considering the importance of role models for females pursuing a non-traditional career. A large number of respondents said they would consider coming back to TMS to be an instructor. The bulk of the respondents were not aware of just how small the female population was at TMS prior to attending, but the overwhelming majority of respondents would still recommend the school to other females.
Table 5

Females in the Industry

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Maybe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of women working in the</td>
<td>30%</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior knowledge of small TMS female</td>
<td>33%</td>
<td>67%</td>
<td></td>
</tr>
<tr>
<td>population</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would consider being an instructor</td>
<td>43%</td>
<td>13%</td>
<td>43%</td>
</tr>
<tr>
<td>at TMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would recommend TMS to other females</td>
<td>80%</td>
<td>3%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Interviews

Eleven current female students were individually interviewed by the researcher with all interviews being recorded and later transcribed by the researcher. Each student was asked 12 open-ended questions with follow-up questions asked as needed for clarification or better understanding. The topics of inquiry were as follows:

1. Interest in the subject matter
2. Family support
3. Females at TMS and in the industry

**Interest in the subject.** Of the 11 women interviewed, seven were introduced to fixing cars and trucks by a family member at an early age. For most of them, it was not necessarily seen as a purposeful introduction into the subject but as helping out Dad in his shop or wrenching in the garage with Grandpa. According to Hannover (1998), real-life experiences in a subject can be a strong influence when deciding on a career.

Participant 10 made the following statement:
It was always really convenient because I had smaller hands growing up, so it started out that I was helping Dad, but it turned out that I liked it too. I was really little. I know it sounds crazy, but I think I was five.

According to Participant 4, “I’ve been into automotives [sic] all my life, since my Dad is a mechanic. I grew up around cars; that was like my daycare. He owns a shop, so I was there, like, 24/7 after school.” For other participants, it was no accident that they knew how to work on cars. Participant 6 said, “I’ve been doing cars since I was 10 years old. My dad’s always been doing that. He’s made sure his kids knew how to fix cars, electrical and plumbing.”

For Participant 1, the interest in cars was not sparked until her freshman year of high school when she began to notice more women in the media working with cars. She said, “[Seeing The] Fast and the Furious, the second one, all of those movies. Seeing women in the movies in cars and on TV, racing cars. Just seeing girls do it, I thought, ‘Why not me?’”

Of the 11 participants, six attended high schools offering some sort of auto-shop courses. Five of the six participants took these courses. For some, auto-shop courses offered a reinforcement of their interest in the automotive world. For another, it offered the entrée for which she had been waiting. Participant 5 stated the following:

They offered it [auto shop] throughout all high school, but it was only in my senior year that I was able to take it. I really enjoyed working on cars and everything, so by the first few months in, I started thinking about it as a career
Not all the female students at TMS had a passion for the subject, though. Attending the school made financial sense for Participant 2. Her father was an employee of the school, and she received free tuition as his dependent. She attended a traditional community college for a semester but was dissatisfied with the experience. She said, “It’s just like high school, but more in detail, and I didn’t like high school.” She decided to attend TMS while deciding her future. She made the following comment:

I am kinda just trying to figure it [her future plans] out right now, but it’s something I can do in the meantime while I figure out what I really want, and if I happen to like it, it’s something I’ll already have. It’s something to do to make better than minimum wage while I try to figure it out. (Participant 2)

**Family support.** Support from friends and family can often make the difference when deciding to choose a non-traditional career path. While none of those interviewed had to deal with an entirely negative reaction from their support systems, many had to try to change the mind of one or more of their loved ones. Four of the participants indicated they had the support of one parent but not the other. Participant 10 said, “Oh, my mom bawled her eyes out because she wanted me to be a nurse. But my dad and my brothers and my cousins were all for it.” According to Eccles (1987), “Parents can also affect the options actually available to their children by providing or withholding funds for certain training and educational experiences” (p. 142). Such was the case for Participant 8: “My mother actually threatened to throw me out. She tried to stonewall me at every
opportunity. And she wouldn’t fill out any paperwork for any of it at all. So thankfully, my biological father was completely supportive of it.”

For several of the interviewees, family members offered their support right away. When asked if her family and friends were supportive of her decision, Participant 7 answered, “Very. Aside from the whole money factor, it being a good paying job, they just thought of it as if it is something that you want to do, just go for it.” Participant 3 also received this kind of acceptance; her family was only hesitant about the distance of the school from their home because she relocated to Northern California from Fort Wayne, Indiana.

When asked if they had been discouraged by anyone about attending an automotive school, five participants indicated they had. Oddly, all five of these students had been criticized by other women, specifically their mothers. Several of the participants indicated their mothers had different career plans envisioned for their daughters and expressed these hopes when explaining their objections to automotive school, as the following responses illustrate:

- “You were going to be a vet.”
- “I hoped you’d continue with culinary school.”
- “She wanted me to be what she couldn’t be: a doctor.”
- “She thinks I should be a nurse.”
Ultimately, these women either convinced their loved ones to see their viewpoint or did not let the discouragement influence their decisions. When asked if anyone had discouraged her, Participant 5 answered, “A few people, but no one I listen to.”

**Females at TMS and in the industry.** According to the United States Department of Labor (2009), less than 3% of all automotive, diesel, and collision repair technicians are women. Such a statistic coincides with the female population of TMS’s Northern California campus, which was 4%. While many women were in leadership positions on campus and throughout TMS system wide, including the CEO of the company, the school had no female instructors or women in direct contact with the cars and trucks. When asked if any of the students were aware of women working in the automotive industry prior to attending TMS, four of the 11 said they were, but only two of the students personally knew a woman who worked in the industry. Participant 11 had a friend whose mother was an automotive mechanic:

> Back a long time ago – she’s a paralegal now. She used to tell me all the stories of her with her pink toolbox and always getting crap from the guys, telling her she didn’t belong. But she could wrench better than any guy in the world.

Participant 10 explained that she grew up on a ranch, and all hands were needed to make it work:

> Everyone in the family has to help out, so boys and girls all have to work but not a lot of women get in there and fix the equipment. I mean, they can use it, operate it, but to fix it? Maybe some little things, but they aren’t techs or anything.
While six of the 11 women felt TMS was female friendly or female welcoming, only one did not. Four of the women interviewed had mixed emotions. Participant 2 said the staff and teachers were friendly to all students, but the school’s image “is not a female-friendly one. In the ads, it’s always guys working in the shop.” And although the school itself tried to be as welcoming as possible, the male students had their own opinions. According to Participant 11, “The guys will give you a hard time and you have to get past the crude talk and the way they act.”

All the women interviewed had strong but conflicted opinions about whether a woman could teach classes at TMS. Each of the 11 respondents explained that a female instructor had the ability to convey the information in the classroom, but most of them felt the young, male students who comprised a vast majority of the population would not be able to see past the fact that she was a woman. Participant 9 explained that a woman would not be able to teach at the school:

Because guys are just way too immature. You may have the best training and the best ideas, but I don’t think the students themselves could keep on track. There’s a respect level there that’s different because it’s a woman. There’s a knowledge base level that they might think, whether it’s arrogance, but I think the treatment would be different and disrupt the class.

Participant 10 did not mince words: “I think they would pay attention, but if it were a nicer looking woman, they’d pay attention to the wrong things.”
Finally, the women were asked if they would like to see more women in the automotive field. Seven of the respondents definitely wanted to see more women in the field. Participant 7 even went so far as to encourage her friends’ interest in the subject: “I’ve gotten a few friends into it and they like it. They are going to the community college back home.” Three of the participants were only interested in more women in the field if they shared the same passion and enthusiasm for the subject matter.

**Conclusion**

The vast majority of these women had to relocate 250 miles or more to Northern California to attend TMS, indicating a high level of commitment to the pursuit of this education. Additionally, most of the respondents were not aware of other women in this field and had no role models to blaze a trail for them to follow. They also persevered at a school where they were in the vast minority. Several had to convince their families and friends they were doing what was right for them. For the most part, these were persistent, independent women with a passion for cars, trucks, and self-improvement.
Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Women have shattered the glass ceiling in many different occupations, but they remain grossly underrepresented in the vehicular-repair fields. As a pathway to employment in this field, attending a vocational school can be a foot in the door for females seeking to enter this career. In 2007, the U.S. Department of Education counted women as less than 6% of all students seeking a certificate in a “manufacturing, construction, repair and transportation” subjects (U.S. Department of Education, 2008b). Understanding the motivation of the women who choose to pursue this education pathway can help recruit more women to the field of study. By understanding the challenges and obstacles they face, programs can be improved to meet the needs of female students and appeal to a broader audience of women.

The purpose of this study was to understand the reasons females pursue an education in a male-dominated field, the obstacles and complications they face, and whether they would encourage other women to follow in their footsteps. Specifically, this study addressed the following research questions:

1. What motivates a female to pursue an education in a male-dominated field?
2. Why would a female want a career as an automotive technician, specifically?
3. What obstacles do females face in their attempt to pursue an education in a male-dominated field?

**Conclusions**

The literature explained that people study fields and enter professions in which they believe they can be successful. People pursue careers that fit their image of themselves and their place in society, but which they have not already removed from their pool of possible careers. Role models and previous experience can encourage females, especially, to consider other non-traditional careers. Respondents indicated early experiences with automobiles and trucks made an impression on them early in their lives. For many of the students, the idea of making a living doing something they loved far outweighed the idea of being outnumbered 20 to 1. Other respondents were interested in the idea of earning a good living with only a year or two of education.

Respondents reported experiencing challenges before ever getting to school. Many family members – other women, oddly enough – either discouraged the females or downright forbade them from studying automotive repair. Once at school, respondents mentioned having to deal with male classmates who either did not take their abilities seriously or were more interested in their appearance.

While many of the respondents liked the idea of being unique as one of only a few females at the school, they were also open to the idea of more females pursuing this career, if it were something about which they were passionate.
Recommendations for Further Study

As previously stated, this study involved 33 female students at one vocational proprietary school in Northern California. Further research expanding to all 10 campuses of TMS would allow a greater population from which to draw and would allow for any geographic discrepancies. Additionally, a local community college offers similar programs of study. Female students of community college automotive programs could also be studied to ensure part-time students and students from all socioeconomic backgrounds were represented.

Another avenue of study would be initiating pilot programs targeting female elementary, middle, and high school students who show an interest in the automotive industry. Inviting these students to campus and allowing them to interact with cars and trucks and meet successful female TMS graduates could have an impact on them that changes their career path.
APPENDICES
APPENDIX A

Eccles’s Model of Achievement-Related Decisions

The arrows in the figure show which indicators influence each other and the direction of influence. The double-headed arrows signify that the indicators influence each other.
APPENDIX B

Online Survey Questions

1. Age
2. How many classes have you completed?
   a. 1-5
   b. 6-10
   c. 11-20
   d. 21+
   e. Graduate
3. What is (was) your program of study?
   a. Collision Repair and Refinish Technology
   b. Automotive Technology
   c. Automotive, Diesel, & Industrial Technology
   d. Automotive Technology + Elective (e.g., FACT, TPAT, NATT, Smog)
   e. Automotive, Diesel, & Industrial Technology + Elective (e.g., FACT, TPAT, NATT, Smog)
4. Prior to attending TSM, which of following did you complete?
   a. High school diploma
   b. General educational development test – GED
   c. Diploma equivalent earned in a foreign country
   d. Other ______________
5. Did you have to relocate to the Sacramento area to attend TMS?
   a. No, I already lived in the area.
   b. Yes, I relocated from ______________.
6. Have you previously completed any postsecondary schooling?
   a. No
   b. Yes
      i. Some college courses
      ii. Associate’s degree
      iii. Bachelor’s degree
      iv. Master’s degree
      v. Doctorate degree
7. Are you a veteran of the U.S. Military?
   a. Yes
   b. No
8. What is your race/ethnicity?
   a. White/Non-Hispanic
   b. Black or African American
   c. Hispanic or Latina
   d. Asian
   e. American Indian or Alaska Native
   f. Native Hawaiian or Pacific Islander

9. After you graduate from TMS, what do you hope to accomplish?
   a. Work for a dealership
   b. Work for an independent shop
   c. Work for a manufacturer
   d. Continue your education at another TMS campus or at a manufacture-specific advanced training (MSAT)
   e. Join the military
   f. Other_________________

10. Prior to attending TMS, did you know any females (either personally or by reputation) working in the automotive industry?
   a. Yes
   b. No

11. Prior to attending TMS, did you visit the campus?
   a. Yes
   b. No

12. Prior to attending TMS, were you aware of the number of female students enrolled?
    a. Yes
    b. No

13. If you had not chosen to attend an automotive school, what would you have done?
    a. Attended a two-year college
    b. Attended a four-year college
    c. Joined the military
    d. Worked
    e. Attended another vocational program (e.g., culinary, medical technician, etc.)
    f. Other_________________

14. Would you consider coming back to TMS as an instructor?
    a. Yes
b. No

c. Maybe

15. Would you recommend TMS to other females?
   a. Yes
   b. No
APPENDIX C

Interview Questions

For both current students and alumnae:
1. Why did you choose to attend an automotive school?
2. When did you become interested in cars or trucks?
3. Did your high school offer any auto shop courses? Did you take them?
4. When did you start to consider it as a career?
5. Prior to attending TMS, were you aware of other women in the industry?
6. Did your family and friends support your decision to pursue this career?
7. Has anyone discouraged you?
8. What other career or education options did you consider?
9. Have you had any classes at TMS with other female students? What happened? (Did you work together? Did you purposely work separate from her? etc.)
10. Do you think of TMS as female friendly or female welcoming?
11. Do you think a female instructor could teach an auto class of male students? Why or why not?
12. Would you like to see more females working in the auto industry? Or is being one of a few part of what drew you to this industry?

Additional questions only for alumnae:
1. Are you currently working in the automotive industry? Where and doing what?
2. If yes, are there other females at your workplace?
3. Do you feel being part of such a small minority helped you or hindered you? How so? Did it prepare you?
4. Is your current workplace female friendly?
5. If there were a network of female TMS graduates, would you be willing to participate to assist current students and recent graduates with their careers and to help encourage enrollment of future female students?
Dear TMS Graduate,

I am writing to you to ask for your assistance. I am currently in graduate school at Sacramento State University seeking my master’s degree in Higher Education Leadership. I have completed all my classes and I am currently in the process of researching and writing my thesis.

I have worked at TMS for over five years and have always been intrigued by our female students and what led you to choose a school and career where you are such a distinct minority. Because of this, I have chosen to write my thesis on the female students at Sacramento and why they chose to attend TMS. (I have the approval of TMS’s home office and the Sacramento campus to use this topic, and I have received permission from Sacramento State to interview human subjects.)

I am hoping for your input, as graduates, to create the most complete portrait of our female students. To this end, I have created a completely voluntary survey for you to complete. It should take no more than 10 minutes and will be completely anonymous. I am also looking for volunteers to be interviewed and answer a few more in-depth, open-ended questions. The interview could be done in person or via Skype. Obviously, this part would not be anonymous, but it would be kept completely confidential.

Again, this is strictly voluntary; you can choose to complete both components, just the electronic survey, or nothing at all. Click on the link below to complete the survey. If you are interested in being interviewed as well, please reply to this email and we can further discuss how you would like to complete the interview. Both the surveys and the interviews need to be completed no later than the end of June.
APPENDIX E

Consent to Participate in Research

Purpose of the research. You are being asked to participate in research conducted by Rory Gillingham, a student in Higher Education at California State University, Sacramento. The study will investigate factors related to female students and their decision to attend a male-dominated learning institution.

Research procedures. You will be asked to complete a questionnaire about why you chose to enroll at TMS, some of your experiences as a female student, as well as your opinions and perceptions of these experiences. The questionnaires may require up to 15 minutes of your time. If you agree to be contacted, you may also be asked to later participate in a one-on-one interview about these topics. The interview should last around 30 minutes.

Risks. Some of the items in the questionnaires may seem personal, but you do not have to answer any question if you do not want to. Some of the topics in the interview may also seem personal, but you do not have to answer any question if you do not want to.

Benefits. You may gain insight into factors relating to learning or working in an environment where you are the minority, or you may not personally benefit from participating in this research. It is hoped that the results of the study will be beneficial for female students in the future and may possibly help recruit more female students at TMS.

Confidentiality. Your responses on the questionnaires will be anonymous. Your interview will be held in a private area and will be audio taped. Those tapes will be destroyed as soon as the discussions have been transcribed and, in any event, no later than one year after they were made. Until that time, they will be stored in a secure location. Only group results for the project will be reported.

Compensation. You will not receive any compensation for participating in this study.

Contact information. If you have any questions about this research, you may contact Rory Gillingham at [redacted] or by e-mail at [redacted].

Your participation in this research is entirely voluntary. Your signature below indicates you have read this page and agree to participate in the research.

_______________________________                   _______________________
Signature of Participant                   Date
REFERENCES


