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Women Into Advanced Manufacturing: Can Community College Open this Door?

Carissa Bradley Schutzman

University of Kentucky, carissa.schutzman@gmail.com
Author ORCID Identifier:
https://orcid.org/0000-0001-5453-5973
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WOMEN INTO ADVANCED MANUFACTURING:
CAN COMMUNITY COLLEGE OPEN THIS DOOR?

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DISSERTATION

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A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By
Carissa Bradley Schutzman
Lexington, Kentucky
Director: Dr. Beth Goldstein, Associate Professor of Educational Policy Studies and
Evaluation
Lexington, Kentucky
2019

ABSTRACT OF DISSERTATION

WOMEN INTO ADVANCED MANUFACTURING:
CAN COMMUNITY COLLEGE OPEN THIS DOOR?

Women still rarely choose to seek employment in advanced manufacturing. Lack of familiarity with manufacturing jobs and education programs, lack of role models, and too few experiential opportunities contribute to women not choosing manufacturing jobs as well as other jobs traditionally held by men (Reha, Lufkin, & Harrison, 2009; St. Rose & Hill, 2013; Starobin & Laanan, 2008). Nontraditional jobs for women often provide higher wages and more opportunity for advancement than traditional jobs for women. This study is a qualitative thematic narrative analysis of factors that influenced women who chose an advanced manufacturing program at a community college to enter employment in a male-dominated career sector.

Intersectionality and agency were the overarching concepts used to examine how working-class women navigated the unfamiliar spaces of higher education and manufacturing. Data were collected through interviews that spanned across several years as the women in the study advanced through the community college and into the manufacturing workplace. The primary research questions included: 1) What motivated the women to begin the program and what were their doubts? 2) How did the women's experiences in the community college and participation in an advanced manufacturing program influence their education and career choices? And, 3) What might be learned through their stories, particularly their perspectives related to identity and agency?

Women reported their top reason for initially pursuing education and employment in manufacturing was the potential income and employee benefits; however, as the women progressed, they reported additional benefits that included increased confidence at work and at home. The women cited earning a college credential as the most transformative aspect of their journey and attributed unexpected personal growth and self-discovery to their college experience. Additional findings pertained to the value of the college support program, the challenges of exercising agency in a patriarchal environment, and the advantages of women's ways of working for both the employee and the employer.

The results of this study have financial implications for women, programmatic implications for colleges, workforce development implications for communities, and employee recruitment and retention implications for manufacturers.

Carissa Bradley Schutzman

11/25/2019

Date

WOMEN INTO ADVANCED MANUFACTURING:
CAN COMMUNITY COLLEGE OPEN THIS DOOR?

By

Carissa Bradley Schutzman

Dr. Beth Goldstein
Director of Dissertation

Dr. Jane Jensen
Director of Graduate Studies

11/25/2019
Date

To Joe, Joey, Thomas, and Mark

I wish to express my heartfelt gratitude to my chair, Dr. Beth Goldstein, who served as a scholarly mentor, a champion, and a friend. Thank you, Beth, for believing in my ability to complete the degree during times when I did not believe in myself. You always waited patiently for me to reengage and met me with a peaceful kindness for which I am truly grateful.

It is sometimes through the eyes of others that we learn to see ourselves differently and to think about the possibilities. Dr. Angie Taylor first encouraged me to pursue a doctoral degree, and she walked this journey with me shoulder to shoulder. Angie, I will always treasure our many conversations along the way, and I am most grateful for your presence in my life. Thank you, friend!

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To my husband, I hardly have words to describe my deep gratitude for your generous friendship and steadfast love. Joe, you have always supported me in both big and small ways in all that I do, and during the past eight years, you have never wavered in your belief that I would (eventually!) earn my doctorate. Of course, you shouldered a larger load in our family life while I was working toward my degree, but it was the emotional commitment that made all the difference. I knew we were in it together, and you were holding my hand every step of the way.

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The Welder
Cherrie Moraga

I am a welder
Not an alchemist.
I am interested in the blend
of common elements to make
a common thing.

No magic here.
Only the heat of my desire to fuse
what I already know
exists. Is possible.

We plead to each other.
we all come from the same rock
we all come from the same rock
ignoring the fact that we bend
at different temperatures
that each of us is malleable
up to a point.

Yes, fusion *is* possible
but only if things get hot enough –
all else is temporary adhesion,
patching up.

It is the intimacy of steel melting
into steel, the fire of our individual
passion to take hold of ourselves
that makes sculpture of our lives,
build buildings.

And I am not talking about skyscrapers,
merely structures that can support us
without fear
of trembling.

For too long a time
the heat of my heavy hands
has been smoldering
in the pockets of other
people's business –
they need oxygen to make fire.

I am now
coming up for air.
Yes, I *am*
picking up the torch.

I am the welder.
I understand the capacity of heat
to change the shape of things.
I am suited to work
within the realm of sparks
out of control.

I am a welder.
I am taking the power
into my own hands.

CHAPTER 1: INTRODUCTION

"Are there different types of manufacturing? That's what I don't understand." A young woman asked this while looking at me on the first day of a workshop at a community and technical college. Hailey had signed up to participate in a career exploration workshop to introduce college women and soon-to-be college women to careers in advanced manufacturing. As I started to answer her question, I realized she was thinking aloud, and she was already moving on to a conversation with another participant. Her question reminded me that most people have only a vague notion of how goods are manufactured, or they have an antiquated mental picture of dimly lit factories with large, oily machines. The treacherous and uncomfortable environment of early 20th century manufacturing has been replaced in many instances in the U.S., but certainly not all, with an environment that is clean, well lit, temperature controlled, and high tech. Despite this transformation, along with its high wages, benefit packages, and career pathways, manufacturing is typically not on a woman's short list of desirable jobs. Lack of familiarity with manufacturing jobs and education programs, lack of role models, and too few experiential opportunities contribute to women not choosing manufacturing jobs as well as other jobs traditionally held by males (Reha, Lufkin, & Harrison, 2009; St. Rose & Hill, 2013; Starobin & Laanan, 2008). While Hailey had casually asked her question about types of manufacturing, the question was logical and astute.

Most of the women in this study plunged into the male-dominated world of manufacturing because they were attracted to the entry level wages and potential for subsequent raises. I thought this financial rationale made sense and would be enough to

minimize any of the inconveniences of working in the nontraditional-for-women manufacturing environment. By the conclusion of the study, I found myself thinking about this trade-off differently: Are the high wages worth the challenges of working on the male-dominated shop floor? The original working title of this study was, "Women into Advanced Manufacturing: Can Community College Open this Door?" After spending several years working with manufacturing companies and leading a program for women in manufacturing, I began to wonder if the title should be, "Women into Advanced Manufacturing: Should Community College Open this Door?" Of course, this sort of either/or dichotomy is a drastic oversimplification of the manufacturing sector, the workforce development system including higher education, and most of all, an oversimplification of the women who choose to engage with any or all of these entities. This study includes in its backdrop the roles of some manufacturing companies, the perspectives of some advocates for women to earn a living wage, and the role of some community stakeholders in economic development. The perspectives of these three groups provide the context for those whose stories are the focus of this research – the women who took the risks of enrolling in college and working in manufacturing.

1.1 Study Background

The manufacturing sector is comprised of companies that are "engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products" (U.S. Bureau of Labor Statistics, 2018). The significance of manufacturing to the United States' economy has been studied and documented for decades. According to the National Association of Manufacturers, manufacturing employs 12 million men and women and contributes $2.25 trillion to the U.S. economy. Manufacturing companies typically bring jobs and a higher standard of

living to a community. For every job in manufacturing another three to four employees are hired elsewhere in the community (Top 20 Facts About Manufacturing, 2018). Conversely, when a manufacturing company moves out of a community, the effects can be far-reaching and devastating to the financial well-being of a region. The Midwestern region featured in this particular study is home to several hundred manufacturing companies.

Touring a manufacturing company, specifically the production floor, can be a fascinating experience for several reasons. Sometimes the mere scale of a building and the machinery housed within its walls is difficult to take-in all at once. I have visited companies that make gears for transmissions, fuselages for airplanes, cookies and animal crackers, frozen pizzas, wheels and brakes for airplane landing systems, medical devices, shampoo and cosmetics, hydraulic lifts, ski poles, and even companies that make machines for other manufacturing companies to use in making their particular products. Manufacturing production areas vary greatly across companies and sometimes within companies as well. Regardless of the various types of manufacturing, most companies have one thing in common: they agree they need more employees, preferably employees with high-tech skills. Around 2010, some companies in the Midwest turned up the heat on their community partners — technical colleges, workforce intermediaries, government officials, chambers of commerce, etc. — and demanded the partners provide them with a job-ready workforce.

Simultaneously, women leaders from non-profits, government agencies, education, and manufacturing companies discussed how this need for a better-trained manufacturing workforce could be an opportunity to change the financial trajectory of women, especially women willing to attend community college. After all, the earning

potential for women who attend community college to enter traditionally female jobs like cosmetology, nurse aid, or early childhood education is not promising. These traditional jobs historically do not lead to a livable wage for a woman with two children, which is approximately $23 per hour in the Midwest (Glassmeier, 2019). A livable wage is the "hourly rate that an individual must earn to support their family, if they are the sole provider and are working full-time (2080 hours per year)" (Glasmeier, 2019, Living Wage Calculator). With the goal of meeting the needs of both manufacturers and community college women, the women leaders designed a regional training program. The Women in Manufacturing program was comprised of four pillars that included recruiting, training, placing, and supporting women in manufacturing jobs. The founders of Women in Manufacturing knew that the predominantly male manufacturing workplace would present challenges for the women. The founding women began with questions about *how — how* to recruit, *how* to train, *how* to place, and *how* to support.

On the surface, this idea of solving two problems seemed plausible – manufacturers needed a skilled workforce and women needed jobs that paid a livable wage. However, the reality of this match-up was problematic, particularly for the women who faced a patriarchy that was the status quo on the manufacturing floor. While the regional manufacturers in this study were begging for a workforce, they appeared to have little interest in expanding their vision of what their employees might look like. On a national level, the Manufacturing Institute released a report in 2014, *Celebrating Success, Achievement, and Potential of Women in Manufacturing: A Leadership View of Overcoming the Talent Crisis and Filling the Skills Gap* (Giffi, McNelly, Leatherberry, Carrick, & Dollar, 2014) calling for companies to rethink their recruitment strategies because "women represent manufacturing's largest pool of

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untapped talent" (p. 4). When I read reports coming out of the National Association of Manufacturers (NAM) and the Manufacturing Institute about recruiting women, I inevitably think of the World War II efforts to employ women in factories and shipbuilding yards to replace the male workforce that was fighting the war. A male workforce shortage underpins both circumstances during which manufacturers recruit women; manufacturing companies were and are simply out of bodies to do the work. To be clear, manufacturers are recruiting women because the companies are running out of male laborers. The other side of the equation that the Women in Manufacturing founders were trying to solve -- women not making a livable wage -- is not the problem manufacturers are aiming to solve.

In research reports from NAM and the Manufacturing Institute, both manufacturer advocacy entities provide rationales for hiring women that go beyond the obvious need of filling a position: women earn over half of college degrees; women advance in their careers and occupy half of managerial positions; women have insights and experiences that could provide new perspectives; business partners/suppliers expect companies to represent the diversity of the marketplace; and, companies with higher percentages of women in leadership positions are more profitable than companies with lower percentages of women in leadership positions (Giffi & McNelly, 2013). Making the case for hiring women to improve the bottom line is good for business and creates opportunities for women. Companies need to make decisions that keep the enterprise moving forward. This rationale for hiring women goes beyond filling a skills gap, but are manufacturers committed to hiring women for the aforementioned reasons, which would include changing the work culture, or are they simply looking for a quick workforce solution? The question is important because one rationale is about women

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bringing value to the manufacturing workplace, and the other rationale is about women filling a spot that a company cannot find a man to fill. In a survey of over 600 women currently working in manufacturing, the Manufacturing Institute learned that "51 percent cited that the main driver of women's underrepresentation in manufacturing is the perception of a male-favored culture" (Giffi & McNelly, 2013). Respondents in the same survey further noted that the history of gender bias in the manufacturing sector has also excluded women from moving up the power structure in management and supervisory roles, resulting in very few women making it to top leadership positions (Giffi & McNelly, 2013).

Despite NAM's and the Manufacturing Institute's push for manufacturers to focus on women, most companies are not hearing the message. Based on the stories of the informants in this study, the patriarchy on the production floor and in the front office is flourishing. In fact, I argue patriarchy is so engrained as the status quo that few who work in manufacturing take note. To see manufacturing through the experiences of the women in this study, I chose to approach this research from a feminist epistemological perspective. In the patriarchy of manufacturing, the male perspective is the default while women are often silenced or ignored. Whereas NAM and the Manufacturing Institute are looking to women as a newfound pool of potential employees, women are looking at manufacturing for a higher wage than offered by many traditionally female jobs.

1.2 Research Questions

Through this research, I wanted to learn about community college women who were considering a nontraditional career in advanced manufacturing. I focused on the population of female students who enrolled into the Women in Manufacturing program. I had three main research questions, beginning with: What factors have influenced the

women to participate in a community college program that prepares them for a nontraditional career in advanced manufacturing? In other words, what motivated the women to begin the program and what were their doubts? The second research question was: How have the women's experiences in the community college and participation in an advanced manufacturing program influenced their education and career choices? The third research question was: In what ways do intersectionality and agency affect the women's education and career choices? What may be learned through their stories, particularly their perspectives related to identity and agency?

1.3 Study Significance and Organization

This study, a qualitative thematic narrative analysis, provides new insight into the experiences of women who choose a nontraditional education program leading to employment in a male-dominated career sector. This matters because jobs that predominantly employ men often have better wages; this is particularly true when comparing jobs that require an associate degree. The dissertation is organized into nine chapters including this introductory chapter. Chapter Two provides an overview of the conceptual framework. Intersectionality and agency are the overarching concepts used to examine how working-class women navigate the unfamiliar places of higher education and manufacturing. This chapter explores how the complexities of gender, class, and race intersect to construct the identities and influence the experiences of individual women aiming to work in manufacturing. Agency, a person's capacity to make choices and act independently within the structure of a particular environment (Hitlin & Johnson, 2015), is also discussed in the context of the women navigating the structural and cultural barriers of patriarchy.

Chapter Three is an overview of manufacturing in the United States beginning

with an explanation of the need for skilled workers and the role of manufacturing in job creation and economic development. This chapter also discusses the gender wage gap and the opportunities for women to mitigate that gap in nontraditional science, technology, engineering, and math (STEM) jobs. Additionally, the role of the community college in serving working class and first-generation students is highlighted. Community colleges can provide an avenue out of poverty, but they must still recognize the financial and cultural barriers for many of their students. Finally, the chapter concludes with a section on manufacturing jargon that will serve the reader well in the analysis sections in later chapters.

Chapter Four covers the methodology and design of the research. After an overview of the qualitative design, this chapter provides a timeline of the research phases and a description of the pilot study. The next section describes the overall population of women and more specifically the research participants. This chapter also includes descriptions of researcher positionality, data generation, and the research site. Chapter Four describes the Women in Manufacturing program, which is not to be confused with the focus of this study, the women. The final section of this chapter is an explanation of the data analysis and a short discussion about trustworthiness. Chapter Five contains the biographical sketches of the six primary informants.

The next three chapters explicate the themes from the data in relation to the research questions. Chapter Six discusses why the women chose to enroll in a manufacturing program to pursue a job in manufacturing. Also, this chapter discusses a relationship between previous work experience and a woman's awareness of nontraditional jobs. Chapter Seven covers topics related to the women's experiences in college including fear of failing, motivation, financial struggles, and college and

workplace support. Chapter Eight provides a robust discussion around intersectionality and agency. Topics include nontraditional environments, the burden of representing all women, patriarchy in manufacturing, and policies and practices. The last section of Chapter Eight describes how women compared themselves to their male coworkers and ultimately reported that their ways -- women's ways -- of working were more productive and collegial.

The final chapter, Chapter Nine, presents findings that emerged from the data on the following topics: the role of the Women in Manufacturing program; the effect of attending college; patriarchy in the manufacturing workplace; women's ways of working; and women who persisted. The results of this study have financial implications for women, programmatic implications for colleges, and workforce development implications for manufacturers.

CHAPTER 2: A CONCEPTUAL FRAMEWORK

How a researcher positions herself within a research project depends largely on how she views the world. Glesne (2001) explained: "Every research study is, therefore, informed by higher level theory, even though researchers sometimes are not aware of these theories because they are embedded in their assumptions about the nature of reality and knowledge" (p. 5). I know as a qualitative researcher part of my work is to interrogate mindfully my assumptions and corresponding theories. This chapter provides the conceptual framework that I used to explore the identities and lived experiences of women in a community college manufacturing program.

Ravitch and Riggan (2017) described the conceptual framework as "the overarching argument for the work – both why it is worth doing and how it should be done" (p. 8). The conceptual framework explains the relationships among theories and concepts that the researcher is using to explore the meaning and nature of a particular phenomenon (Bloomberg & Volpe, 2016; Ravitch & Riggan, 2017; Miles, Huberman, & Saldana, 2014). Drawing from feminist theories (Adair, 2008; hooks, 2000; Luttrell, 1997; McNay, 2004; Weis, 2004), I focused specifically on the concepts of intersectionality and agency to examine women learning and working within patriarchal institutional environments. Concepts are "interrelated ideas" that "enable us to impose some sort of meaning on the world" (Bloomberg & Volpe, 2016, p. 127). I considered how gender, class, race, and age intersected in myriad ways to impact the identities and experiences of the women in this study (Bettie, 2006; Crenshaw, 1989; May, 2015). Using the concept of agency (Hitlin & Johnson, 2015; Isaacs, 2002), I explored how the

women chose to act, as well as not to act, in their own interest in the college classroom and on the manufacturing floor.

While I used feminist conceptualizations of intersectionality and agency as the overarching concepts in this framework, I also used several other concepts including patriarchy, neo-liberalism, post-feminism, and meritocracy to complete the conceptual framework (Acker, 2006; Collins & Rhoads, 2010; Enloe, 2017; Gonick, 2006; McRobbie, 2011; Ouelette, 2009; Sullivan, 2003; Walkerdine & Ringrose, 2006). I began with these concepts knowing the women would encounter the complexities of the patriarchy in manufacturing where men's ways of doing things were the default, and women were met with suspicion. The dominant culture found within manufacturing was in stark contrast to the post-feminist, neo-liberal assumption that women have achieved equality.

2.1 Intersectionality

I used the concept of intersectionality to examine the lived identities of the women in this study as they entered into the capitalist, patriarchic field ofmanufacturing. Intersectionality, as an applied framework, interrogates powerful institutions and their influences on multiple social identities. The concept of intersectionality is rooted in Black feminist theory and was founded in response to the identity politics of anti-racists and feminists who often saw, and some continue to see, their causes as mutually exclusive. Crenshaw (1989) argued this "single-axis framework erases Black women in the conceptualization, identification and remediation of race and sex discrimination" (p. 140). Crenshaw's point is that when racism and sexism are considered in isolation of one another, Black women are excluded while Black men and White women are

privileged. In other words, sexism focuses on the experiences of White women, and racism focuses on the experiences of Black men. To examine race and sex in isolation excludes the complexity of identity. Bettie (2003) argued that gender, class, and race are "always produced and read in relationship to one another in the social world" (p. 56). While the genesis for Crenshaw's conceptualization of intersectionality was the exclusion of Black women from feminist theory and critical race theory, intersectionality encompasses multiple identities that cannot be teased apart: "Intersectionality highlights how lived identities, structural systems, sites of marginalization, forms of power, and modes of resistance 'intersect' in dynamic, shifting ways" (May, 2015, p. 21).

May (2015) argued that intersectionality should not be reduced to "a demographic factor, or a depoliticized matrix device with no commitment to eradicating injustice or to transforming ways of being and knowing" (p. 226). In other words, attention to intersectionality should be an ongoing practice to disrupt hierarchies of power and to challenge the ontological and epistemological status quo. Established knowledge practices reinforce structural inequality, and intersectionality should recognize and resist how power structures are continuously changing and recreating new dynamics (Cho, Crenshaw, & McCall, 2013; May, 2015). To accomplish the potential for disruption by intersectional practices of resistance, marginalized groups may attempt to find commonalities so as not to contribute to the cycle of social reproduction of inequalities. In order to understand intersectionality in the context of this study, I discuss the ways in which post-feminism, neoliberalism, and meritocracy inform societal understandings of gender. I also delineate how classism, racism, and patriarchy persist, infusing education institutions and the workplace. Finally, I discuss intersectionality in the workplace.

2.1.1 Post-Feminism and Neo-Liberalism

The debate about the disparities between men and women regarding education and work has emerged from academia into popular media, best-seller lists, and most recently, the news media. Some argue that gendered behavior stems from dichotomous, fixed attributes grounded in biological differences; however, I argue that the social construction of gender does not exist in a vacuum (Acker, 2006). Bettie (2003) argued that an oversimplification of gender is popular within the American culture because a one-dimensional view of gender supports the neoliberal idea of individualism and ignores "social structural forces" (p. 5). As Bettie (2003) pointed out, the post-feminist experience sits at the intersection of gender, class, and race. The post-feminist, neoliberal gaze idealizes middle class values and assumes all women have chosen to be educated or not to be educated; by so doing, it claims that individual women themselves have embraced or rejected upward mobility. The implication is that feminism is an unnecessary ideal of the past, and patriarchy has been resolved: "Post-feminism registers, time and again, the seeming gains and successes of the second wave of the women's movement, implying that 'things have changed,' so feminism is now irrelevant" (McRobbie, 2011, p. 180). Walkerdine and Ringrose (2006) explained:

> Yet current educational debates around girls' achievements in school and later in work contribute to what we would call a post-feminist and post-class discourse of unambiguous female success, where celebrations of 'presumptive' gender equity are taken as proof that meritocratic principles for attaining bourgeois success have worked. (p. 33)

Walkerdine and Ringrose (2006) went on to say that this middle-class mentality supposes that each student and worker is solely responsible for her own success as defined by middle class values – upward mobility is a choice. In other words, the accomplishments of some women are proof that upward mobility is available to all women and that racism, classism, and sexism (and I would include ageism) no longer exist.

In addition to idealizing middle class values, the post-feminist, neoliberal gaze also overlooks any stratification or structural constraints that may exist inherently in institutions such as schools or work environments as well as in policy creation and implementation. Neoliberalism, a laissez-faire economic ideology, favors consumption and profitability, deregulation, privatization of government functions, and individual ownership of personal success or failure (Collins & Rhoads, 2010; Gonick, 2006; Ouelette, 2009). Working class girls and women aspiring to the mores of the middle class will likely fall short.

> While upper- and middle-class families have the resources to fill the gap in providing their daughters with the support they may need to "make it," daughters of those who are not positioned as dominant may have no such extra assistance. When girls encounter neoliberal discourse espousing a conviction that "anyone who works hard can get ahead" and "women have made great gains towards equality," they are led to understand their own experience of successes and failures as a product of their individual effort. How they are positioned within the changing cultural, political, economic, and social climate insistent on a direct

relationship between individualism and individual aspiration does not get factored

in. (Gonick, 2006, p. 6)

Similarly, the assumptions of a meritocracy suggest people have attained power, wealth,

and social status through their own devices where success is achieved by the individual

through ability and effort (Liu, 2011). Neither meritocracy nor neoliberalism

acknowledges structural inequalities such as those that funnel people into or out of

higher education.

2.1.2 Classism, Racism, and Education

Sullivan (2003) listed all the assumptions made by the middle class about poor

people, about blue-collar workers, about people who use substandard English grammar,

and about the assumed limited capacity of poor people. Sullivan (2003) argued that

typically the insults go unchallenged: "These middle-class attitudes often go

unchallenged by those who have experienced a lower-economic-class identity because of

the shame engendered by that heritage and the invisibility that the middle and upper

classes demand of the lower economic classes" (p. 58). The scorn that is projected by

the middle and upper classes onto the working class and poor cannot be buffered even at

the earliest stages of education. Conversations on the topic of class are often thinly

veiled through the use of terminology related to race and gender (Ortner, 1998). Luttrell

(1997) argued, "talking about school is a code for talking about class" (p. 6). In her

study of working-class women in Philadelphia and North Carolina, Luttrell (1997) heard

the school stories of women who experienced school as a place where the cultural capital

of teachers and students of privilege was beyond the reach of the working class and

impoverished girls. By the time a working-class student has reached college, she is

painfully aware of her class and its markings. Luttrell (1997) noted, "School denied but at the same time protected certain students' unearned advantages related to class, gender, and skin color in ways that made the women doubt their own value, voice, and abilities" (pp. 113-14). The women reacted to the daily symbolic violence by either withdrawing from or rebelling against the dominant culture and its authority figures:

> Their testimonies equate teachers and other students' cultural capital with the following distinctions of privilege: forms of knowledge and ability validated by school; white, middle-class feminine behaviors and appearances (e.g., submissiveness, obedience and attractiveness that won the pets approval from the teachers); light skin color; and urban or suburban mannerisms and styles of speech. Most important, the women viewed those who possessed such cultural capital as entitled to their superior positions. (Luttrell, 1997, p. 114)

Luttrell (1997) observed that the context was relevant to how the women responded. The urban, white, Philadelphia, schoolteachers devalued and ignored the White girls' working-class skills such as caregiving; in response, the girls rejected the authority figures of the school and did not view the education as a way to improve their lives. From the Philadelphia students' point of view, becoming motherwise was more useful than becoming schoolsmart. In North Carolina, the relationship between the Black teachers and the Black schoolgirls was different than in Philadelphia because the school played a more prominent part in rural community life. Luttrell (1997) explained that some of the Black teachers in North Carolina were "good" and some were "bad" but ultimately Black girls received the message that they were not worth educating because Whites "had slated them for work as domestics" (p. 115). Luttrell (1997) concluded that

these adolescent experiences of symbolic violence resulted in the women returning to school as adults attempting to reclaim their voices and identities.

Working class and impoverished women are less equipped to push back dominant culture narratives than their peers in the middle class; however, a college education can be an opportunity for some women. Adair (2008) argued that education plays a key role for women wanting to escape poverty. In "The Missing Story of Ourselves: Poor Women, Power and the Politics of Feminist Representation," Adair (2008) discussed how poor women and children were read as pathological or immoral, and how they must learn how to think differently about themselves and push back the narratives that have been placed upon them. Providing a home and food on a limited budget for their dependents, maintaining attendance and grades to retain financial assistance, and navigating higher education occupies the minds and bodies of working class and impoverished women. Adair (2001) asserted that higher education offers opportunity for the impoverished: "Becoming college educated transforms the way poor single mothers think, write, speak, act, work, parent, befriend, and love" (p. 219). In other words, education is one possible way that women can learn the skills and gain the cultural capital to navigate the dominant culture and to transcend poverty; however, gaining access to higher education is only part of the journey (Black, 2005; Perna, 2005; Schnee, 2009).

In "Learning in the Shadow of Race and Class," bell hooks (2000) described her own experiences at college both as an African American woman and as a daughter of working class parents. Once hooks arrived at Stanford, she learned that even within her race, contempt for "other" was rampant as middle class African-Americans

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expressed hatred toward working class people. "Having been taught all my life to believe that black people were inextricably bound in solidarity by our struggles to end racism, I did not know how to respond to elitist black people who were full of contempt for anyone who did not share their class, their way of life" (hooks, 2000, p. 57). She was shocked by the degree of hatred and fear students expressed toward the working class. The author concluded that while she had followed an educational path toward that of the privileged middle class, she had remained rooted in her working-class background and ever mindful of the institutions that "scorned and shamed" her for her race and class (hooks, 2000, p. 57).

Lucey, Ringrose, and Walkerdine (2003) used the concept of hybridity to discuss the complexities of working-class women who seek a college education and must somehow reconcile their family and peer culture with the dominant middle-class culture. Working class parents often express a desire for their children to have a better life than theirs, and they view education as a way to accomplish that goal. Some working-class parents know that education can provide class mobility, so they encourage their children to go to college; however, they may not understand the emotional, psychological, and intellectual challenges. Despite the encouragement of their families, some working-class women struggle as their identities shift, and they find themselves uncomfortable in both the working-class environment of their families and the middle-class environment of their colleges. Lucey et al. (2003) explained: "This process of educational success and of social mobility involves crossing borders of social class, gender and ethnicity, of negotiation between competing subjectivities as other spaces, other possibilities are opened up" (p. 286). The "uneasiness of hybridity" is rooted in the myriad emotions that

stem from the women's successful experiences in college that cause them to grow in new and unfamiliar ways compared to those of their families (Lucey et al., 2003, p. 286). The discomfort of hybridity is not necessarily something that can be remedied or transcended; in fact, it can become a source of shame (Ali, 2003).

2.1.3 Intersectionality and the Workplace

McBride, Hebson, and Holgate (2015) argued that intersectionality has not been applied to research in the "field of work and employment relations" (p. 332). McBride et al. (2015) asserted that this gap has been a missed opportunity to gain more nuanced data in the workplace. The authors outlined two approaches, or challenges as they said, to utilizing intersectionality in workplace research. The first challenge is for researchers to be intersectionally sensitive, and the second challenge is for researchers to take an intersectional approach. McBride et al. (2015) explained their belief that the literature on intersectional research methods is written for those who are already using intersectional methods rather than those wanting to learn: "This may explain its under-usage in the field of work and employment relations" (p. 334). McBride et al. (2015) listed several single-axis studies that could have yielded more informative data if the research design had been intersectionally sensitive. May (2015) called these absences, both intended and unintended, "gaps in knowledge" or "epistemologies of ignorance" – missing pieces of the story along with their missing meanings (p. 189). For intersectional research in work and employment relations, McBride et al. (2015) suggested that researchers expand analysis beyond the categorical subjects to include those who are in power. The authors acknowledged the challenge in accomplishing this.

May (2015) identified the need for intersectional sensitivity and methodology to be applied to the workplace and labor relations. For the purpose of this study, the concept of intersectionality, as well as additional concepts, provided a starting point for examining the identities and lived experiences of community college women who were pursuing careers in manufacturing. Community colleges are typically open access for most students and like other institutions of higher education, community colleges enroll more women than men (St. Rose & Hill, 2013). Simultaneously, manufacturers are clamoring for a skilled workforce to fill jobs that pay well. Together, higher education and manufacturing have the potential to open the door to upward mobility for women, but college and manufacturing are also places for the social reproduction of inequities. Bettie (2003) argued that gender, class, and race are "always produced and read in the relationship to one another in the social world" (p. 56). This social world includes post-secondary institutions that may provide the best path out of poverty for women.

2.2 Agency

Perhaps the best way to transition the discussion to the concept of agency is to include the connection May (2015) made between intersectionality and agency. May (2015) argued that the resistance function of intersectionality can be used to expand options, or even reject limited options, for agentic action "by transforming the contexts and structures in which we live" (p. 46). The underpinnings of women's agency lie at the intersection of gender, class, and race. Agency is a person's capacity to make choices and act independently within the structure of a particular environment (Hitlin & Johnson, 2015). Agency matters because it is through a woman's personal exercise of agency, as well as women's collective agency, that women are able to pursue an

education, earn a livable income, and secure their own freedom. From a feminist

epistemological perspective, the systemic structural and cultural stratifications are

barriers to women exercising agency. Higher education, particularly the community

college, appears to provide opportunities for women to transcend barriers; however, on

closer examination, that is often times not the case. The trend toward commodification

of higher education and credentials in a knowledge-based economy has served to make

access more precarious for some populations, particularly those who are already

disenfranchised such as working class and impoverished women. Limited access and

stratification persist in most of higher education, but nowhere are they more in contrast

with an institution's mission than that of the community college's open access mission.

The dissonance between the lives of working class or impoverished women and that of

the post-secondary institution, including the community college that admits more women

than any other higher education institution, exists for numerous reasons that are

interrelated and confounding. Certainly, some working-class women are "othered"

simply by their clothes, their speech, and their lifestyles. In addition to how others see

them, the larger issue is how the women see themselves, their identity, in the context of

the college and the workplace. Some women lack the social capital and agency to be

actors and advocates on their own behalves as they often perceive themselves as

incapable and unworthy of a college education (Adair, 2001). Add to these obstacles the

goal of completing a training program in a nontraditional career sector, and the chasm

continues to deepen.

Women's agency is compromised when situated in a patriarchal culture (Isaacs,

2002). While some argue that patriarchy is a parochial concept that has been eclipsed by

intersectionality (Patil, 2013), I argue that patriarchy and intersectionality are not mutually exclusive. Patriarchy is subtle yet pervasive in American culture – so pervasive that most often patriarchy is neither questioned nor challenged (Enloe, 2017). The meritocratic, patriarchal backdrop convinces women they are part of a culture that equally values the contributions of women and men. This gaze ignores the realities of a patriarchal culture that situates the male viewpoint and experience as the default and the female viewpoint and experience as "other." As girls and women grow up, attend schools, and move into the workplace, institutions would have women believe they have the same agentic opportunities as men. This institutionalized patriarchy does not account for the realities women face in a gendered workplace: sexual harassment; misconceptions of masculine ability versus feminine ability; fewer opportunities for promotion; and, isolation from coworkers. Additionally, supervisors and coworkers may overlook and devalue the work of women in a patriarchy. In the context of the workplace, patriarchy underpins what constitutes men's work versus women's work; the practice of sorting work based on gender has economic consequences, particularly for working class women.

Patriarchy allows fewer opportunities for women to attain positions of power, and it creates a feminine socialization that is juxtaposed against the default masculine socialization (Isaacs, 2002). Isaacs (2002) defined feminine socialization:

> This socialization encourages us to be passive, dependent, maternal and nurturing, concerned about others, compromising, unambitious, less competitive, disproportionately concerned about our physical attractiveness to men. In essence,

it encourages us to accept a subordinate place in society, and indeed, hardly to

recognize it as subordinate. (p. 131)

Isaacs (2002) concluded that patriarchy compromises women's agency. Feminine

socialization can be more problematic for working class women who have "an uneasy

relation to dominant norms of femininity because these have evolved historically from

idealized notions of bourgeois womanhood" (McNay, 2004, p. 186). Working class

women want to become "respectable" by emulating middle class normative ideals of

femininity while simultaneously rejecting the dominant culture narrative that "others"

them as outsiders (McNay, 2004, p. 186).

Similar to "becoming respectable" (McNay, 2004), a recurring theme in the

research on working class and impoverished women is one of "becoming somebody"

(Bettie, 2006; Luttrell, 1997; Skeggs, 1997; Weis, 2004). Luttrell (1997) asserted that

the elite convince the rest of the American people that privilege is of no consequence.

She argued, "their ascendancy as rulers depends upon the appearance that color, class,

ethnicity, and gender do not determine who counts as a 'somebody' or who attains the

American dream" (Luttrell, 1997, p. 113). In other words, the middle and upper classes

rely on the semblance of a classless meritocracy that provides an equal opportunity for

all people. While some who are poor and disenfranchised look to education as an

equalizer, Luttrell (1997) asserted that schools play a pivotal role in the "social

production and reproduction of inequality" (p. 8). The women in Luttrell's study told

school stories that included groups as well as individuals pitted against one another in

dichotomies of good and bad. Luttrell (1997) summarized, "The overarching moral of

these tales is that school divides female students *within* themselves and *against* each

other in the struggle to establish themselves as a 'somebody'" (p. 9). The paradox is that women want to "become somebody" through education, yet schools and colleges perpetuate social inequities that are maintained by the status quo. For a woman to become somebody, she needs to believe she has the ability to be successful and then act on those beliefs. In other words, she must exercise personal agency.

Self-efficacy is a person's belief in her ability to succeed in a situation. Self-efficacy affects how a person influences or responds to her environment, to other people, and to her own emotions and thoughts. Ultimately, self-efficacy influences agency. For example, women's low self-efficacy can impact their beliefs about being successful:

> Perceived efficacy plays a key role in human functioning because it affects behavior not only directly, but by its impact on other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perception of impediments and opportunities in the social environment. (Bandura, 2000, p. 75)

The concept of low self-efficacy has been identified as a contributing factor for low participation by women in nontraditional career and technical education programs (Reha, Lufkin, & Harrison, 2009). A person's belief in her ability often affects her willingness to act -- to exercise agency in the events and outcomes of her life.

Women's agency also poses a potential paradox when considered in the context of feminine socialization. Isaacs (2002) pointed out that if women individually exercise agency within the confines of the traditional arenas learned through feminist socialization (e.g., care taking, nurturing), they are not challenging the oppressive social structures.

In order to address oppression, we need to take a step away from the context of individual lives and the roles and responsibilities in them and to turn to the way these lives fit into patterns of oppressive practices. In order to do this, I reconceptualize the self-in-relation, emphasizing relations to other women. This emphasis allows us to recognize oppressive social structures and to see the potential for collective action with other women. Overly individualistic or particularistic views of the self fail to provide a perspective from which to recognize and address oppressive social structures and therefore fail to address the paradox of feminist agency. (Isaacs, 2002, p. 130)

In other words, to have agency is to have a wide array of choices to enact in the world that go beyond the context of typically feminine spaces and beyond the traditional roles for women. Women may recognize oppression in their own lives as well as see themselves as part of all women who experience similar oppression. The identification with all women, with women as a particular group, is an important step in recognizing misogyny and oppression (Issacs, 2002).

Patriarchy perpetuates the imbalance of power between men and women in all types of contexts, and patriarchy influences women's agency specifically in the arena of education and career choices. In addition to the contexts of society and family, a woman's sense of self-efficacy is also connected to her program and career choices (Reha, Lufkin, & Harrison, 2009). In some instances, women's agency in the context of career choice affects a woman's earning potential and ultimately her ability to be financially secure. One avenue to economic stability for women includes choosing a nontraditional career pathway that provides better paying jobs. By definition, a

nontraditional career is one in which 25% or less of the workforce is female. Women

often do not consider nontraditional career paths because they cannot envision

themselves working in a male-dominated environment or they may not even be aware of

some nontraditional jobs. Betz (2005) pointed out that jobs traditionally held by women

are typically lower in earnings and status whereas jobs often held by men are in science

and technology, both of which command higher salaries. Betz (2005) added that besides

the financial consequences of women's career choices, a psychological advantage also

exists for women who work versus women who do not work outside the home. Due to

the significance of work to the overall well-being of women, Betz (2005) argued that it is

crucial for women to make career choices "that they find fulfilling, satisfying, and

economically sufficient" (p. 256). Betz (2005) identified women's perceived self-

efficacy and childhood experiences as two major factors affecting women's decisions

regarding their careers, but Betz also acknowledged that women make choices based on

other factors as well.

    Betz (2005) identified several barriers that affect women's career choices: "math

anxiety and avoidance, low self-efficacy and outcome expectations, gender and

occupational stereotypes, and a restricted range of vocational interests" (pp. 256-7).

According to Betz (2005), beliefs about self-efficacy are connected to persistence. Low

self-efficacy and math anxiety can especially be risk factors to women in a nontraditional

program or career. Betz (2005) explained, "low self-efficacy, especially in relationship

to male-dominated careers and/or careers requiring mathematical or technical expertise,

may reduce the self-perceived career options for women" (p. 259). Women in these

nontraditional situations need some combination of support from educators, peers,

family, and mentors if they are going to ₑₓercise agency in pursuit of a broader spectrum of careers including those occupied primarily by men.

2.3 Conceptual Framework Conclusion

I began this chapter with a discussion about intersectionality and the complexity of identity, which cannot be distilled into one or two simple attributes. Gender, class, and race must be read in relation to each other and within the social context. The neoliberal, post-feminist gaze purports that sexism, classism, racism no longer exist, and all people have the opportunity to become upwardly mobile by making the right decisions. In a culture that is imbued with patriarchy, upward mobility is certainly not an option for all women "to become somebody." Whereas some want to place the burden on the individual to attain and adopt a middle-class milieu, I focused this research on working class women as a group. Working class women are often oppressed yet are blamed for any perceived shortcomings that have kept them out of the ranks of the middle class. For women to exercise agency, particularly in their choices about education and careers, patriarchy must be acknowledged and dismantled.

CHAPTER 3: THE STATE OF MANUFACTURING

As I stated in the introduction, manufacturing companies have clamored for a skilled workforce over the past decade, yet the sector struggles to attract talent. Despite the promise of competitive wages and updated production floors in climate-controlled buildings, manufacturers still suffer from the reputation of the *Three D's* – dark, dirty, and dangerous. The manufacturing sector has long suffered the ills of having an unfavorable reputation, and even with advocacy efforts raising awareness among the public, people are not flocking to work in the sector. In a 2017 report, the National Association of Manufacturers found that over 80% of respondents in a survey considered manufacturing important to the prosperity and standard of living for America; however, less than 3 in 10 respondents would want their children to work in manufacturing (Giffi, Rodriguez, & Mondal, 2017). This chapter starts with definitions of a few key terms related to manufacturing before moving on to related topics including workforce, and the gender wage gap and nontraditional jobs in STEM.

3.1 Manufacturing Jargon

Employers and employees in the manufacturing sector regularly use the words *manufacturing* and *advanced manufacturing* interchangeably. In this study, I also often use the terms *manufacturing* and *advanced manufacturing* interchangeably; however, the terms technically denote an historical divide between traditional manufacturing and advanced manufacturing. While there is not necessarily a universal definition, most experts describe advanced manufacturing as utilizing innovative technology to drive efficient processes and create new products ("What is Advanced Manufacturing," 2017; Schuetz, 2013). In fact, some identify the year 1951 as the beginning of advanced

manufacturing because that was when the computer became part of the manufacturing

process (Schuetz, 2013). For manufacturing, efficient processes are those that require the

least amount of time and produce minimal waste. Some manufacturing processes include

removal of material by cutting or shaping raw materials, while other processes include

formation of material by forging or stamping. Another process is additivemanufacturing,

often called 3D printing, which produces a part or a product by building from the bottom

to the top, layer on top of layer ("What is Manufacturing Technology," 2018). Of course,

additional processes exist, and the research and development arms of the manufacturing

industry are constantly developing new technologies. In simple terms, the degree to

which a process is considered advanced is somewhat dependent on the technology used

to create a product. For example, a machinist in the past may have used several hand

tools to cut metal and form a part. In more recent decades, however, a machinist can use

a computer numerically controlled (CNC) machine to cut the same part in far less time

and with greater accuracy. The CNC machine is an advanced technology and process.

As I previously stated, the terms *manufacturing* and *advanced manufacturing* are often

used interchangeably without regard to the historical and technical differences of their

definitions.

Additional terms often used when discussing manufacturing are *durable* and

nondurable goods. Durable goods are those typically not used up, worn out, or

repurchased within the first three years; they retain their value for a relatively long period

of time. Examples include automobiles, building materials like lumber and bricks,

appliances, tools and equipment, and consumer electronics. Nondurable goods, often

referred to as consumable goods, do not last very long. Examples include food and

drinks, cosmetics and personal hygiene, clothing and textiles, and paper products. Two other terms that are loosely associated with *durable* and *nondurable* are *heavy manufacturing* and *light manufacturing*. While the terms are not synonymous, it is fair to say that heavy manufacturing is typically associated with durable goods, meaning the production of these goods may require more capital, physical space, and energy. Often times, heavy manufacturers produce durable goods from raw materials for other businesses rather than end-user consumers. Similarly, light manufacturing is typically associated with nondurable goods that are created for end-user consumers. Light manufacturing usually requires less physical space and energy than heavy manufacturing.

Finally, the terms *automation* and *artificial intelligence (AI)* are frequently included in conversations about manufacturing. Workforce development professionals and manufacturing experts often debate the future of the manufacturing worker in light of the pace at which processes are becoming automated. Automation and AI are transforming the manufacturing workplace and will continue to do so: "Workers will need to acquire new skills and adapt to the increasingly capable machines alongside them in the workplace. They may have to move from declining occupations to growing and, in some cases, new occupations" (Manyika & Sneader, 2018, p. 1). In this constantly evolving sector, automation pushes companies to weigh the benefits and challenges of adopting the latest technology and to consider the consequences for their workforce. Automation is attractive to manufacturers because it has the potential to increase productivity, improve quality and precision, decrease labor costs, and improve safety. Regardless of its benefits, automation often poses challenges for the manufacturing workforce which may need significant retraining or may simply be replaced.

Definitions of select manufacturing terminology are relevant to this research. Often times, heavy manufacturing companies pay their employees more than light manufacturing companies pay their employees; likewise, manufacturers of durable goods pay more than manufacturers of nondurable goods. The women in this study worked at both types of companies, heavy and light, and earned commensurate wages. Understanding types of manufacturing, types of jobs, and wage ranges were part of the learning curve for the women in the study. Also, the physical demands across various types of manufacturing can differ significantly, which is sometimes mentioned by the informants.

3.2 The Need for a Skilled Workforce

The shortage of a skilled workforce in the advanced manufacturing sector is a problem across the United States, and the shortage has prompted some manufacturers to relocate because they cannot afford the consequences of an unprepared workforce that include more overtime and decreased production. Many communities throughout the U.S. rely on the manufacturing sector to provide jobs and to drive the local economic development. Since the recession of 2008, manufacturing has contributed over "25% of the overall growth in GDP between 2009 and 2011" and has added "500,000 new jobs between the beginning of 2010 and the end of 2012" (Bond, 2013, p. 1). In "The Geographic Concentration of Manufacturing Across the United States," a report from the U.S. Department of Commerce, economists identified counties across the U.S. where manufacturing provided at least 20% of total earnings and then ranked the states with the most counties: Indiana (50 counties); Ohio (48); Tennessee (42); Wisconsin (40); Georgia (36); Iowa (36); and, Kentucky (31) (Bond, 2013, p. 1). In the same report,

economists acknowledged that within a state, these manufacturing counties were probably not distributed evenly though they may have been located in diverse areas that included metropolitan and rural settings (Bond, 2013). In Kentucky, manufacturing companies span both urban and rural communities, with the largest concentration of manufacturers in the northern counties on the borderline between northern Kentucky and Cincinnati, Ohio.

Across the United States, manufacturers are clamoring for skilled workers to fill the manufacturing pipeline. During the last five years, the demand for a prepared workforce has reached an unprecedented level for several reasons. Supply chain complexities, high fuel costs, on-shoring, new job creation, complex technologies, and a lack of product quality and consistency have driven jobs from foreign countries back to the United States. At the same time, much of the skilled labor currently working in manufacturing is aging and most companies have no plan for succession. Some companies report up to 70% of their workforce will become eligible for retirement in the next five to ten years (Manufacturing Workforce Needs, 2012). Along with a graying workforce, a chasm between the technical requirements on the manufacturing floor and the technical skills of newcomers continues to widen. During the 1980s and 1990s, laborers and unions bemoaned machines replacing workers, and now another consequence of automation plays out as manufacturers scramble to find people with the appropriate skill sets to program, monitor, and repair the computer-driven automation of the advanced manufacturing sector. The Manufacturing Institute reported "U.S. manufacturers face reduced earnings of up to 11% annually due to increased production costs and revenue losses resulting from skills shortages" (Out of Inventory, 2014, p. 2).

The skill gap has forced American manufacturers to think strategically about filling the talent pipeline. "More than 75% of manufacturers report a moderate to severe shortage of skilled resources and over 80% of manufacturers report a moderate to severe shortage in highly skilled manufacturing resources" (Out of Inventory, 2014, p. 3). Whereas in the past, workforce discussions focused on skilled versus unskilled labor, the current conversation has turned to skilled versus highly skilled. Typically, a skilled employee possesses more than a high school diploma but less than a bachelor's degree, and often times that employee has learned those skills at a community college and may have an associate degree. A highly skilled employee usually has a bachelor's degree. This upward trend in competencies is reflected in the data. In 2000, 14.1% of the U.S. manufacturing workforce did not have a high school diploma or GED, but by 2014 that number was only10.6% (Facts About Manufacturing, 2014). At the opposite end of the education attainment spectrum, employees with bachelor degrees have increased from 16.3% to 19.9%, and employees with graduate degrees have increased from 5.7% to 8.8% (Facts About Manufacturing, 2014). Aging incumbent workers in the manufacturing sector have had the opportunity for on-the-job training to keep pace with the increased reliance on technology.

Throughout the U.S., companies are trying to build a pipeline, but most current entry-level jobs require some sort of training. Many advanced manufacturing companies are turning to apprenticeship models where the employee works full time for the manufacturer and goes to school part time. The company pays the tuition and fees for the student/employee who must complete a regimen of training ranging from a certificate to an associate degree; the student completes the credential and graduates debt-free.

Despite the financial attractiveness of this training model, companies still struggle to hire apprentices.

A group of manufacturers, Partners in Manufacturing (PIM), in one Midwestern geographical area commissioned a study in the summer of 2012 to identify the specific needs of the local manufacturing companies within their industrial park. Most of these manufacturers comprise the PIM membership that advocates for policies germane to its goals, which include talent recruitment and development. The PIM study results identified 680 open positions at the time of the study in 2012, 2500 openings in the following three years, and 6250 manufacturing jobs that would be available in the next ten years (Manufacturing Workforce Needs, 2012). Reflecting national trends, the study found that the majority of the skilled production positions required more education than a high school diploma and less education than a four-year degree. The PIM leadership presented the results at a well-attended stakeholder meeting and press conference in October 2012 at a large automobile manufacturing company. The National Association of Manufacturers, as well as the membership of the PIM, has identified five target populations for recruitment into manufacturing: high school students, veterans, displaced workers, retired seniors, and women.

3.3 The Gender Wage Gap and Nontraditional Jobs in STEM

A woman working full-time in 2015 earned 79 cents for each dollar earned by a man, and on average women earned less than men in almost all occupations (Pay Equity and Discrimination, 2016). Historically traditional jobs for women have paid less than historically traditional jobs for men (Pay Equity and Discrimination, 2016). Nontraditional programs and careers for women, both STEM and non-STEM, are more

likely to provide a livable wage than traditional programs and careers for women. Women choose traditional programs over nontraditional STEM programs/careers for several reasons which include a lack of familiarity with STEM jobs and training programs, an absence of STEM career information, a scarcity of role models, and limited experiential opportunities that potentially could spark interest (Reha, Lufkin, & Harrison, 2009; St. Rose & Hill, 2013; Starobin & Laanan, 2008). Without information about nontraditional programs or exposure to relevant experiences, women's participation in nontraditional programs and careers will remain stagnant. Consequently, community colleges might miss an opportunity to impact the financial future of their female students.

The current manufacturing workforce is composed mainly of men with many of them approaching retirement in the next 10 years. According to the 2014 U.S. Bureau of Labor Statistics, 4.2% of the 4,964,000 employees in installation, maintenance, and repair occupations, many in manufacturing, are women. In the 8,275,000 production occupations, 27.6% are women. Again, the vast majority of the production occupations are in manufacturing. At a closer look, the subcategories of production occupations include several jobs that are traditionally held by women. These include bakers (59.8%), food batch makers (51.4%), sewing machine operators (76.1%), and tailors, dressmakers, and sewers (72%) (U.S. Bureau of Labor Statistics, 2014). The production jobs held mainly by women such as sewing machine operators have significantly lower earnings than production jobs predominantly held by men. The median weekly earnings for a sewing machine operator is $405.00 whereas a tool and die maker earns $911.00 (U.S. Bureau of Labor Statistics, 2014). Numerous reasons are cited for women earning less

than men across most occupations including some of the choices that women make. Often times women choose jobs such as a childcare worker that do not provide a livable wage because they are unaware of their options. In 2013, the median hourly wage was $17.04 for welders, $23.20 for electricians, and $17.21 for automotive technicians. In contrast, the median hourly wage was $9.28 for childcare workers and $10.82 for cosmetologists and hairstylists (St. Rose & Hill, 2013). In some Midwestern regions a self-sufficient wage for a single mom with one child is approximately $22 per hour (Kalsem, 2012). In the region where the Women in Manufacturing program exists, women make up 7% to 10% of the manufacturing workforce (Partners for a Competitive Workforce, 2013). According to the U.S. Department of Labor, a job is considered nontraditional for women when women comprise 25% or less of workers in a particular field (St. Rose & Hill, 2013, p. 32). Just as manufacturing is nontraditional for women across the U.S., manufacturing is also nontraditional for women in the local region that is home to the Women in Manufacturing program.

Unlike the transient nature of the manufacturing jobs for women who temporarily replaced men during World War II, the current manufacturing job openings are permanent assuming the national and global economies remain stable. Recruiting women into manufacturing has the potential to be a win-win situation both for women and for companies. Women attending community colleges can drastically increase their earning potential by choosing nontraditional STEM programs such as those in advanced manufacturing that lead to higher wages. According to the U.S. Department of Labor, in 2012, 1.8 percent of electricians and 4.8 percent of welders, solderers, and brazers were women (St. Rose & Hill, 2013, p. 33). These jobs are in the manufacturing and

construction sectors. "Not only do these occupations offer higher wages compared with traditionally female occupations, but they also typically offer more opportunities for growth and advancement" (St. Rose & Hill, 2013, p. 33). Multiple pathways to high-wage, high-tech careers exist in secondary and post-secondary institutions, but community colleges may provide the quickest and most affordable route.

STEM fields account for an increasing number of new, high wage positions. For women, especially low-income women and mothers who want to support their families, earning a credential in a STEM field can be a stepping-stone to a better-paying career (St. Rose & Hill, 2013). Townsend (2008) explained: "These fields [high wage] are typically considered nontraditional ones for women and include areas such as engineering technologies, precision production, and mechanics of transportation" (p. 10). Women attending community colleges can significantly increase their earning potential by a range of six to ten dollars per hour by choosing nontraditional STEM programs. Women's underrepresentation in STEM and STEM-related fields reduces the likelihood that their community college education will bring the expected payoff.

3.4 The Role of the Community College

The research supports the need for community college pipeline programming that bridges the gaps between women and male-dominated career pathways like advanced manufacturing. Whereas much has been researched and written about the experiences of women in high schools and universities, less has been examined against the backdrop of the community college. Researchers have identified the need for "additional studies to examine female students in STEM at community colleges by applying qualitative research inquiry" (Starobin & Laanan, 2008, p. 39). Women who attend two-year

colleges often must balance work, school, and family obligations while simultaneously attempting to assimilate into the unfamiliar culture of a college. Women, especially those who are mothers of young children, attend community college more than anyother type of postsecondary institution. Often times the women who enroll in a community college are the only providers for their children, and they are looking to the college for a pathway out of poverty. While women outnumber men in community colleges, the socioeconomic status of women has declined over the last 20 years, and women's enrollment in high-wage career pathways has remained stagnant (Townsend, 2008). For women to provide for their families, they must enroll in and complete a program that leads to employment in an industry that pays a livable wage. The research shows that community colleges must provide spaces and opportunities for women to explore high-wage programs and to create a new narrative about themselves as learners and wage earners.

Women are "overrepresented in lower-status jobs and earn lower salaries" (Deutsch & Schmertz, 2011, p. 479). Researchers and journalists alike have attempted to explain gender differences in wage disparities, occupational interests, college enrollment and completion, STEM participation, and career trajectories. Often times, these debates focus only on middle class men and women attending or graduating from four-year colleges and universities. The lack of women in STEM programs is also a problem for university engineering schools that cannot seem to break the 25% mark like some law schools, medical schools, and accounting programs have in the recent past (Cain and Leahey, 2014). Like four-year colleges and universities, community colleges enroll more women than men (Townsend, 2008). This gender difference in enrollment has

been true for several decades, but the higher enrollment of women has not resulted in more women in high wage sectors. "Although women earn the majority of associate degrees and certificates awarded by community colleges, they are concentrated in lower-wage, lower-skill fields" (St. Rose & Hill, 2013, p. 15).

Some four-year colleges and universities actively recruit women into engineering programs, but few two-year colleges do the same for recruiting women into engineering technology or any other nontraditional program. Women attending community colleges can significantly increase their earning potential by choosing nontraditional STEM programs. STEM fields account for a growing number of new, high wage positions. For women, especially low-income women and mothers who want to support their families, earning a credential in a STEM field can be a stepping-stone to a better-paying career (St. Rose & Hill, 2013). Women's underrepresentation in STEM and STEM-related fields reduces the likelihood that their community college education will bring the expected payoff. Community college women who choose traditionally "female" programs (e.g., cosmetology, early childcare) are not better off economically than their peers who only have a high school diploma. Women who choose nontraditional STEM programs/careers have more opportunities to make a livable wage. Yet, despite the economic trajectory of high-tech pathways such as advanced manufacturing, most women do not pursue these careers. "Community colleges enroll the majority of undergraduate women in higher education, so they have an opportunity to increase women's participation in nontraditional fields, including STEM, by actively addressing the barriers women face in pursuing these fields…" (St. Rose & Hill, 2013, pp. 31-32). In addition to the limited knowledge and experience with nontraditional programs and

careers, women may also feel the cultural dissonance between themselves and that of the manufacturing environment. Therefore, women may choose traditional programs over nontraditional programs and careers because they lack the cultural capital and agency to navigate the manufacturing classes and workplace.

3.5 Working Class and First-Generation Students

Community college students represent a wide range of ages, ethnicities, and life experiences. The community college classroom often includes even a broader range of people looking for a second chance – students who may be homeless, students who may be single parents struggling to provide for their families, students who are displaced workers, students who have recently immigrated to the U.S., students who have recently served in the military, and students who may have a criminal record. Most community college students, including over a million mothers, work while attending college part-time (St. Rose & Hill, 2013). Even with the vast life and work experience that dwells within community college students, they typically arrive at college with a tremendous amount of fear and self-doubt (Bailey, Jenkins, & Leinbach, 2005). While some researchers focus on the dissonance between the middle class and working-class students at four-year universities, there are yet more complications when studying the "other" post-secondary institution, the community college and its students, specifically working-class women. Despite its overall increased visibility, the community college still inhabits a place of shame and punishment in the mind of the American college-consumer and therefore in the very ethos of the community college student (Dowd, 2014).

Tiamiyu and Mitchell (2001) used the phrase the "feminization of poverty" because more and more women are living in poverty, as are their children. Single-parent

households headed by women with children are five times as likely to be poor as married-parent families (Cancian & Reed, 2009). Higher education is one of the mechanisms capable of lifting women out of their circumstances, but attaining that education is not as easy as some would claim. In "Poverty and the (Broken) Promise of Higher Education," Vivyan Adair (2001) argued that education is critical to women working to escape poverty, yet the culture of higher education does not embrace the poor or the single parent. Some researchers (Adair, 2001; Owens-Manley, 2003; Tiamiyu & Mitchell, 2001) were also critical of the welfare reform of 1996, The Personal Responsibility and Work Opportunities Act, because it emphasized work over education and forced women to stay in low-wage jobs and to quit school. Tiamiyu and Mitchell (2001) asserted "the focus on getting people off the welfare rolls and into the workforce, ignores education as the crucial key to economic independence" (p. 48). Adair (2008) claimed, "The reform was designed to rehabilitate 'undeserving' poor single mothers by bringing them squarely under the control of men in the home and the workplace" (p. 5). While the welfare reform of 1996 began over 20 years ago, it set a precedent that is still being followed and extended to other programs like Medicaid. These practices maintain the status quo and prevent women from accessing one potential resource that can change their lives and the lives of their children.

Some potential college students come from impoverished circumstances that not only create financial barriers to higher education but also pose a cultural disconnect. The dissonance between a student's family background and the dominant middle-class culture of a university can be unfamiliar and intimidating. While there are numerous ways in which a student can experience dissonance, first-generation college students can

especially feel out of their element once they step onto a college campus (Nomi, 2005). Often, in homes where parents are college-educated, it is simply assumed that children will attend college. In homes where parents are not college-educated, the decision for children to attend college can be a bit more complex. Whereas many parents work hard to see to it that their children go to college, or that their children have a "better life" by going to college, some families are not so supportive. In "Family Capital: How First Generation Higher Education Students Break the Intergenerational Cycle," Gofen (2009) noted that some first-generation, college-bound students encounter friends and family who discourage them from attending because they view the potential college student as "rejecting" her home culture in favor of a new one. For those students who do have support from their families as they matriculate into college, they still face a steep learning curve in their new environment. Gofen (2009) stated, "Evaluating family background and parental involvement indicates that first-generation students experience a strong 'culture shock' in college as college represents a fundamentally different culture compared to their parents' way of life" (p. 106). Referencing Bourdieu's theory of cultural reproduction and cultural capital, Liljander (1998) added that students drop out or change programs because of the dissonance between their culture and the culture of higher education. Certainly, the culture of the community college is not one of elitism, but I would argue that it is similar enough to other higher education institutions to be a barrier to some students who are first generation and may not be from middle class families. In fact, many students at community colleges are "first generation, minority, and underprepared students" who experience a cultural disconnect even at two-year colleges (Chaves, 2006, p. 140).

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3.6 Women Choosing Careers

Deutsch and Schmertz (2011) asserted that gender and family identities play important roles in the career choices of women: "Not only are women's pathways to school likely to be influenced by their gendered positioning, but their lives once in school are shaped by their roles in their families and society's gendered norms and structures" (p. 478). In a qualitative phenomenological study that explored the influence of family on the career choices of adult women whose parents did not attend college, researchers identified five primary themes: family role/gender such as being a daughter/woman; support from the family; prioritizing what is important to the woman; the woman's reasons for choosing to attend college; and, the woman's barriers and options (Gibbons et al., 2011). Of the five themes, participants reported that being female and fulfilling the roles of daughter, wife, mother, and sister influenced their career decisions more than any other factor. Some participants provided examples of how family members' attitudes, both positive and negative, affected the participants' decisions. Researchers identified perseverance as the most consistent sentiment expressed by the women in the study: "For the participants, perseverance is the essence of work and career and the influence of family on these experiences" (Gibbons et al., 2011, p. 324). In other words, participants expressed a sense of perseverance across all five primary themes. Perseverance seems crucial when one considers Deutsch and Schmertz's (2011) assertion that the multiple family roles played by women may contribute to an overall increase in stress, depression, and anxiety.

3.7 Conclusion

   Manufacturing companies in the United States need a skilled workforce to keep

up with the demand for both durable and consumable goods. Frontline jobs in

manufacturing range from unskilled to skilled; unskilled employees typically need ahigh

school diploma and skilled employees usually need a college credential ranging from a

certificate to an associate degree. As automation expands, companies need more skilled

employees. Community colleges provide the type of education needed for

manufacturing jobs, and most two-year community colleges have tuition costs that are

less expensive than four-year colleges and universities. Women who attend community

colleges and major in a STEM field such as advanced manufacturing will typically earn

more than their peers who earn credentials in traditionally female majors. Women who

work in nontraditional STEM fields like manufacturing may change the financial

trajectory of their families.

CHAPTER 4: DESIGN AND METHODS

I approached this research from a feminist epistemological perspective with two goals in mind that extended beyond answering the research questions. First, I wanted the informants to have an opportunity to tell their stories and share their experiences and opinions. I wanted the women to know that their experiences mattered. Second, I wanted the research to privilege their stories. In the patriarchy of manufacturing, the men dominated how work was done, yet the women had such insight about how they could contribute to production and improve the culture on the manufacturing floor. A qualitative feminist methodology honored and respected the women's stories and provided a safe place for the women to be heard. This place was in stark contrast to the manufacturing floor, a place where men's voices were privileged and where the women encountered hostility and invisibility.

4.1 Design

A researcher has infinite choices in creating a method and design to accomplish the goals of a project. The process of doing so is often iterative and reflective as the researcher systematically examines the execution of the design and makes adjustments along the way. Whereas this may be true in various types of research, it is imperative in qualitative research where the researcher must be aware of both the project and her role as researcher. Glesne (2011) writes, "In a sense, you conduct two research projects at the same time: one into your topic and the other into your 'self'" (p. 151). Qualitative researchers do not standby fearful of engaging the informants; rather, the researchers immerse themselves to connect, to question, and to tell a story.

I designed this qualitative study to gain a better understanding of factors that influenced community college women to choose a nontraditional program like manufacturing and employment in a male-dominated field. In particular, the population of my research project was women who enrolled in advanced manufacturing classes and subsequently participated in a career support program that was situated in a community college in the Midwest. For this study, I refer to the support program as "Women in Manufacturing." I was interested in how the women's experiences in the classroom and in the workplace impacted their construction of identity. Using a qualitative approach, I examined how gender, class, and race intersected to affect the women's choices about education and careers. I also studied how women exercised agency within the patriarchy of manufacturing. Interviewing was the main method of generating data from informants who were the only individuals who could expound upon their experiences working in manufacturing.

While the unit of analysis was the community college women, the context of the support program was relevant. The experiences of the women were the starting point for my work, and the manufacturing program was the context; therefore, I collected data on more than one level. Qualitative research projects often examine levels of "nested" data that include the data of the context and the data of the participants (Yin, 2011). Qualitative methods were used for this project so I could study the multiple layers of the women's stories that included their lived experiences as women, students, and employees, as well as the contexts for these experiences that included homes, schools, and workplaces (Coffey & Atkinson, 1996). My research project lent itself to the five features of qualitative research according to Yin (2011): learning about people in a real-

world context; reporting the viewpoints of the informants; including the context of the informants' lives; sharing findings within existing research regarding how people live; and, employing methods of triangulation for multiple pieces of data.

4.2 Research Site

The primary site of the study was a community and technical college in the Midwest. This community and technical college was one of many public community colleges that comprised a statewide system. The college was accredited by the Southern Association of Colleges and Schools Commission on Colleges and offered certificates, diplomas, and applied associate degrees in technical programs as well as an associate in arts degree and an associate in science degree for transfer. Enrollment was over 4,500 with 28% of its students attending full-time and 72% of its students attending part-time (Fall 2015 Enrollment and Retention Report). The average age of a student was approximately 27 years old with women outnumbering men 55% to 45%. While the definition of a "typical" community college is rather elusive, the college's demographics were indicative of several national trends including the average age of students and the full-time to part-time student ratio.

The college had 4 campuses spread across 4 cities and 2 counties in this Midwestern state. Students could take general education courses on all campuses; however, the manufacturing courses and labs were all at one particular campus. This campus was situated among manufacturing companies, retail shopping, fast-food restaurants, gas stations, and some single-family housing. The manufacturing campus had three buildings: the Advanced Manufacturing Center that housed the manufacturing labs; the Workforce Development building; and, the bookstore. The main manufacturing

lab was a large, rectangular, open lab with five adjacent classrooms that were offshoots designed for a seamless flow from lecture to lab. This lab housed equipment for three of the five manufacturing programs: industrial maintenance, manufacturing engineering technology, and electrical technology. The welding lab was located in the Advanced Manufacturing Center building, but it was separate from the main lab. The computerized manufacturing and machining lab was in the Workforce Development building. Since manufacturing courses and labs were on this campus, students in the Women in Manufacturing program attended classes and received support services at this particular campus.

4.3 Context - Women in Manufacturing Program

Women in Manufacturing was a program that recruited, trained, placed, and supported women in advanced manufacturing programs at a community and technical college. In spring 2013, 26 women in education, industry, and community-based organizations came together to create a program that could possibly serve two purposes: fill the manufacturing talent pipeline and place women in jobs that provide livable wages. A noncredit pilot program launched in fall 2013, and the full program began in January 2014. Women in Manufacturing was not a specific academic program; rather, it was a support program that served all women who were in any advanced manufacturing certificate or degree program at the college. Support services ranged from financial assistance in the form of grocery vouchers to academic assistance in the form of a laptop on loan.

Recruitment efforts for the program targeted potential students as well as community-based workers who provided services to job seekers. One-hour informational

meetings for case-managers at community-based organizations taught client-facing workers about the program so they could share information with women who were seeking services from their organization. If a woman was interested in the program, she would then attend a full-day workshop that included information about the program, the college, and the manufacturing sector. Prospective students participated in a discussion surrounding manufacturing careers, toured the manufacturing labs on campus, and took part in a demonstration led by a college manufacturing faculty member. The full-day workshop also included a tour of a manufacturing company for the women to see what that environment looked like.

The 77 women (see Appendix A: Demographics of Population) who participated in the program from fall 2013 to fall 2017 ranged in age from 18 to 60 years of age. The Women in Manufacturing program included women in any of the five advanced manufacturing majors, so a woman could complete training in a short, 16-week certificate or a longer two-year, associate degree program (see Appendix B for Training and Job Placement of Population). Manufacturing was a career pathway with stackable credentials and with multiple entry and exit points. Women who participated and succeeded in the classroom could apply for a manufacturing job at any point. The Women in Manufacturing program assisted with developing the support systems women needed to be hired and sustained in manufacturing positions. Some examples of support included locating transportation, accessing childcare, and utilizing career services. Additional support services included referrals and connections with community agencies to provide housing, food, clothing, and financial as well as legal aid when needed.

4.4 Researcher Access

As explained in the introduction, I was a member of the founding women of the Women in Manufacturing program. The women leaders designed a regional training program that needed to be housed at one particular community college, which was the community college where I worked. The Workforce Development division administered the actual support program and partnered with manufacturing faculty who taught the courses. When the program began, I worked in the Workforce Development Division and remained an employee in that division for five years. Before an advisor and coordinator were assigned to the Women in Manufacturing program, I did the majority of the work. In the initial months of the program, I often was the person who met with interested women, and I provided an overview of the college's advanced manufacturing programs as well as the job prospects in the manufacturing sector. As the program grew, I hired a program coordinator and reassigned additional staff and faculty to the Women in Manufacturing program. I continued my involvement in the operations of the program, and I also supervised the Women in Manufacturing program coordinator, the academic advisor, and the manufacturing instructor, all of whom interacted with the women frequently. Additionally, I stopped by classes and labs and occasionally sent emails or texts to ask the women how they were progressing in the program or at their jobs.

4.5 Timeline of Research Phases

The field research for this project spanned across five years beginning in 2013 and ending in 2017. Data generation within the five years was divided into three phases. The first phase of research began with a pilot study in the fall of the 2013-2014 academic

year and ended in the summer of 2014. A second phase of data generation spanned the academic years of 2014-2015 and 2015-2016 and the fall of 2016. The third and final phase of research occurred during the spring and summer semesters of 2017. During the Phase One pilot study, informants participated in journal writing, individual interviews, and group interviews. My skills as an interviewer improved over time as I learned to ask open-ended questions and to listen for opportunities to ask follow-up questions that generated rich data. I also conducted field observations in some of the women's classes as well as some of their Women in Manufacturing support activities. During Phase Two, I conducted individual and group interviews as well as interacted with the women. In Phase Three, I conducted extensive individual and group interviews. The data from the first two phases informed my decisions about methodology, design, methods, and interview questions for the third and final phase. Phase Three was explicitly designed to generate data for my dissertation, but in the dissertation I have also included data from Phases One and Two, with IRB approval. Table 4.1 lists the informants and the phase or phases in which they participated.

Table 4.1 *Informant Participation Timeline*

Informants	Phase 1 Fall 2013 – Summer 2014	Phase 2 Fall 2014 – Fall 2016	Phase 3 Spring 2017 – Summer 2017
Janie	✓	✓	✓
Sienna	✓	✓	✓
Tanya	✓	✓	✓
Faith		✓	✓
Samantha		✓	✓
Sarah		✓	✓
Delores			✓
Bridget	✓		
Catherine	✓		
Hailey	✓		

4.6 Population and Sampling

Qualitative researchers choose samples specifically to render the data that is relevant to the research topic, which is purposive sampling (Yin, 2011). Whereas random sampling may represent breadth of a population, purposive sampling can represent depth of a population. I studied the population of women who joined the Women in Manufacturing career support program, which was open to any woman enrolled in a manufacturing major at the community college. Program representatives employed by the college recruited women into the career support program. Some women were already enrolled in a manufacturing program at the college, but the majority of women were connected to the program through recruitment events specifically for

women. Choosing informants from this population was also a convenience sampling because I worked at the community college, in part with the manufacturing programs.

4.6.1 Phase One Sample: Fall 2013 – Summer 2014

During the fall of 2013 the community and technical college conducted a manufacturing career exploration workshop for six women who were in the Ready to Work and Work and Learn programs. Both programs provided extra support for women who were receiving benefits through the Temporary Assistance for Needy Families (TANF) program. Three women who had recently lost their jobs also participated in the career exploration workshop; the Career Center connected them to the community college. The purpose of the workshop was to introduce manufacturing careers to the women and to encourage their enrollment into a manufacturing major beginning in spring 2014. I invited the nine women who were in the workshop to participate in my pilot research study that I began in fall of 2013 and continued through the summer of 2014 as part of my doctoral course work. Six of the nine women participated in the pilot research study for fall 2013 and continued in the pilot research for spring 2014. Three of the six women dropped out of the program during the spring 2014 semester, and the other three women continued into the summer 2014 semester when the Phase One pilot research ended.

4.6.2 Phase Two Sample: Fall 2014 – Fall 2016

Whereas I completed the pilot research study for my doctoral course work, I subsequently decided that I wanted to continue this research with the possibility of the study becoming the focus of my dissertation. By fall 2014, only three informants from Phase One remained in the program. As new students matriculated into the Women in

Manufacturing program, I asked them if they were interested in participating in the research study. At this point in time, I continued to interview women to learn about their background in work and education and their goals moving forward. Most of the women wanted to be a part of the study but finding a mutually agreeable time for their schedules and mine was challenging. Ultimately, I interviewed three new women during Phase Two as well as the three women from Phase One for a total of six informants during this time. While I continued to collect data in Phase Two, I did not systematically analyze this data in isolation. Instead, as previously stated, I used this data aggregated with Phase One data to inform Phase 3 research. An example of how Phase 2 informed the research was when I heard a Women in Manufacturing student participating in a panel discussion share her perspective on women and men working differently. Her response prompted me to ask all the women during Phase 3 interviews about their perspectives on women and men working differently. This line of questioning ultimately led to an overall finding of the research project.

4.6.3 Phase Three Sample: Spring – Summer 2017

Phase Three, the final phase of research, was conducted as my formal research for my dissertation. The work I did and the data I collected during Phases One and Two informed my design and decisions for Phase Three. For example, during the 2013-2014 Phase One pilot research study, I learned that the ages of the women mattered in how they viewed their experiences in the program and how they perceived the male-dominated environment of manufacturing. In the original design for the Phase Three interviews, I planned to identify a sample of women from each of three age groups: 18-24 years old; 25-40 years old; and, 41-55 years old. I planned to choose two women

from each age group for a total of six women and planned to interview each woman twice for a total of 12 interviews. In addition to the age criteria for sampling, I aimed to choose women who had been in the Women in Manufacturing program for a minimum of two months, so they would at least have had some experience in the manufacturing classroom and possibly in the manufacturing workplace. Miles, Huberman, and Saldana (2014) define this sampling strategy as quota selection because I identified "the major subgroups" and chose "an arbitrary number from each" (p. 32).

Another criterion that influenced my opportunity to interview informants was my rapport with each of them. In fact, my relationships with the informants became the most influential factor in my success at engaging the women in conversation and interviews. I did not anticipate how difficult it would be to connect with women simply based on their age and their length in the program rather than their familiarity with me. I interviewed seven women during Phase Three, and I had an ongoing rapport with six of the seven. Two of the women were in the 18-24 age group, zero in the 25-40 age group, and five in the 41-55 age group. I conducted a minimum of two interviews with six of the seven women but only one interview with one of the informants. I became more acquainted with some women because of their longevity in the program and their participation in the Women in Manufacturing events.

Table 4.2 (below) lists all 10 informants who contributed to the research by participating in individual and group interviews during either one, two, or all three phases. Of those 10 women, six were engaged significantly in the classroom and through the Women in Manufacturing events. The events included networking with women in manufacturing as well as other manufacturing students, hearing guest speakers

from companies, and learning how to find a mentor. Due to the women's involvement in the program and their longevity in the program, I established a strong rapport with them. Other women in the Women in Manufacturing program also contributed informally to the data by sharing stories or asking questions. Many of my informal conversations gave me fresh insights into the women's experiences. While their specific stories may not be included in the data, their experiences and opinions that were shared with me certainly influenced my decision-making regarding interview topics and questions. Table 4.2 includes the research phase participation of each informant as well as her age, college credential, and employment status as of summer 2017. Three of the participants, Janie, Sienna, and Tanya, began the program in spring or summer 2014 and participated in the interviews I conducted during the Phase One pilot study as well as during Phases Two and Three of the research.

Table 4.2 *Informant Age, Credential, and Employment*

Participant	Research Phase	Age	Credential	Employment
Janie	1, 2, 3	55	A.A.S.	Manufacturing
Sienna	1, 2, 3	42	A.A.S.	Manufacturing
Tanya	1, 2, 3	55	A.A.S. *	Manufacturing
Faith	2, 3	19	A.S. transfer	Left manufacturing
Samantha	2,3	23	A.A.S.*	Manufacturing
Sarah	2, 3	45	A.A.S.*	Full time student
Delores	3	44	Unknown	Full time student
Bridget	1	31	None	None
Catherine	1	25	Unknown	Unknown
Hailey	1	26	None	None

*In progress as of summer 2017

4.7 Pilot Study

As noted above, I conducted a pilot research study beginning in fall of 2013 through summer of 2014 as part of my doctoral course work. I have referred to the pilot study as Phase One of the research. The community college offered a manufacturing career exploration workshop in the fall 2013 semester, and then began the Women in Manufacturing career support program in January 2014. The Phase One pilot study that began in fall 2013 continued through the beginning of the career support program, Women in Manufacturing program, in spring and summer of 2014.

4.7.1 Context of the Pilot Study

The context for the 2013-2014 pilot study was the manufacturing career exploration program (fall 2013) and the Women in Manufacturing program (summer-spring 2014). The Women in Manufacturing program was not a specific manufacturing course or major; however, for its spring 2014 launch, the nine women who enrolled in the program took their first class together, Manufacturing 102 (MFG 102). This was helpful for me as I was easily able to connect with all 9 women to ask if they were interested in participating in the research project. The 6-credit-hour class, MFG 102 Certified Production Technician, was a foundation course for all five of the community college's manufacturing majors. The curriculum was created by the Manufacturing Skill Standards Council (MSSC) to prepare students for online tests that if passed would certify the student with the industry-recognized credential of Certified Production Technician. Six of the nine women who completed the fall 2013 manufacturing career exploration workshop began the MFG 102 class on January 13, 2014. Other women who were referred from the State Office of Employment and Training joined them to create a class of women who wanted to complete at least one credential in advanced manufacturing.

4.7.2 Data Generation in the Pilot Study

I began collecting data from the women in the manufacturing career exploration workshop in fall 2013 and continued collecting data in spring and summer 2014. The pilot study provided an opportunity for me to practice various methods of data collection. The primary method of collecting data during the Phase One pilot was interviewing the women who were in the manufacturing career exploration workshop (fall 2013) and/or

the Women in Manufacturing program (spring and summer 2014). The questions that were used for interviews during Phase One are in Appendix C – Guiding Questions for Pilot Study Interviews. Additional methods for collecting pilot data included field observations, journals, and group interviews. I also had private, face-to-face conversations, phone conversations, email correspondence, and texting correspondence with the women. While the Women in Manufacturing participants were the primary informants for the pilot project, I also gathered data through interactions with the instructor of the MFG 102 class in which the women enrolled, the academic advisor, and other college personnel whose scope of work within the college included the women in the Women in Manufacturing population. The data from the instructor, academic advisor, and other college personnel provided a different perspective and added to my understanding of the women's experiences. I wrote memos to record my thoughts during and after fieldwork. The types of data generated in the Phase One Pilot Study are listed in Appendix D – Phase One Pilot Data Inventory. The research I piloted from fall 2013 through summer 2014 informed the methodology and design of my formal dissertation research in Phase Three.

During the pilot, I also learned that group interviews with the women provided further insight into their experiences as students and/or employees in manufacturing. I conducted group interviews three times in the pilot phase and observed that the conversations among the women generated new and sometimes contrasting perspectives that provided nuances that I had not discovered in the one-on-one interviews. The conversation among the women was organic and evolved into additional topics that informed my questions for subsequent interviews. According to Yin (2011), "The

groups are 'focused' because you have gathered individuals who previously have had some common experience or presumably share some common views" (p. 141).

4.7.3 Thematic Coding in the Pilot Study

The pilot research was also an opportunity for me to begin developing a thematic coding system for data I had gathered, which included the women's job histories and thoughts on college and manufacturing. My process for analysis began with open coding of the data during which I initially identified 44 themes related to work history, family education history, and impressions of manufacturing that emerged during my first forays into the field and during interviews with the informants. After the identification of the 44 topics, I began to examine topics that were similar to other topics and chunked them together into larger thematic groups. For example, I combined seven initial topics (current income, potential income, benefits, public assistance, homelessness, housing, transportation costs) into one thematic group that I coded "Financial Issues." A financial issue that emerged during the pilot study was the dilemma some of the women faced to continue with their college education or to seek immediate employment. The original 44 topics were combined into eight thematic groups. As data gathering continued during the pilot, the eight groups expanded to 12 thematic groups (see Appendix E – Initial List of Codes from the Pilot Study) with 54 subtopics. The thematic groups from the pilot were a starting point for coding the data in Phases Two and Three. The data from the pilot study also provided direction as I created the interview protocols for Phases Two and Three.

4.7.4 Emerging Themes Identified in the Pilot Study

The family and personal relationships of women heavily influenced their education and career choices. The relationships served as a push-pull mechanism in the lives of the women who were sometimes discouraged to pursue an education and career and sometimes inspired to do so. The second theme identified during the pilot was the women's fear of failing in their college courses. Most women were first generation college students and lacked familiarity with the college classroom. First generation college students are defined as students whose parents have minimum to no college experience (Redford & Hoyer, 2017). A third theme was the challenge women faced with balancing staying in school with the financial impact of not working. All of the women in the pilot study received some type of assistance from at least one if not more than one of the following: unemployment, Workforce Investment Opportunity Act (WIOA) training accounts, Temporary Assistance to Needy Families (TANF), and food stamps. Despite these programs, the women faced a dilemma between choosing education for a long-term employment pathway versus choosing work for short-term earnings. A fourth theme that emerged was how women described themselves as passive in their process of making choices regarding their education and their jobs. Several of the women said that they had not thought about jobs in a strategic or purposeful way. Instead, they reported their experiences with education and jobs as happening to them.

4.8 Researcher Positionality

Qualitative researchers immerse themselves to connect, to question, and to tell a story. The researcher is the main instrument in qualitative research (Glesne, 2011; Stake, 2010; Yin, 2011). How a researcher positions herself within a research project depends

largely on how she views the world. Glesne (2001) explains: "Every research study is, therefore, informed by higher level theory, even though researchers sometimes are not aware of these theories because they are embedded in their assumptions about the nature of reality and knowledge" (p. 5). I know as a qualitative researcher that I must be aware of my limitations and biases, and I understand that my decisions during planning and implementation of the study affect the outcomes along the way and in the final analysis.

4.8.1 Researcher Professional Experience

While I have limited experience as a researcher, I have worked in education for 30 years in a variety of settings. I currently work at a four-year, liberal arts college in a senior administrative position. Previously, I was at a community and technical college where I began as faculty before moving to division chair, dean, and finally served as vice president. Prior to the community college, I worked in a public high school as a teacher, curriculum developer, Tech-Prep coordinator, and School-to-Work coordinator. I also held part-time positions at a technical college and at a four-year, regional university in various capacities including instructor, writer, and editor. I became interested in other post-secondary opportunities, particularly opportunities for women, beyond the traditional four-year college. I wrote curriculum for career exploration in technical programs, especially those programs that were high-tech/high-wage and nontraditional for women. For most of my career, I have remained interested in the role of gender in educational settings.

As this project unfolded, my own life experiences with education and manufacturing contributed to my viewpoint as a researcher. Unlike the women in this

research project, I have never worked in an advanced manufacturing company nor have I attended a community college; however, I had ongoing involvement with both settings. In my role as an administrator at a community college, I oversaw customized training and continuing education for several industry sectors including manufacturing. The team and I worked with approximately 30 manufacturing companies ranging in size from 40 employees to over 1,000 employees. I forged relationships with varying levels of company leaders including human resource directors, shift supervisors, plant managers, vice presidents, and CEOs. Often times, these relationships took months to develop and during that time I had opportunities to observe the physical plant, the company culture, and the company leadership. While progressive companies that plan and implement training programs were typically committed to employee development, retention, and job satisfaction, other companies were not as proactive. I worked with both types of companies and saw the consequences for employees; therefore, I had ambivalent thoughts about encouraging women to choose careers in manufacturing. My involvement and observations of the manufacturing sector affected my conversations with the women in this study.

4.8.2 Researcher Personal Connection

On a personal level, I do know how some jobs in manufacturing have historically provided an income that far exceeds the threshold for a livable wage – often defined as the minimum income needed to cover the basic necessities. My maternal grandfather worked for Ford Motor Company for 30 years, and my father worked for Ford for 35 years. My grandfather completed the eighth grade before leaving school to work on his family's Tennessee farm and eventually to serve in World War II; my dad began working

for Ford shortly after completing high school in 1964 and retired in 2001 after making six figures during his last few years as a computer numerical control (CNC) machinist. He often recalled thinking to himself on his first day at Ford: "There is no way I can work at this place." The money and the benefits soon outweighed the constant fine mist of oil floating in the air and the monotony of the assembly line. As time passed, my dad put in for other jobs where he had opportunities to learn new skills and work with processes more complex than assembly line work. Seniority often dictated whether or not he landed a new position.

I knew firsthand that a manufacturing job had the potential to change the financial trajectory of an employee and his or her dependents. I also was familiar with some of the challenges of working in manufacturing. Mandatory overtime sometimes meant working seven straight days of 12-hour shifts leaving little time or energy to enjoy the extra money. From a young age, I also knew about labor unions, strikes, picket lines, scabs, committeemen, and the United Auto Workers (UAW). My dad was a union guy for sure, but he was not a zealot. He would always say, "There isn't any organization, religious or otherwise, that I can believe in 100%." He did not believe the union should protect people who did not come to work and do their jobs; however, he was very clear about the necessity of the union to negotiate a fair contract between the company and its laborers. I remember my dad receiving a monthly magazine, *Solidarity*, from the UAW. When I was in middle school, Lech Walesa, a Polish labor organizer, was on the cover of the UAW magazine, and I recall a discussion about how some countries forbade labor unions. These snippets of conversations from an early age have stayed with me and have

influenced my sensibility and respect for people who work in manufacturing on the production floor.

4.8.3 Researcher Bias

As the researcher in this project, I must disclose that I was one of the founding women of this particular program designed to recruit, train, place, and support women in manufacturing education and careers. In addition, I oversaw the program and the college staff who did the day-to-day work. This role provided me with a clear understanding of the program and its evolution, but the program was only the context for this study. The women were the focus. During the pilot study, I began keeping a journal of my thoughts about the data, the women, the program, the community college, and the manufacturing world. This process of reflecting on my own thoughts through journaling was helpful for me to see myself in the context of the work. I continued this reflexive practice as one way of examining my assumptions, biases, and insights.

In the data generation and analysis connected to the context of the Women in Manufacturing program, my interpretation may have been influenced by my role as one of the founding women. I thought the program was effective, and I may have homed in on data that reflected the program's success and inadvertently disregarded data that represented the program's shortcomings. Due to my role at the community college, I worked closely with approximately 30 manufacturing companies, and I saw firsthand how management viewed employees including women and people of color. Some companies hired a diverse workforce, invested in their employees, and valued the employees' contributions to the company's success. Other companies seemed to resent their employees and regarded them as a burdensome necessity. When the Women in

Manufacturing program began, I anticipated that companies would support it because the manufacturing companies desperately needed employees who had the training offered by the college. Certainly, some companies embraced the program, but I found myself trying to convince companies to interview the women. Simultaneously, I was listening to the women share their experiences and challenges of working on the manufacturing floor. Over time, I began to realize that some companies just did not want to hire women. Based on the experiences of an African American woman in the program, I would say the companies also did not want to hire women of color. I began asking the same question some of the women asked, "Is working in manufacturing a good opportunity for women?"

4.9 Data Generation in Phase 3

Through interviews with the informants in the Women in Manufacturing program, I hoped to gain insight into the women's experiences in the classroom and on the job for those women who had manufacturing jobs. I began gathering data informally as part of Phase One, the pilot research project that began in fall 2013 and continued through Phase 2. Formal extensive and in-depth data generation, Phase Three, for this study began in January 2017 and concluded in August 2017. I conducted an initial, conversational interview with each informant and used the guiding questions in Appendix F – Guiding Questions for Phase Three Interviews for this first interview. I based the interview questions for the second interview on the data generated from the first individual interview and the group interview. The dates of the interviews with the names of the informants for Phase Three data generation are listed in Appendix G – Phase Three Data Inventory. Yin (2011) commented on the qualitative interview:

This conversational mode, compared to structured interviews, presents the opportunity for two-way interactions, in which a participant even may query the researcher. In addition, qualitative interviews can take place between the researcher and a group of persons rather than a single person only. (p. 134)

Yin's description of the discourse between informants and the researcher in qualitative interviews was an accurate characterization of some of the conversational interviews that I conducted with the Women in Manufacturing students. I used the guiding questions simply as a reference during my interviews with the informants; therefore, I did not follow the questions in a specific order. I kept the interview protocol in front of me for consistency throughout the interviews, but I provided space for the informants to move from one topic to the next in an organic manner that seemed comfortable to them. I chose to conduct the interviews this way because I wanted to maintain a conversational atmosphere that was respectful.

At the beginning of the individual and group interviews in all phases of the research, I shared the informed consent document with each woman. I explained that participating in the research project was strictly voluntary, and they could discontinue their participation at any time with no consequences whatsoever. I also reassured the women that their identities would remain confidential. Since I had established a friendly relationship with six of the women, I was concerned that some of them would feel obligated to skew their responses about the program in a positive direction for the sake of politeness. I explained that I wanted to learn all about their experiences with the manufacturing classes as well as the manufacturing work environment. I wanted to know their perspectives: "Should we encourage women to go into manufacturing?" I

expressed that I did not know the answer because I did not work in that environment, and I wanted to know their thoughts.

Since I was interested in how women saw themselves as both students and laborers in the male-dominated area of manufacturing, my interview questions started with asking them to provide their own biographical context. To do this, I asked questions about their personal histories of jobs and education levels as well as the work and education histories of their families. I also asked each woman about her sense of self in relation to her education and work history. After asking about past choices, I asked each woman to describe her motivation for enrolling in college, specifically in a manufacturing program. We discussed the reactions of their friends and families, their specific challenges, and their motivation to persevere. For those who were employed in manufacturing, I asked about the specific tasks of their jobs and how they judged their skill levels. I also asked all of the informants to describe any people at work or at college whom they believed were helpful to them.

After the first round of interviews, I planned to conduct a group interview with a minimum of four of the informants with at least one informant from each of the three age groups. I conducted one group interview during Phase Three with the women after the first round of individual interviews. My role with the group interview was to provide discussion questions and act as a moderator who encouraged participants to express themselves while receiving minimal direction from me (Yin, 2011). The group interview was an opportunity for informants to discuss further some of their common experiences as well as unique experiences. In addition to generating data, the group interview also informed my questions for the second round of interviews. Finding a time that

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accommodated everyone's work, school, and life schedules was challenging. The first time I scheduled the group interview, two of the four women texted a few hours before the designated time that they could not attend. I cancelled the interview for the othertwo women and rescheduled. I planned a second and third group interview only to have the same issue with cancellations. On the fourth attempt, two informants were present, so I proceeded with the group interview. Tanya arrived a few minutes early, and Samantha arrived shortly after that. As the moderator, I was cognizant of ethical considerations of informant confidentiality and informant participation (Glesne, 2011). I was careful not to use prompts or to ask questions connected to any specific information revealed by an informant during the first round of interviews. Confidentiality was particularly important for a group interview with Tanya and Samantha because they worked at the same manufacturing company. Tanya had shared with me her distrust of the human resources manager and her overall dissatisfaction with company leadership. Samantha had a different perception that was less critical of the human resources manager and the company leadership. Without revealing Tanya's perspective, I used the group interview to learn more about Tanya and Samantha's contrasting perceptions.

After completing both rounds of individual interviews, I conducted member checks with the six informants that participated in the Phase Three interviews in 2017. I shared a rough draft of each woman's biographical sketch, and I also shared a brief summary of the overall findings. I anticipated that the women would have corrections and revisions for their biographical sketches, but only two informants had small changes. The women were more interested in discussing the findings and commented the most

about women's ways of working. The women did not recommend any changes to the overall findings.

4.10 Data Analysis in Phase 3

Qualitative research is an organic and ongoing process that continues to evolve during planning, implementation, and analysis. A qualitative researcher needs to be vigilant during this cycle because decisions made along the way impact all subsequent processes and analyses. In thematic narrative analysis, the primary focus is on "'what' is said, rather than 'how,' 'to whom,' or 'for what purposes'" (Riessman, 2008, pp. 53-54). I began the analysis of data by using a deductive approach beginning with research questions that provided focus for data collection (Miles, Huberman, & Saldana, 2014; Yin, 2011). According to Yin (2011), most qualitative analysis is conducted in a five-phase cycle: "(1) compiling, (2) disassembling, (3) reassembling, (4) interpreting, and (5) concluding" (p. 177). The analysis cycle is not linear but instead is recursive and iterative (Yin, 2011). I used this five-phase process to analyze the data.

4.10.1 Compiling

Compiling data means to organize the data into some type of order that makes sense to the researcher, which may or may not include the creation of a database (Yin, 2011). I transcribed all of the individual and group interviews I had conducted during the three phases of the research. I used the software program MAXQDA12 that allowed me to import and transcribe the audio file. The program synchronized the transcription with the audio, which made it possible for me to listen and read simultaneously during various phases of analysis. The process of transcribing the interviews and organizing the

interviews was pivotal in my becoming confidently familiar with the data. I organized

the files within the software by the name of the informant and the date of the interview.

4.10.2 Disassembling

Disassembling data is "breaking down the compiled data into smaller fragments

or pieces," and the researcher may assign codes to the pieces of data (Yin, 2011, p. 178).

I identified some emerging themes during the pilot when I collected data through

observations, individual interviews, and group interviews. The themes and subtopics

continued to shift, expand, and combine as I interviewed the informants during all three

phases culminating with the 2017 interviews. After sifting through the interview

transcripts, I identified 15 thematic groups (see Appendix H – List of Codes from Phase

Three Interviews). Using the MAXQDA12 software, I coded all of the transcripts with

the coding tools. I assigned some pieces of data one code whereas other data pieces had

four or five codes.

4.10.3 Reassembling

For deeper data analysis, I reassembled data by codes as I looked for patterns,

consistencies, and inconsistencies. Yin (2011) identified three procedures for analysis of

reassembled data: constant comparisons, negative instances, and rival thinking. With the

MAXQDA12 software, I first reassembled data by using the broad thematic codes.

During my first round of coding, I tended to code large chunks of dialogue so I could still

see the context as I began reading the data thematically. This was helpful for the first

reading through the themes, but as I refined my coding by recognizing patterns I began

pinpointing smaller, specific lines of dialogue. I moved back and forth between larger

chunks of data to smaller pieces at the sentence level. The process was one of comparing, interrogating, doubting through many iterations of coding.

4.10.4 Interpreting

Yin (2011) asserts that it is difficult to say, "what constitutes a comprehensive or good interpretation," but he adds that it should have "as many of the following attributes as possible: completeness; fairness; empirical accuracy; value-added; and, credibility" (p. 207). After numerous rounds of coding and reassembling, I began looking at thematic groups of data and writing statements that summarized what the data were saying. This was an arduous process that sometimes included moving back into coding and reassembling data. As I wrote summary statements I also had my three research questions in front of me and questioned if and where the statements might provide answers or insights into the questions. I approached the interpretation process inductively as a way to ensure empirical accuracy. I did not want to write summary statements to *fit* the questions; I first wanted to interpret and summarize the data.

4.10.5 Concluding

Yin (2011) defined the conclusion as a statement(s) that "raises the findings of a study to a higher conceptual level or broader set of ideas" (p. 220). Yin (2011) explained that in qualitative research conclusions often reflect the significance of a study. While drawing conclusions is part of the analysis of data, I had to consistently come back to this step in the process. Throughout the recursive and iterative processes of disassembling, reassembling, and interpreting, I frequently wrote notes to myself that included the following two questions: "Are the data saying…?";and, subsequently, "Am I saying….?" I used these two questions to elevate my thinking beyond the interpretive

statements that I connected to my research questions. I continued to contemplate the conclusions even as I was writing the chapters that presented data interpretation in relation to the research questions. This time of writing and contemplation was necessary for me to see the significance of the interpretations on a broader scale.

4.11 Trustworthiness

Yin (2011) identified three objectives for establishing trustworthiness and credibility in qualitative research: transparency of the research process for others to scrutinize; methodic-ness or consistency in researcher positionality, reflexivity, and journaling; and, evidence that the perspectives and conclusions are rooted in the data. To establish trustworthiness and credibility, I have followed Yin's tenets of transparency of process and consistency in positionality. Throughout the research process, I established the practice of journaling and memo writing to ensure researcher reflexivity. Also, the stories of the women and the conclusions I have drawn are from the data. During the Phase One pilot, I used several data collection methods that included individual and group interviews, informant journals, and participant observations. This triangulation of data contributed to the trustworthiness of the study and established the in-depth interview as the most effective method of capturing the complexity of the women's lived experiences (Glesne, 2011; Stake, 2010; Yin, 2011). I also used member checking during Phase Three to assure accuracy and sensitivity. I established a strong rapport with six of the Women in Manufacturing participants because I had interviewed and observed the women for an extended period of time. This prolonged contact between researcher and informant, along with respondent checking, also contributed to the credibility of the research.

CHAPTER 5: BIOGRAPHICAL SKETCHES OF THE WOMEN

The biographical sketches are primarily based on individual interviews but also include information from conversations I had with the informants. Informants guided conversation topics that were somewhat random and ranged from work issues to family news. I guided interview topics as I followed the interview protocol. Since I had relationships that spanned several years with some of the women, I often knew pieces of the women's stories simply through casual conversation. I sometimes used that information during individual interviews to steer the conversation by asking specific questions; this was particularly true for the second round of interviews. I also learned additional information when the women spoke to various groups about their experiences at the community college and at their manufacturing workplace. I attended these events and listened to the women share their perspectives and experiences. Other sources of information included the Women in Manufacturing academic advisor and program coordinator. The advisor and coordinator often shared information with me about the women, and sometimes the advisor or the coordinator brought issues to my attention for the purpose of solving a problem for one of the students.

The purpose of including biographical sketches is to provide a short personal history of the informants in the Women in Manufacturing program who participated in this study. Some of the topics in the sketches include: why they chose manufacturing; how did they move from the idea of college and manufacturing to the action of enrolling; and, what were their education and work histories as well as the histories of their parents. The interviews began with a common protocol of questions, but the focus of the interviews became more personal as the women answered the questions in ways that

guided my follow-up questions. Responses either broadened or narrowed the conversation and signaled for me to either continue along the line of questioning or to move on to other topics. This chapter provides a broader context and historical perspective for each informant and serves as the larger biographical background for the analysis chapters that contain more focused discussion about the women's experiences in relation to the research questions.

As I explained in the design chapter, I initially chose women to participate in the study based on their age, time in the program, and willingness to participate. I did not set out to choose women with any particular education, work background, or life story. As I wrote the biographical sketches, I was struck by the complexities of each woman's life. Most women were juggling multiple responsibilities while struggling to pay their bills and to take care of their families – children, elderly parents, grandchildren, a disabled spouse, and a child with special needs. Although I had multiple conversations with the women in this study, I did not see clearly the load carried by these women until we sat down for the lengthy interviews in 2017. Whereas previous interviews and conversations had been relatively short, the interviews in 2017 lasted close to four hours for some of the informants. To hear the totality of their lives spread out before me all at once was impactful. I could not feel any greater respect and admiration for a group of women, some of whom had been working toward their goals continuously for over three years. From my interactions with the other women in the program, I think the biographical sketches that follow in this chapter are not depicting outliers. It is likely that most of the women in the program would have shared stories of similarcomplexity.

5.1 Tanya

"If you look at it and I tell my story people say, 'Oh my god, you poor thing,' but it is what it is and you just keep going."

Tanya, a 51-year-old White woman who was unemployed, came into my office in fall 2013 and said, "Just sign me up." She had been laid off from a title company – in fact, this was her third lay-off from a third title company. Tanya told me about her visit to the Career Center, commonly known as the unemployment office, to inquire about finding a job that "made good money." The case worker told her a job in manufacturing would pay well, but she would need to complete some training at the community college. The case worker also told Tanya that due to her lay-off, she was eligible for some federal funding through the Department of Labor Workforce Investment Act (WIA), which became the Workforce Innovation and Opportunity Act (WIOA) in July 2014. I recall thinking that Tanya was dressed like she worked in an office, but she exuded determination as we discussed the manufacturing world. Tanya seemed almost matter-of-fact and certainly not dissuaded as she learned more about enrolling in college, completing a credential, and landing a manufacturing job. She remarked, "I'll do what I got to do. I just want to make the money."

Tanya has had a variety of jobs through the years beginning with working at a grocery store in high school. After graduating, she worked for a company filing insurance claims and billing doctors and hospitals; her initial job was to count money and balance books, but she eventually had her own accounts. After three years, she then moved to a neurology group where she filed insurance, Medicare, and Medicaid claims.

When Tanya was pregnant with a second child, her husband transferred to another state, and she did not work outside of her home for eight years. After the birth of her fourth child, she began working again in self-employed, service type jobs such as watching children, cleaning houses, and hanging wallpaper. Tanya eventually worked for a carpet company where she cleaned and installed carpet. Once all of her children were in school, she worked at a bank for several years.

Eventually, Tanya and her husband owned a grout business that was a franchise, and they both worked full-time at their business. Tanya did all the accounting as well as joined her husband to do the actual grout work. Due to the need for health insurance, Tanya also picked up an additional part-time job doing billing for a title company. Tanya's husband and father of their four children died suddenly of a heart attack in 2006. At the time, their children were 23, 21, 18, and 14 years old. Once her husband died, Tanya continued to run the grout franchise and work for the title company, but it eventually became too much. Tanya remarked, "My kids at that time were old enough to help me every once-in-a-while but then they just didn't want to help. So, it just got to be too much and I couldn't do it so I sold the business and just worked full time [for the title company]."

Two of Tanya's adult children were living with her when she began the Women in Manufacturing program in January 2014, and she mentioned that their living with her was certainly part of the equation as she considered how much money she needed to make. Her oldest daughter who has four children of her own still lived with Tanya when I interviewed her in the winter and spring of 2017. Tanya remarried in 2011 to a man who has five adult children and six grandchildren. He does not allow any of his adult

children to live with them, and he has not been tolerant of Tanya's children. Tanya explained, "It's hard to blend marriage. He has five kids, I have four kids and some are living at home still. So, when we got together and he kicked his out and he wanted me to kick mine out but I wasn't comfortable with that because they didn't have a dad to go to." Currently, Tanya lives in their home and her husband lives separately in a condominium. He sometimes stays in their home, but Tanya thinks he will not move back in permanently until her daughter and grandchildren move out. Tanya acknowledges that keeping two homes is not cost effective: "I mean he pays bills at my place and it works, it works, only thing I have to pay is gas and electricity. We'd have a lot more money if he'd sell that damn condo. I think he's waiting for the kids to get out and then maybe he'll come back." Regardless, Tanya is somewhat indifferent to the future of their relationship, "If you don't want to be here, I don't want you to be here. I did it before by myself, I'll do it again."

Tanya's resolve and fortitude in her personal life has served her well as a college student and apprentice. She began the Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) certification program in January 2014 and used Workforce Investment Act (WIA) funding to pay for it; she passed all four sections of the test to earn the certification. Tanya's other unemployment benefits ended in May 2014, so she decided to interview for an apprenticeship with a heavy manufacturing company. The Women in Manufacturing program assisted Tanya in landing an interview as well as preparing for it. The company hired Tanya who ended up being one of two women in the group of 15 apprentices as well as the oldest apprentice. When added to the existing apprenticeship program, this company employed over 30

apprentices. Tanya, along with the other apprentices, works a full-time, 40-hour schedule Monday through Friday and attend classes in the evenings at the community college. The manufacturing company pays apprentices a competitive hourly wage, provides full benefit packages, and pays college tuition and book costs. Since apprentices attend school part-time, they typically need four years to complete their associates degree. Tanya anticipates graduating in 2018 with an applied associates degree in manufacturing engineering technology and continuing to work for her current employer.

5.2 Janie

"I didn't do a lot of job interviews, but I never felt like I had anything to offer because everything on my resume was because I said so. There was no one to back me up. [My previous company] was closed, everybody was gone. They couldn't call and verify that yeah, I worked as a production planner for so many years or anything, but a college degree is verifiable. It's concrete. To me, it's concrete evidence that I am worth training and that I have something to offer them. So, yeah, it does make me less fearful."

At the beginning of the Women in Manufacturing program, Janie was at a crossroads debating whether to enroll in college or to apply for a job in January 2014. Janie, a 52-year-old White woman, previously had a job in a warehouse where she made $25.00 an hour, but the warehousing function of the company had recently been sent to Mexico. After losing her job, Janie met with a caseworker at the Career Center who told her about the job opportunities in advanced manufacturing. Since Janie was eligible for training dollars, she decided to attend an information session about a program at the community college for women interested in advanced manufacturing. After the

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information session, Janie completed the admissions process, attended the orientation, and enrolled in the Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) course offered by the community college. Janie began using training dollars from the Department of Labor Workforce Investment Act (WIA) fund that provided $3500.00 for training per year for two consecutive years for a total of $7,000 to displaced workers. With the community college credit hour rate of $145.00 per credit hour, Janie could complete several certificates and be close to finishing an associate degree.

Janie's caseworker and I assisted Janie with the online processes during enrollment. Janie expressed self-doubt and concern that she could not succeed in college because she felt like she did not belong in college. In fact, Janie had not anticipated enrolling in college during her first visit to campus: "Really, I had no clue when we walked in that day that we were enrolling for school. I had no idea, and I was just like, 'Wait a minute.'"

I asked, "What did you think when you left?"

"Okay, I guess we start January 13th or something like that. And you know. I don't know. I'd like to think I would have had the nerve to do it, but it was probably better it happened that way," Janie said.

"You think?" I questioned.

"Oh yeah. Because it was like all taken care of and it was like, 'Oh, okay.' I don't know if I would have talked myself out of it."

"Why would you have talked yourself out of it, do you think?" I asked.

"Just thinking I couldn't do it," Janie answered.

During the enrollment process, we had encouraged the women to enroll in the associate degree program that includes several certificates and ultimately leads to a degree in manufacturing engineering technology. Janie agreed to enroll but made it clear that she would only complete the 12-week CPT portion of the program. She said she was too old to stay in college, and she could not picture herself being a student for two years.

Before her $25.00 an hour warehouse job, Janie's first jobs included babysitting and working for an opinion center at the local shopping mall where she asked shoppers to participate in surveys. She began working at a truck stop as a cook but moved to the fuel desk where she worked for several years. Janie's last job at the truck stop was ordering all the supplies for the kitchen and store and taking care of the inventory. She left when a new manager started: "He was stealing from them, and I was like, 'I'm not getting in trouble over this. I'm not going to let him lay the blame on me.'" After the truck stop, Janie worked for a candy and cigarette wholesaler and at a warehouse. Janie landed a job at another warehouse where she eventually made $25.00 an hour until it closed.

Janie started the advanced manufacturing program with the goal of earning a certificate as quickly as possible and then finding a job. Janie was frustrated with the ambiguity of college credentials and specific job titles and simply wanted someone to tell her, "Take these classes and apply for this job." Once she experienced some success and started viewing herself as a capable student who was enjoying learning, she became more confident. Attending college was creating a new identity for her, but it was also stressful from a financial perspective since she was not working. While the advanced manufacturing program provides an opportunity to gain financial stability and earn a

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livable wage, it is not without its consequences as the students weigh short-term consequences against long-term payoffs.

Janie and I had a conversation in late January 2014 shortly after the CPT class began. She told me that she only wanted to complete the CPT course and assessments and then find a job. Janie reiterated to me that she did not want to complete any coursework beyond the CPT because of her age and her desire to get back to work. Janie expressed skepticism about the college credentials, the credentials' potential to provide access to a job, and her ability to complete any of it. On February 12, 2014, I observed Janie and all the women interact with a guest speaker who is the human resource director from a large manufacturing company. The speaker explained different types of jobs at the company, wages and benefits, work environment, and training requirements. After she spoke, the women asked for more details about all of the topics, and the speaker answered them. Janie honed-in on the relationship among education, hiring practices, and wages. Once the speaker left, Janie turned to the instructor and said, "So do you all want us to get a job with her? Is that what this is for?" The instructor denied any covert agendas, and she reminded the women that they would hear several speakers from manufacturing as well as tour some of the manufacturing facilities. Janie challenged the notion that she could attend college and ultimately have a better chance to be hired by a company.

While Janie originally doubted her aptitude and the intentions of the college, she soon realized that she enjoyed attending college and was excited about learning new things. Janie began to recognize her situation as an opportunity to earn a postsecondary credential rather than a negative consequence of unemployment. She also realized that

higher education could be a mechanism by which she could once again establish financial stability. During an interview in 2014, Janie shared that she felt guilty for attending college rather than finding a job. Janie elaborated most on her feelings of guilt when she discussed her grandchildren. Janie lamented, "My daughter is a single mom, and I try to help her out. The kids' school pictures are coming up, and I usually pay for stuff like that, but I can't while I'm going to school." Janie decided to continue in the program beyond the CPT certificate. Despite her guilt about the financial consequences of attending college instead of working, she began to see some of the intangible benefits for her family. She shared that her granddaughter often sat with her while she was completing the online modules for the CPT class and asked questions about what Janie was learning. Janie commented that at times she wanted to quit, but she persevered because she wanted to be an example for her grandchildren.

Janie decided that the long-term benefits of completing her degree outweighed the short-term financial setback of not working. Initially, from January 2014 until August 2015, she focused only on college and did not work; however, Janie did begin working for a light manufacturer in August 2015. She learned to balance work, college, and family during those final months leading up to her completing her applied associate degree in manufacturing engineering technology in December 2015. Janie's daughter and grandchildren live separately from Janie, but she has a daily routine with them that ranges from driving them to school or activities to helping them with homework and preparing dinner. Her granddaughter is 10 years old, and her grandson is 8 years old. Janie, who had her daughter at age 23, never married and understands what it is like to be a single mom. In addition to her daughter and grandchildren, Janie has some care-taking

responsibilities with her mother. She continues to work for the same manufacturer where she began in August 2015, and Janie cites the company's flexibility with her schedule as being one of the most important aspects of her job.

5.3 Samantha

"At the end of the day, I get treated well. I work in the air conditioning and heat. I love my coworkers. And I have I think a very well-respected reputation at the company."

Samantha was an honors student in high school who made mostly "A's", played sports, and worked at a fast food restaurant as a cashier. After high school graduation, she attended a four-year university to become a nurse. Samantha, who was White, had numerous family members who worked in the medical profession, including her mother who was a nurse, and Samantha thought it was the right direction for her as well. By the middle of Samantha's second semester at the university, she realized she didn't want to be a nurse, and she didn't want to be at a four-year college. Samantha also had learned that she didn't have the emotional fortitude to work as a neonatal intensive care nurse, which was where she thought she wanted to be. Samantha failed some courses and felt rather dejected about her likelihood of success at college and even began doubting her desire to attend college: "I told myself I would, but I just didn't know what I wanted to do. Of course, while I was failing at [the four-year university], I was beating myself up because I hated that I was not focusing on school and not doing well. So, I think that's when it really set in for me that you know, maybe this [college] just isn't for me." When Samantha moved back home, her mother gave her some sobering choices: "After I dropped out, I was living with my mom and she gave me an ultimatum saying you need

to get back into school, move out, or start paying rent. And so, I was – it really shocked me and I realized that I needed to do something."

During the weekend after the ultimatum from her mother, Samantha coincidentally ran into a friend who was working at a large manufacturing company as an apprentice. He told her the company was hiring and suggested that she apply. Samantha did just that, and the company hired her as an apprentice to work full-time and to attend the community and technical college part-time. She felt like her family supported her in both her career choice and her college choice: "The whole family was thrilled. They loved it. And I think if it hadn't been wrapped around school, they wouldn't have been as excited but because of the opportunities that have presented themselves and could present themselves, everyone's been fully on board." Samantha saw a connection between her initial interest in nursing and her subsequent interest in manufacturing. She enjoyed learning how the human body works, and she discovered that she also liked learning how technology works: "And I think that's the biggest correlation between nursing and manufacturing. It's why I enjoy it so much because I get that knowing how things work satisfaction but I don't have to deal with the patient side."

While Samantha's family supported her work as an apprentice, her boyfriend did not. A consortium of manufacturers in the region launched an advertising campaign to attract people ages 16 to 28 years of age to consider manufacturing as a career. The organizers of this initiative asked Samantha to participate in the photo and video shoots. At the first photo shoot, she informed the photographer and others that her name on her shirt needed to be removed from all visual images of her because her boyfriend would not like that. Samantha brought up her relationship with him during an interview when I

asked her about any stressors in her personal life that caused problems for her at work and/or school. Samantha said he was "extremely abusive," and she had "lost all of her friends." She explained that she would be excited about moving to another department to learn new things, and he would become angry and downplay her job and school. Samantha shared, "He hated that I was doing better because he couldn't keep a job. And I was making all the money, and I was paying the bills, and he couldn't." Eventually, Samantha moved out and needed a restraining order for protection. Her family was shocked when they were told about the relationship: "I hid it really good. My family was – well, my mom wasn't, but the rest of my family was super surprised. So, mymom actually was in an abusive relationship after my parents divorced, so she knew the signs and she knew what it was like to be there, but I don't know why I was so afraid to say anything. That's just the kind of hold that he had on me." Although the restraining order is still in effect, Samantha said she does not feel completely safe.

Like all apprentices at the company, Samantha works a full-time, 40-hour schedule Monday through Friday and attends classes in the evenings at the community college. The manufacturing company pays apprentices a competitive hourly wage, provides full benefit packages, and pays college tuition and book costs. Since apprentices attend school part-time, they typically need four years to complete their associate's degree. Samantha anticipates graduating in 2018 with an applied associate's degree in manufacturing engineering technology. She is interested in pursuing her bachelor's degree in business to increase her opportunities in manufacturing, including the possibility of working in the front office.

5.4 Sarah

"I went to our local career center, and I sat down, and I met with a lady named Kathy, and I told her, I was like, 'You know what? I cried over this. I have. I know you can't help me, you can't cure my son, you can't give me enough money to live on, so here's my situation. I'm caught in a circle. It's never ending. I'll just get up and leave now.'"

Sarah was 45 years old, White, and unlike most of her peers in the Women in Manufacturing program, she had worked in manufacturing in her early twenties at a food manufacturer. Sarah liked the company, but she wanted to work in the front office rather than on the production floor making frozen pizzas.

They [the company] knew I was going to school, and they actually helped me pay for a couple of classes, and they foresaw me working for them still, but in the office. But, when the position popped up, someone that had been there just as long as I was, but had no schooling underneath them, ended up getting a position in the office, and I was like, well, you know, if you're not going to invest in me, I mean, yeah, you're paying to help me a little bit with classes, but if you're not ... I just felt that I had every intention of investing in them, and they weren't taking me seriously. It's like, you know what, I just don't think I want to work here…. I mean, basically the salary isn't that much different, except they're not on the line, they're in the office. They get to wear better clothes. So, yeah, they don't have to wear a smock and a thing on their head. And I wanted to get out of there, so when I was there, I started going to school for computers, and I got my associates for that and then got out of the manufacturing. And did well."

Sarah acknowledged that the compensation between the office job and the front production line was not that much different, but she certainly was aware that the office staff wore better clothes and didn't have to wear the smock and hairnet – visible signs of who worked on the floor. As Sarah was telling me this, she paused and laughed, "I haven't looked at my resume recently. Anyway, so it's so obsolete now." Sarah lamented that she had attended a for-profit college that does not exist anymore. However, she described the degree as serving her well at the time because she was able to find positions working as an assistant in IT or as a "super guru administrative assistant." Sarah worked at General Electric and DHL in IT and was an administrative assistant at Toyota. She also worked in collections at Cincinnati Machine, a machine tool company that is one of the oldest in the region. While Sarah had only worked on the production floor of one company, the food manufacturer, she certainly had worked around the edges of manufacturing in some of the other departments.

Sarah's life changed dramatically when she gave birth to her third child, a son, at 24 weeks. Sarah recalled, "At the hospital, we were told one of us, mom or dad, had to quit our job. I'm like, well it ain't me. I make more money than you." After evaluating their options, they learned that her husband had better insurance, and she indeed would be the one who quit working. The baby spent his first year in the hospital: "And the financials were a whirlwind. We actually lost everything, went bankrupt, and it's like I knew at one point I had to get, go back to work. I knew I had to start doing something once he went to school." Sarah said it took two truckloads to bring all of the medical equipment to her home, and she recalled his doctors' appointments, therapy sessions, both away and in-home, and his constant care were more than a full-time job. In

addition to her youngest child, Sarah has a daughter who is 22 years old and a son who is 15 years old. She knew that she would not work again until her younger son began school. Sarah and her husband are now divorced, but he supports her going to college: "[He] knows that this is the only way for me to get out of this, and that he's just going to have to be patient. He's just going to have to provide like he did before, until this road's over. And I guess,…especially him trying to advance himself as well, then if it's going to better both of us, then let's go through this valley." While Sarah's ex-husband has been supportive, she thinks her children have had mixed feelings about her going to college and eventually back to work. She said seeing her do homework has not affected her 15-year-old son in the way she hoped; however, her going to college has prompted him to think more about finding a career interest.

When Sarah began looking into her options, she started by visiting the Career Center in her county. She explained her situation to a case manager by describing her life as an unending circle of debt and medical expenses, along with ongoing appointments for her son. After hearing herself explain her unending circle aloud, Sarah stood up to leave, but the case manager grabbed her arm. Sarah recalled the conversation: "So, she was like, 'I've got something I want to show you.' And she laid down a brochure for Women in Manufacturing. I was like, you're kidding, right? I went to school to get out of there [manufacturing]." The case manager responded to Sarah: "Well, what I'm guessing you need is something that will eventually make you self-sufficient, and for starters, there's nothing out there." Sarah sat down to hear more, but she wasn't excited about working in manufacturing or going to back to college. The case manager told her about the high demand for skilled labor in manufacturing and about the

Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) credential she could attain in just 16 weeks. The case manager also told Sarah she qualified for the Workforce Innovation and Opportunity Act (WIOA) funding that would easily cover the cost of the CPT. Sarah commented to the case manager, "I'm already in debt. I'm still paying off that degree that I can't use."

Sarah began the CPT training at the community college with the support of the Women in Manufacturing program: "I liked what I learned. I liked the possibilities. She [the case manager] was right about the networking and them [the manufacturers] wanting to devour us alive before we even got to finish the program, and I actually was drawn to a couple areas that I thought were a perfect fit." Sarah's CPT certification was a strong foundation for the manufacturing engineering associate degree program, and she was heading in that direction. Sarah still struggled with the vivid memory of leaving manufacturing because she did not like the work, and despite her success in the challenging CPT curriculum, she could not envision herself working on the assembly line: "I saw myself either designing the machines for the line, supervising the line, or be quality or testing, maybe facilitating the operation of the line. I didn't see myself maintenancing [sic] or working the line." While meeting with the coordinator of Women in Manufacturing, Sarah rather serendipitously saw some information about training and jobs in logistics and supply chain management. After discussing this with the coordinator, Sarah called the logistics program coordinator to learn more. She then met with her academic advisor who had a positive response. The advisor, who admitted that she was always hesitant to encourage students to change majors, told Sarah, "But for you, not only do I think it's a good fit, but there's only one class that you took that's off

track." Sarah had completed an entire year in the manufacturing engineering program, and she proudly said she only had nine classes left including her current two classes to complete her supply chain management degree. Sarah said she would have finished her degree earlier, but she missed the 2016-2017 academic year due to a medical issue.

5.5 Faith

"I really liked being challenged to build the robot because I'd never been challenged that much with something. Because it was totally new to me."

Faith's interest in manufacturing began during the summer before her senior year in high school, albeit by virtue of her mother telling her she had to attend a camp. The community college was offering a free, one-week career exploration camp for high school girls to learn about careers in manufacturing. Faith's mother told Faith she had to attend the camp even though she did not want to go. Faith, who was 20 years old and White, reflected on her parents' reasons for sending her to the camp:

> I really had no interest in doing it whatsoever. But, because I didn't have a clue what was I going to do after I graduated high school, my parents really pushed me, because they've heard how many jobs were opening up in manufacturing, especially for women around here.

At the camp, the girls learned how to use tools, how to read a blueprint, and how to build a robotic arm. Additionally, they toured two manufacturing companies and met women who currently worked in manufacturing. Faith ended up enjoying the camp, and she specifically liked building the robotic arm because it was challenging and different than anything she had ever done. The camp certainly piqued Faith's interest in manufacturing, so much so that she applied for a scholarship to take the Manufacturing

Skill Standards Council (MSSC) Certified Production Technician (CPT) course. The community college was offering the CPT course as a dual credit high school course. Faith earned the CPT credential as well as six hours of college credit in manufacturing.

Faith's experience at the girls' manufacturing camp and her success in the CPT class prompted her to apply for an apprenticeship in the spring of her senior year. In addition to Faith's CPT success, she was also a top student in her senior class:

I was really driven. I wanted to be in the top of my class. I wanted to be ... I know this sounds like superficial, but I wanted to be that group that got to sit in that first row that everybody was like, "I wish I was up there." I did everything my senior year to keep my grades up so I could do that.

Faith was exactly the type of student that manufacturers wanted to invest in by paying for her education. I knew this because of the college's partnership with apprenticeship companies that recruited student-employees who were highly motivated. The community college and its manufacturing partners had two apprenticeship models. The first model required students to work full-time and attend college part-time. Students chose their classes to fit their schedules, and they completed their associates degree in four years. The second model required students to attend school full-time and work part-time. Students went through their classes as a cohort and completed their associates degree in two years. Both apprenticeship models were highly competitive and difficult to secure. Two companies offered Faith an apprenticeship, which was a rarity. She chose a large manufacturer that required its apprentices to work full time and go to school part time.

If there was one area of weakness on Faith's resume, it would have been her work experience. The only job she had before beginning her manufacturing apprenticeship was working as a hostess at a pizza restaurant. When asked if she liked it, Faith said she did not necessarily like working as the hostess, but she did like working in the kitchen:

> I liked working in the back because I had more control over everything. Like if the servers were giving me a hard time, I could yell at them to wait. But if customers are being rude, you gotta keep your cool and all that. Sometimes it's just really hard for me to do that, because I like to be in control of things. And if it doesn't work out that way, I get frustrated. That's kinda nice going back to manufacturing because you have more control over your stuff.

Despite Faith's youthfulness and inexperience in the world of work, she was confident in her ability to solve problems and to work with all types of people. Once while sitting on a panel discussion by women who worked in manufacturing, Faith made the argument that women were often times more effective problem-solvers on the manufacturing floor because of their ability to maintain composure rather than succumb to frustration.

Faith's mother and father supported her decision to pursue manufacturing as a career, and they particularly liked the idea of the company paying for Faith's college: "They, my dad, really pushed for it because he knew of all the opportunities and my mom was also supportive of it." Her parents also liked that she would gain valuable work experience. Faith began her apprenticeship in the summer of 2015 and maintained a 4.0 grade point average. Faith was enjoying her manufacturing classes as well as the work on the production floor; however, she began to have second thoughts about her career choice when she took two business courses during the summer 2016 semester.

Subsequently in fall 2016, the number of customer orders for Faith's employer began to slow significantly, which affected her training rotation and her wage increases: "And business wasn't picking up, it was just getting slower, and I was like, well am I just gonna wait until the end of my program to get moved up, or am I gonna stay here and get the same pay that I'm getting now?" Faith's hunch about the direction of the company was correct; the large manufacturer announced an opportunity for employees, including apprentices, to take a buy-out. Faith was concerned that if she didn't take the buy-out, she still would end up losing her job in January 2017 depending on how many employees left willingly: "I was one of the newest hires. So, come January, if they didn't have enough people, they could lay me off and I coulda got nothing. So, I was like, well this is my out and I can go and do that." Faith said the company did offer her a "businessy" job, but the work schedule was 10:00 A.M. until 7:00 P.M. and the tasks were mostly data entry. Faith recognized that the work schedule would make it difficult for her to continue working toward her degree. Faith took the buy-out with the support of her parents: "And then when I left, they [her parents] were very supportive of it, too. I made sure my dad read it, and he's like, 'Yeah, sounds like if you don't take it you're going to get the short end of the stick come January if they don't get enough people.'" Faith planned to finish an applied associate's degree in business at the community college in December 2018 and then transfer to a nearby regional university to complete a bachelor's degree in business. Faith said she did not regret her decision to become an apprentice, and in fact she thought her time on the production floor would serve her well:

> I think it would be beneficial because I understand more. Whenever you would
> talk to somebody from up in the offices or when they would come out on the floor

it was like they didn't have a clue what they were talking about. Just because I

was out there for a year and a half on a floor, I would understand so much more.

Faith may or may not apply her experience at a manufacturing company in the future as

she considers her options. She currently works as a sales clerk at a department store to

help pay for college and living expenses.

5.6 Sienna

"My mama was like you know that other place they treated you so bad, but I said,

'You know, another door opened and it's 18 dollars an hour.' I have never made that

amount. Now I get to sustain my family. It feels so good."

Sienna was 42 years old, African American, an Army veteran, and a mother of

three children. Sienna had two grown children from her first marriage, a son who was 22

years old and a daughter who was 21 years old. She also had an 8-year-old son with her

current husband. Sienna was in the Army Reserve for 13 years where she worked as a

cook connected to a Military Police unit; her unit was deployed one time to Afghanistan.

Sienna was humble about her military service. In fact, when she enrolled in the Women

in Manufacturing program, she did not disclose that she was a veteran. A few weeks

after she began the program, she casually mentioned her military service, which

prompted Sienna's advisor to assist with accessing veteran's benefits. In an interview,

Sienna reflected on her time serving:

> I've gone to Afghanistan. I've been there and come back and you know it
>
> changes you. I'll tell you that. You are a different person when you come
>
> back. I find myself even now when I get into a certain, you know when certain

things happen, that I feel like I can't control you go into survival mode. It's like

it's still with you no matter what.

In addition to Sienna's military service as a cook, she has worked in numerous jobs

across several sectors. Sienna worked as a medical secretary and in medical records for

several years but tired of the paperwork and wanted to do something with her hands. She

began working with a temp agency and was placed at a global logistics company and

then placed at a large manufacturer. The manufacturer promised to hire her eventually

for a full-time position; after two years as a temp, Sienna decided the company would

never hire her, so she quit the job. Sienna also stopped working for the temp agency.

After leaving the temp agency, a manufacturer of automobile drivetrain parts

hired Sienna as a full-time employee. Sienna worked at this particular company for

almost five years, but it was a challenge. The manufacturing company was located in a

rural area, and Sienna believed the White males created an atmosphere of discrimination

against female employees and Black employees. Sienna reported being targeted on a

regular basis:

I used to have to fight for my job like every year. Like if I made a simple mistake

that anybody else would make, it was a big deal. I would be like reprimanded,

wrote up. All that made a big deal about nothing. Somebody else would do it –

never the same.

Sienna said she stayed because of the money, but the company ultimately fired her for a

"no call, no show" incident. Sienna and the human resources person had met and

completed Family and Medical Leave Act (FMLA) paperwork for Sienna to be with her

son who was scheduled for surgery. The day after her son's surgery, Sienna was fired for not calling in to report her absence and for not showing up to work.

After being fired by the automotive parts manufacturer, Sienna went to the Career Center to begin receiving unemployment and to discuss job opportunities. Her case manager suggested she visit the community college to learn about the Women in Manufacturing program. I asked Sienna why she chose to stay in the manufacturing sector after her experience with the last company. She answered:

> Because I knew there's more. I know there's more out here and I know that just being out here that there are better people. There has to be more 'cause people wouldn't stay here this long if there isn't more. There has to be more than just that.

Shortly after Sienna began the Women in Manufacturing program, she landed a job at a company that makes acrylic composites for numerous products. This job paid more than the previous one, and Sienna did well during her training on first shift. After completing most of her training, she moved to third shift where she would finish training and begin working. Sienna's supervisor was not communicative:

> Then it was like as soon as I went on thirds, it was like, the guy was on vacation I think for a couple weeks when I first started. So, by the time he come back like the first day I met him, he never told me he was my boss. He never told who he was. He never told me his name. He never even like introduced his self. Like he just, I didn't even know who he was at first. And they were like this is Jim your supervisor, and I was like, "Oh."

The first interaction Sienna had with the supervisor, Jim, was when he told her that she wasn't doing so well as an employee. Jim reported to human resources that Sienna didn't do something he asked her to do, that she was late from break, and that she just worked too slowly. The company fired Sienna, and she was devastated. Sienna believed she lost her job due to a supervisor who was sexist and racist. Sienna recalled that her coworkers on first shift warned her that Jim was racist.

After being fired from two different manufacturing companies, Sienna contemplated leaving the sector entirely by changing her major and working in a completely different field. The second firing left Sienna doubting her theory that "there has to be more [good people]." She considered changing to social work but finally decided to stay in manufacturing. Sienna's husband had not worked for three years due to a chronic problem with his foot that limited his mobility. Sienna had to work to support her family, and she decided she was too close to finishing her degree in manufacturing to change. Sienna was bolstered by the fact that she had been hired by two companies and was convinced that she was hired because front office employees recognized her ability:

> You know, in the office they saw that [Sienna's ability], and they hired great potential like they wanted to do some things, and I know they did. But, you know, there's a disconnect between the people upstairs and the people who work for them. And you know, I don't think they even know because they can't figure out why people aren't staying, like they don't know.

Consoled by this insight, Sienna applied to and was hired by a third manufacturing company, one that manufactured frozen food. Sienna was somewhat worried about

performing the duties of her job, yet she was encouraged by her new company's belief in
her:

> And I feel like I've been prepared for this all this time so you know I'm finally
>
> being rewarded for everything that I've done because I was like, I don't know if
>
> I'm going to get there. Like I've tried many times thinking like you know you
>
> almost get scared because you're like, I don't know if I'm built for this. You
>
> know, everything you learn you hope that it comes back and you hope that you're
>
> even capable of doing what they want you to do. I mean they have high hopes for
>
> me.

Sienna planned to finish her associates degree in December 2017 and hoped to continue
working at the food manufacturer.

5.7 The Other Four Women

Three women – Bridget, Catherine, and Hailey – participated in the pilot program
but left the program before the pilot phase ended. Bridget, who was African American,
left the program in spring 2014 because she did not have transportation nor Internet.
Several cold weeks along with snowfall made Bridget's walk to a place where she could
access Internet challenging. The winter weather also affected Bridget's ability to walk to
the community and technical college where her class was located. Women in
Manufacturing staff attempted to work with Bridget but were not successful in assisting
her. Catherine, who was White, also left the program in spring 2014. Catherine was a
single mother who lived with her parents because she could not afford to live on her
own. Her parents were not supportive of her attending college and would not help
Catherine with any related expenses or assistance including childcare. Like Bridget and

Catherine, Hailey left the Women in Manufacturing program in spring 2014. The father of Hailey's children was employed when Hailey began the program. Hailey, who was White, qualified for several federal support programs, but she and the father of her children needed his income to cover their expenses. The father's employer learned that he had a felony conviction, and they fired him. During that same time, Hailey learned that she was pregnant. Hailey left the program to support her family by finding a job.

Delores, a White woman who joined the Women in Manufacturing program in fall of 2016, sat for an interview in 2017 but did not participate in a second interview. Delores enrolled in the Women in Manufacturing program shortly after completing a substance abuse recovery program. Delores was referred to the program by her case worker who thought Delores might do well in manufacturing. Delores was still in the manufacturing program in summer of 2017 but her communication with me was sporadic, and we could not establish a date for a second interview. Some data from these four women are woven into this study but not at the same level as the primary six women who participated in the two formal interviews during the spring and summer of 2017: Tanya, Janie, Samantha, Sarah, Faith, and Sienna.

CHAPTER 6: WOMEN SEARCHING FOR A GOOD JOB

The women in this study had unique and diverse life circumstances that led them to the Women in Manufacturing program; yet, they also shared some common experiences and points of view that were identifiable. I had worked with some of the women since the program's inception during the 2013-2014 academic year. As I first met the women and began talking with them and listening to their stories, I was surprised by some of the adversity they each had experienced. Knowing the circumstances of their daily lives and the rigid environment of manufacturing was cause for concern as I contemplated the potential chasm between the women and manufacturing. However, for some women their challenges and experiences may have prepared them well for a nontraditional program and job. In the biographical sketch chapter, I discussed how the participants came to the decision of enrolling in the Women in Manufacturing program. This chapter focuses primarily on why the women chose to pursue a college credential and a career in manufacturing. The college actively recruited for the Women in Manufacturing program through outreach events that emphasized the upside of the sector, and women were drawn to manufacturing for the money and for the promise of a good job. This chapter also includes some of the common experiences and thoughts among the women as they embarked on what they each saw as a formidable journey. I discuss what influenced the ten women to participate in the program and how the women's work experiences influenced their awareness of nontraditional occupations.

6.1 Why Manufacturing

In Chapter 3: The State of Manufacturing, I discuss how gender and families influence the education and career decisions of women. One study's participants

reported that being female and fulfilling traditional roles as daughters, wives, and mothers had the most influence on their career decisions (Gibbons et al., 2011). Ironically, the traditional roles of daughters, wives, and mothers for the women in this study also put them in the nontraditional role of breadwinners. In fact, of the ten informants who participated in the study, eight of them were the main financial support for their particular family situations, all of which included some combination of dependent minor children and adult children. Tanya and Sienna were the only participants who were married, each for a second time. Tanya and her husband lived separately from one another, and Sienna was in the role of care-taker quite often since her husband was disabled. Tanya had two adult children and two grandchildren who depended on her at varying levels and times. Samantha and Faith, who were younger than the other eight, were somewhat financially self-sustaining with varying degrees of support from their families. Neither Samantha nor Faith had any dependents. Regardless of their family situations, the women's focus on improving their financial stability was a shared priority. For the study participants in the Women in Manufacturing program, earning potential was most often cited as the primary reason that brought them to the community college with the goal of landing a job at a manufacturing company.

During my interview with Tanya in summer 2017, we reminisced about the day she sat in my office and described her visit to the Career Center. When I asked her to think back on what prompted her to try manufacturing, her answer had not changed: "I just need to make this much money." Tanya's reason for pursuing a degree and a job in manufacturing was representative of what most of the women reported; they joined the

Women in Manufacturing program because they wanted a job that would pay well. From the initial pilot sample of women to the larger formal research project population, women were motivated by the opportunity to increase their income through working in the manufacturing sector. Community college programs that lead to nontraditional jobs usually offer better wages than traditional programs and jobs for women (St. Rose & Hill, 2013).

When Tanya came to the Women in Manufacturing program she was 51 years old and unemployed. As I discussed in the portrait chapter, Tanya had worked all types of jobs but her last three were with title companies, all of which laid off Tanya. She was confident that she could handle the physical demands of manufacturing because she and her late husband had owned a grout business, and before that Tanya had worked as a carpet installer. As many manufacturers do, Tanya's company hired her through a temporary employment agency for a 90-day probationary period. In June 2014 Tanya started her apprenticeship making $11.00 an hour and after her 90 days she made $12.00 an hour as a full-time apprentice. The company evaluated apprentices every six months, and based on the evaluation hourly pay increases ranged from $.75 to $1.00. Tanya considered the raises to be significant and shared that she currently was making $17.00 an hour: "This is the most I've ever made, besides having my own business, on the hour working for somebody else." Tanya seemed to glide through the challenges of work and school but sometimes admitted that the work was difficult and tiring, so I asked her if making the money had been worth it:

> It will be. Because once we finish with the school part then they give you a sort
> of understanding. They give you … When I first said I need to make this much

money tell me what I need to do, that's … When you finish your classes and get

all your classes done, classes we have to pay for plus the classes that they're

paying for I think they said it's like between 22 and $25 an hour, is what they're

going to pay too depending on what department you're in. So, it will be worth it.

Tanya hoped her manufacturing career would take her into retirement: "I don't know.

Hopefully I'll retire there. I'm too old to prove myself somewhere else."

Similar in age to Tanya, 52-year-old Janie had worked in warehousing for 20

years when she lost her job due to the company sending its warehousing and distribution

operations to Mexico. Janie made close to $25.00 an hour to support herself as well as

some financial support for her daughter and her two grandchildren. When Janie began

looking for another job, she quickly became aware that without a credential of some

type, she had to make the case to potential employers that she had experience at a high

level. Janie was frustrated that her explanation of her skills, or "her word" as she put it,

did not resonate with human resource representatives:

I looked but, yes, I was the production planner and I have experience doing that,

but I don't have anything on paper saying besides my word. The company's not

there. There's no one they can talk to. I had no degree. I would have to start out on

the bottom again.

Since their jobs had been sent to Mexico, Janie and two of her former coworkers were

eligible for Department of Labor Trade Adjustment Assistance funding that could be

used for education. Initially, Janie and her co-workers were asked if they wanted to be

hairdressers, which interested none of the three. The case manager at the Career Center

convinced the three former co-workers to consider the Women in Manufacturing program as a pathway to recover their previous wages.

Reluctant and skeptical, Janie enrolled in the program with the initial goal of simply completing one credential and finding a manufacturing job. Janie was more skeptical of the college portion of the program than the manufacturing sector: "I just knew that manufacturing paid better than warehousing. I did not want to go back to almost minimum wage and start all over again in a warehouse." Janie's starting wage at her manufacturing company was $12.00 an hour but had increased to $15.00 an hour. While she missed the significant lost wages from her warehouse job, she was pleased with some of the intangibles at her current workplace such as a flexible start time that allowed her to drive her grandchildren to school sometimes. Janie did not foresee herself ever being able to retire:

> I don't ever see with the way healthcare is and so-called social security and the whole [warehouse company] closing thing kind of just wiped out my 401K and everything, so you know, starting over again in your 50s doesn't give you much time, so I don't ever see me retiring.

Tanya and Janie entered the Women in Manufacturing program because someone at the Career Center told them about the program and the potential earnings; neither had previous knowledge of the manufacturing sector nor its job opportunities. Despite their lack of knowledge about manufacturing, they did possess a keen understanding of the difference between "good" jobs and "bad" jobs, and both women talked about wanting a good job. Since Tanya and Janie had recently lost their jobs, each of them defined a good job as one that was stable and unlikely to "go away" and one that paid well. Tanya

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had lost several jobs in a row at title companies where her wages were low; the job instability and low wages prompted her to show-up at the Career Center looking for a good job. Tanya was looking for a job that provided stable employment and high wages, and Janie was looking for the same. Janie had experienced working in a good job for 25 years but suddenly found herself looking for another good job without a credential or references to vouch for her skills. Although in their fifties, Tanya and Janie were willing to risk their time and money to attain a good job.

Similar to Tanya and Janie, the women in the study defined good jobs as having several attributes beginning with high wages. All of the informants in the sample population had experience working for hourly wages and discussed wages in hourly terms rather than yearly. Most women hoped to eventually earn above $18.00 an hour but were willing to start anywhere between $12.00 and $15.00 an hour if the company provided a short timeline for increasing hourly wages. A livable wage, enough income to cover the basic necessities, for an adult and one child in this particular region was approximately $23.00 an hour (Glasmeier, 2019). The women thought they could make a lower wage work temporarily. Companies typically had a structure to increase wages that was based on job performance and length of employment; however, not all companies structured wage increases to happen within a relatively short time period of one or two years. In some cases, employees might have to work seven or eight years before reaching a livable wage. In addition to high wages, the women also named healthcare benefits, job stability, and flexible work hours as attributes of a good job. Many manufacturers in the area provided "day one" healthcare benefits, which meant new employees had health insurance beginning on their first day of work. The need for

flexible work hours cannot be overemphasized when one considers the care-taking responsibilities that women often undertake. Manufacturers typically expect employees to conform to rigid start and stop times, rotating shifts, and mandatory overtime. The women's definitions of a good job were consistent with the research: "Good jobs pay relatively well, provide benefits, offer autonomy, provide some control over the job's termination and offer some flexibility and control over scheduling; bad jobs lack these features (Kalleberg, 2011; Kalleberg et al., 2000)" (Jacobs & Padavic, 2015, p.68). Based on these definitions of a good job, manufacturing is a combination of both good and bad.

According to Jacobs and Padavic (2015), neoliberalism has brought about the polarization and expansion of good jobs and bad jobs at opposite ends of the spectrum; this polarization has subsequently hollowed out the middle or "in-between" category of jobs. Similarly, workers in the "new economy" have become divided based on identity: "Just as job quality has become polarized, workers, too, can be thought of as polarized along the lines of class, gender and race, with some groups more likely to occupy good jobs and others bad ones" (Jacobs & Padavic, 2015, p. 68). The rise of neoliberalism has played an integral part in the reproduction of workplace inequalities based on gender, class, and race, and capitalism relies on these inequalities to support production (Acker, 2006; Jacobs & Padavic, 2015).

Samantha lacked any familiarity with the world of manufacturing but was also willing to take a chance on the financial promise of the manufacturing sector. Samantha was familiar with the healthcare community as many of her family members were doctors and nurses. Planning to follow along in the same pattern, Samantha graduated

from high school and went away to a four-year state university where she began studying nursing. After dropping out and moving back home, Samantha faced the disappointment of her family. She disliked the nursing program, yet she did not have a plan for her next steps. Her mother forced Samantha to make a choice between paying rent or going back to school. In a fortuitous and coincidental meeting with a high school friend, Samantha learned about a manufacturing company that was hiring people to participate in an apprenticeship. While she knew nothing about manufacturing jobs, she liked the idea of working full-time while the company would simultaneously pay for her to attend college to learn manufacturing skills. The apprenticeship company hired Samantha and solved her financial problem; by doing so, the company also appeased her family by requiring and paying for college. Samantha started as a new apprentice at $14.25 and had increased to $19.56 as a third-year apprentice.

Sarah also came to the Women in Manufacturing program because of the potential earnings. She was 45 years old, divorced, and a mother of three children. Her youngest son was born at 24 weeks and had long-term chronic conditions that required 24-hour care. After his birth, Sarah quit work to do much of the caretaking. In the year following his birth, Sarah and her husband had to file bankruptcy due to the medical bills. They eventually divorced but both continued to struggle to cover the cost of the extensive care their son needed. Sarah thought a job in manufacturing would have the potential to provide enough for her to climb out of the cycle of debt. Sarah visited the Career Center when she decided to work again, and that was where she learned about the Women in Manufacturing program. Sarah had worked in manufacturing in her early twenties, so she had an idea of the environment, the work, the company, and the people.

Since Sarah changed from manufacturing to logistics, I asked her if she had the chance to do it over, would she still start in the Women in Manufacturing program:

> Yeah, absolutely. Because I wouldn't have known, going in, my focus was, I need to do this for the financial benefit. I can't handle a Walmart salary that's actually going to leave me struggling and actually cut some of the benefits I'm getting now that I need to take care of my son. I'm going to become self-sufficient to where I'll be okay if those, the fundings I'm already getting provided for my family, are cut. And when we talked about the administrative office setting, I would not have realized that I could combine those skills with what you learn through Women in Manufacturing and still become self-sufficient, still be in a fine position or an avenue to where I can be an asset to a company. I thought that my skillset prior to that, I had to leave those behind and obtain a new one. But, that was aligning, so yeah, I would do it over again.

Sarah expressed that her ability to assimilate her previous workplace skills and her newly learned skills was at least partially the result of attending college. Sarah credited her college experience as transformational in her thinking about a career that could be financially and personally rewarding. Research has shown that higher education has the potential to empower poor and working-class women (Adair, 2001). Sarah learned to think about ways to combine skills and reimagine herself as a valuable employee in a rapidly growing sector.

Similar to Sarah, Sienna had experience in manufacturing before she came to the Women in Manufacturing program, but she knew she needed additional skills and possibly a college credential if she was going to have opportunities beyond an entry level

job. Sienna's role as the breadwinner was highly motivating to her. She shared that over the past three years, family and friends had to assist her family financially due to her husband's inability to work. During this time frame, Sienna changed jobs twice and began attending college to increase her skills. Sienna foresaw that she would continue to be the financial provider for her family and knew from her previous work in manufacturing that she needed higher level skills if she wanted to move up in a company. At Sienna's first company, she started at $13.00 an hour and was at $15.00 an hour when they fired her. At the second company, she made $16.97 an hour during the short time she was employed. This was the most money Sienna had ever made, which made it even worse when they let her go. She worried that she would not find another job with a comparable wage, but her third company exceeded her expectations:

> I just applied for the regular operator that was like 14-16 [dollars per hour] because I looked at the whole list of things [job description], and I was just like I don't know. Like I knew I could probably do it but I was like I don't know so when I went in after I interviewed with them, they said well, we actually want to offer you the maintainer position which is more. It is actually 18 dollars an hour. And I was like, so I was like ok, sure, cause I know they know what they are looking for and they're looking for certain people, you know specific certain things. And they was like, we definitely feel with your background and school with all that, that you definitely fit what we're looking for. I was like ok, so I'm like, yay! I didn't think that was possible.

Sienna was thankful that she stayed with manufacturing instead of leaving after she was fired from the second job. Sienna's high-wage job came to fruition for her but only after

suffering through two jobs where she endured sexist and racist behaviors from coworkers and supervisors. Antidiscrimination laws have not solved gender and race inequalities in work organizations (Acker, 2006), and Sienna demonstrated uncommon resilience and fortitude to persist in the manufacturing sector until she found an environment where she could thrive.

The promise of manufacturing cannot be denied when it comes to comparing wages to other sectors; however, women, particularly women of color, may conclude the wages are not worth the personal price. The potential for high wages initially attracted the women in this study to manufacturing, but sexism, racism, inflexible hours, and unpredictable job security offset the wages. Additionally, wages were certainly not high in all manufacturing production jobs particularly when considered over time. At some companies, the incremental hourly raises would need seven years to reach the livable wage threshold of $20.00 an hour for a single parent and two children. The women in this study could not wait seven years to support their families.

6.2 Work Experience and Nontraditional Awareness

In the portraits of the women, I delineate each informant's work history, but in this paragraph I provide a short summary to illustrate a point. Excluding Faith, the one traditional college student who entered the program right after high school, the women in the study came to manufacturing as a second, third, or fourth job change. Similar to Faith, Samantha did not have an extensive work history, but she had some experience in the nursing field as an aide when she began college the first time. Janie had the most longevity in her position in the warehouse for 25 years. Sarah had been out of the job market to take care of her disabled son, but she had worked as an assistant in IT, an

administrative assistant, a collections agent, and a production line operator prior to the birth of her son. Tanya had worked as a grocery store cashier, as a clerk filing insurance claims and billing doctors and hospitals, as a babysitter, as a housecleaner, a wallpaper hanger, a carpet installer, and a small business owner of a grout franchise. Sienna had manufacturing experience when she started Women in Manufacturing, but she also had work experience as a cook from her years in the military, as a medical secretary, and as an entry level worker at a logistics company. Four of the women had at least some work experience in a nontraditional, blue-collar job: Tanya as a carpet installer; Janie as a warehouse production planner; Sarah in manufacturing and IT; and, Sienna in manufacturing. Their wide range of work experiences, especially those in nontraditional settings, tempered the women for the manufacturing classroom and workplace.

Janie in particular had a positive perception of manufacturing and the blue-collar jobs associated with the sector. Some advocacy groups, such as the National Association for Manufacturers (NAM), report that unlike Janie, many people think of manufacturing as dirty, dark, and dangerous. Less than 5 in 10 Americans think manufacturing jobs are interesting, safe, and stable (Giffi, Rodriguez, & Mondal, 2017), and young people in the U.S. and Europe seek work environments that are generally more flexible (Divakaran, Mani, & Post, 2015). However, Janie recalled her introduction to manufacturing and its good jobs through her father's eyes when she was young:

> You know, I think what it is, is we grew up and our dad worked in factories, and they came home and I don't remember my dad being filthy-dirty or anything. But he came home every day and he never got hurt at work, and then all the

manufacturing left and people just don't have the experience like we did. To us,

manufacturing jobs were good jobs.

After sharing her recollection of manufacturing as a good place for her father to work,

she added that this perception only applied to manufacturing as a workplace environment

for men:

Of course, not for us because women didn't work there. You could as a secretary,

but you didn't work out on the floor. That was your brother or You didn't

work…. Women didn't work there because a man needed that job to take care of

his family, basically. But then those jobs were gone and people no longer had the

experience with it anymore.

Whereas Janie had an appreciation for the "good jobs" in manufacturing from her

childhood in the 1970s, she also recalled that the jobs on the manufacturing floor were

not meant for women.

In 2014, at the beginning of Janie's participation in the Women in Manufacturing

program, she and nine other women toured a large, international company's facility that

manufactured shampoo products. In addition to the women on the tour, a group of men

were also visiting the company. Several days after the tour, I conducted a group

interview to ask the women about their experiences in the program thus far. Most of the

women talked about the tour and their astonishment by the size of the facility, the

volume of production, and the extensive automation. Janie's lived experiences gave her

the ability to understand the nuances of the manufacturing environment. At the end of

the tour, both tour groups went into a meeting room for a question and answer session

with some of the employees. Janie noticed that all the manufacturing employees were

male, and the question and answer session was a conversation among all the men in the room and none of the women. Janie recalled the scene during the group interview:

> Everybody sat around and HR came in then and asked some questions and stuff. One thing we did notice – we were later getting in the room than the other group. The table set up in a horseshoe. There was a row of men that were in the tour with us and then over here was a row of men that worked for [the manufacturing company]. We were sitting behind them along the wall in chairs. They were talking about maintenance and mechanical maintenance on the machinery and stuff. They talked to the men. They did not look past the men one time at us until Tanya, she said something about, "Well, how do you guys feel about working with women?" Then they started addressing us but before that….

Janie recalled that until Tanya asked the question, the employees only talked to the men who had been on the tour and did not even make eye contact with any of the women.

I asked Janie why she thought the male employees only talked to the male tourers, and Janie said, "Because they were mainly talking about fixing the machines, mechanical."

"So, what assumptions were they making?" I asked.

"That we weren't either not interested or not qualified," Janie quickly answered.

Janie's recollection and interpretation of the question and answer session was a revelation to some of the other nine women in the class. Most of them admitted to not noticing the male employees speaking only to the males who had been on the tour. In that particular group of women, Janie was the oldest and had 20 years of working in

warehousing behind her in addition to her knowledge of manufacturing from her father's experiences.

At the other end of the age spectrum, as I mentioned above, Faith was the first student in the program to earn the CPT credential in high school and begin an apprenticeship upon graduation. While Faith did not have comparable work and life experience like Janie, she had attended a manufacturing career exploration camp before her senior year. During that camp as well as the CPT class her senior year, Faith had the chance to tour several manufacturing companies. These visits helped Faith to develop a picture of what different types of manufacturing facilities looked like. In the spring of her senior year, Faith applied and was offered apprenticeships from two different companies. In her visit to the first company, which made powertrain components for the auto industry, Faith immediately thought it was not a good fit:

> When I went to the company, I just didn't like how dark and I knew there wasn't very many women. I think when I was at [the company], I only saw one lady on the floor and I was like, "Okay, I don't want to be one of two."

During Faith's visit to the other company offering her an apprenticeship, she felt the company's culture would be more female friendly:

> At [this company] I felt like they were more accepting of women there. It seemed like more male-dominated at the other place. And they wouldn't be as willing to accept a woman coming in there. Because at [this company] there was a lot more women, so you could hear their different stories and they could help more with things that might happen there and stuff like that. And I knew from meeting our

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boss at [the company] what he would do for women there. That's why I picked

[this company].

Faith was not coming to manufacturing as a seasoned worker who had years of experience, yet her limited exposure to the sector through the camp and the CPT class helped her choose an environment that would support her and other women.

6.3 Conclusion

The informants who matriculated into the community college and subsequently began working in manufacturing were women motivated by the earning potential offered in the manufacturing sector. For most of the women, their financial responsibilities urged them to consider alternatives to traditional jobs that likely paid less. Notably, none of the women cited an interest in the actual work, which initially was unfamiliar to most of them. The majority of the women did not have experience in manufacturing. However, previous work experience in an environment that required physical labor turned out to be helpful. For those with less experience with manual labor, the physical demands of the job were daunting in the beginning. Some women also had demanding care-taking responsibilities in their personal lives in addition to the hours on the manufacturing floor and the hours in college classes. Despite the lack of familiarity with the work, the physical demands of the job, and the male-dominated culture of the manufacturing floor, the women were not easily deterred as they persevered toward reaping the financial goals that had brought them to manufacturing in the first place. In simple terms, the women wanted a "good" job.

CHAPTER 7: RISKS AND BENEFITS OF ATTENDING COLLEGE

In this chapter, I discuss how the women's experiences in the community college and participation in an advanced manufacturing program influenced their education and career choices. As I have explained previously, most of the women chose to pursue a career in advanced manufacturing because of the potential wages. To reach their goal of a high-wage job in manufacturing, the women first had to overcome their fear of college. While many had no college experience, some of the women had attended college after high school for varying lengths of time, but even they discounted their experience and expressed doubt in their ability to complete a degree. Most women who came to the Women in Manufacturing program were first generation college goers, which posed some of its own challenges. Additionally, I discuss what motivated the women to stay in college once they began. Some women struggled financially while they attended college and simultaneously needed to support their dependents. Similar to the women who had attended college, a few of the women had previously worked in entry level manufacturing jobs through temp agencies, but they also discounted their experience when they considered their aptitude for completing a degree in manufacturing and entering a skilled position. In addition to the women's reticence about their own abilities, they also were skeptical of the manufacturing industry providing the high wage they were seeking. The women often asked, "What if I go through all of this and I still don't get a job that pays what I need?" This was a fair question. While manufacturers reported an acute need for skilled employees, companies did not guarantee students a job nor a particular wage. The Women in Manufacturing program provided opportunities for women to learn about manufacturing careers, and one consistent take-away for the

women was job descriptions and wages varied widely among different companies. Finally, I will address the importance of classmates and coworkers as the women progressed through the program.

7.1 First Generation and Fear of Failing

Most women in the study population and 9 of the 10 informants were first-generation college students. In other words, the women's parents had either no college experience or some college experience but did not complete college (Redford & Hoyer, 2017). First generation college students may not enjoy the support of their families and may even experience discouragement from family and friends (Gofen, 2009; Lijander, 1998). Students whose families of origin lack much college experience are more likely to have a lower grade point average, time management challenges, difficulty understanding assignments, and to drop-out (Cataldi, Bennett, & Chen, 2018; Gibbons et al., 2011).

Along with being first generation, three of the women in the study had begun college right after high school but chose to leave long before graduating. Tanya reported attending for a semester or two before dropping out to marry and have children; Janie left after two years because she felt like it was a "hassle" with her parents. Samantha dropped out at the end of her first semester after realizing she did not want to become a nurse and subsequently felt adrift with no direction. Tanya, Janie, and Samantha each reported an overall direction or goal when they attended college for the first time. Tanya and Janie, who began college after high school but dropped-out, reported varying degrees of support, or lack thereof, from people in their lives including their parents. In contrast to their first attempt at college, Tanya and Janie found new supporters among their grown

children, grandchildren, and partners. Interestingly, the women who were attending college for the second time in their lives had vivid recollections, both positive and negative, of their first attempts. Even the women who had experienced some level of success during their initial enrollment in college expressed a fear of failing. For their second attempt, the women, with more life and work experience, had mustered up the resolve to try college again but with the specific goal of landing a manufacturing job with high wages.

While some first-generation women were attempting college for the second time and had some point of reference, other first-generation women had no previous exposure to college. A woman from the fall 2013 pilot study had forged an unlikely path from middle-school drop-out to beginning college student. I had pictured someone like Hailey when we were designing the Women in Manufacturing program – maybe someone who had a rough childhood, someone who had made some mistakes and needed a second shot at getting it right. Hailey shared her story with me during an interview. Her childhood and adolescence were plagued with loss, abuse, illness, violence – all of it. Hailey dropped out of school in the seventh grade, but in the spring of 2013 at the age of 26 she enrolled in the GED program held at the community college. She passed the GED exam in December 2013 and decided she would enroll in the advanced manufacturing program for women. The first class of the program, the Certified Production Technician (CPT) course, began on January 17, 2014. I was at this class to meet and welcome the women on their first day of college. Hailey was one of the first women to arrive. She came through the door with wide-eyes and a smile.

She walked directly over to me and said, "I'm in college."

I didn't pick-up on her point. "What?" I asked.

"I am in college! Today is my first day of college!"

"That's right," I said. "Congratulations!"

"I never thought I would be in college. I never thought I would even get a GED. Nobody in my whole family never finished high school, and now I have a GED and I'm in college." Hailey was beaming with pride and excitement.

I stood there for a minute just taking in what Hailey was saying. When she said, "my whole family" I immediately recalled images from her interview – a father who committed suicide, a mother who died of an overdose, a rape that resulted in a child, all under the conditions of abject poverty. I also recalled that during my interview with Hailey, she had shared that her stepbrother taught at a university, and he was the only person in her world who had finished high school and college. At the time of the interview, she commented, "He is the only one who made something of his self."

My mind snapped back to the current conversation. I put my hand up and Hailey slapped it. "You're awesome!" I said.

As if Hailey was reading my mind, she said, "The only person I know who made it this far is my stepbrother, and he teaches at a college. I don't hardly ever talk to him but I know that's what he does."

When Hailey had mentioned her stepbrother in our interview, I had not realized the impression he had made on his stepsister. She had talked about her stepbrother as an exception to the norm in her family in the context of talking about her family's history with not graduating from high school. Since she said that she rarely talked to him, I did not realize the impact of this person's accomplishments on Hailey. With this second

reference to him on her first day of college, I realized that the stepbrother's achievements were important to her. This is consistent with the literature about how a student's family of origin, including brothers and sisters, influences a person's choices about education and career. In fact, siblings affect post-secondary education choices made by other siblings (Gibbons et al., 2011). Parents can also influence siblings' choices in relation to the other siblings by expressing expectations about who should attend college or by indicating who should pursue which careers based on gender (Gibbons et al., 2011). I returned to the data from the interview and reexamined it. In contrast to her narrative describing the lack of education in her family and lack of support from her parents, Hailey highlighted her stepbrother's education during that same interview. Although her relationship with him was distant, she revered him as someone meaningful in her life who was an example of success by her definition. Unfortunately, Hailey's success in the GED program did not continue into her first semester of college. She struggled with finding reliable transportation, paying for necessities for her two children, and supporting her live-in boyfriend who could not find work due to being a convicted felon. Midway through the semester, Hailey learned that she was pregnant, and she slowly stopped attending class. While her stepbrother's educational attainment had given Hailey a different vision than the one provided by her parents, a mere vision was not enough to overcome some very real obstacles.

While none of the women participating in the formal study had the same challenges as Hailey and dropped out of school in the seventh grade, they did face the challenges of being a first-generation college student. Tanya talked about going to a regional university when she graduated from high school: "Right after high school I

went … I took aviation of all things. I wanted to be a stewardess back then. It's called a flight attendant now I guess." Tanya recalled going to college for a semester, maybe two, before quitting to get married and have children; she had no regrets. I asked her what it was like to start college this time, and she said, "I was scared to death." Tanya continued, "I didn't really have very good grades in high school, but I didn't really apply myself. If I probably sat down to read I had to read something three or four times before I understood it. There's a lot of reading in college so I couldn't skip over that part at times. And I felt like I had to read every word." Despite Tanya's fear of college, she was on the dean's list every semester with mostly As and Bs.

Janie recalled not caring about learning when she was in high school, but she reported making mostly As throughout her high school career. After high school graduation, Janie followed her brother to a regional university where she decided to study accounting. Like Hailey, Janie's decision to attend college was influenced more by a sibling than a parent. Janie experienced a strong start but encountered some academic challenges in her Accounting II class where she realized she and her fellow classmates were underprepared due to a weak Accounting I instructor. By the end of her second year, Janie knew she did not want to major in accounting: "I started out in accounting. It was terrible. It just was not me. That's why I left [college] because I never could make up my mind. I wanted to be a forest ranger, and I knew my father would never let me be a forest ranger."

I asked Janie why she wanted to be a forest ranger.

"I always liked the outdoors. I always like the woods and stuff and out of everything that ... I did not want to be a teacher. Out of everything that [college] offered,

that's really what I wanted to do but I knew there was no way that they would let me stay in school for that."

"Did you just assume that they would have a very traditional picture of what you were being as a daughter?" I asked.

Janie explained, "Well actually, I can remember my dad asking me before I went to school, 'Why do you want to go to college? You're just going to get married and have kids. College is not going to do you any good.'"

"Really?" I responded.

"Yeah. But he let me go anyway. That was just the way it was," Janie said.

"What did your mom say about it?"

"She really didn't ... They weren't ... They didn't stop me but they weren't real supportive. I mean, the whole time I was there it was kind of a hassle. But that's the way they were raised. Women didn't go to college.....You didn't – unless you wanted to be a teacher or something."

Janie's father had worked in manufacturing, and her mother was a homemaker for the most part but eventually worked in a warehouse until retirement. Janie's parents had not attended college and had a narrow definition of who should go to college and for what reasons. Parents often have expectations about college that are different from child to child and sometimes include preconceived ideas that link gender and careers (Gibbons, et al., 2011). The expectations of Janie's parents were different for her brother; their parents supported their son attending college, but they did not see a purpose for their daughter to attend. Janie certainly did not feel supported and intuitively knew not to mention her career aspiration of becoming a forest ranger. Janie felt the

scrutiny of her parents as they doubted her attending college: "The whole time I was there it was kind of a hassle." Knowing her parents' lack of enthusiasm about college for her, Janie chose not to pursue her real interest in becoming a forest ranger. Despite completing two years at the regional university after high school, Janie did not request any transfer credit toward her associate's degree at the community college. Although she knew most of the credit would transfer, Janie felt like she did not remember much from her classes. During an interview in spring 2014 when Janie first began the Women in Manufacturing program, she made the comment that she was not interested in taking classes that did not directly teach technical skills needed in her career area: "It [community college] is not a waste of time. Where if I was going to [a university], I'd have so many of those other classes that mean nothing taking up my time. Psychology is not going to get me a job." Janie's memory of her failed first attempt at college as an accounting major lingered in her mind when she matriculated into the community college some 30 years later. Janie initially enrolled in the Women in Manufacturing program seeking a short-term credential and a job, but she soon realized that she enjoyed learning and indeed wanted to complete a college degree rather than a certificate. Janie's applied associate degree did require her to complete some general education courses, but the technical courses dominated the curriculum.

7.2 Return on Investment of College

Women hesitated to enroll in college and pursue manufacturing due to a concern about landing a job that provided high wages. The women's concern is echoed by all stakeholders in higher education as tuition costs continue to rise even at the most affordable institution of higher education, the community college. The return on

investment (ROI) of higher education is a comparison between the cost of a college program and the potential earnings once a student is employed: "Because ROI is driven by how much time and money students invest in attaining a credential, policymakers, students, and their families are paying increasing attention to the labor market success of students after gaining that end product" (Schneider, 2015, p. 67). As women contemplated the potential time and cost associated with attending college, they questioned the likelihood of their finding employment at a company that would allow them to recoup their investment in themselves. This expectation of a certain outcome matters according to expectancy-value theory because a person's beliefs can be predictive of her success. In other words, the women's "expectations for success and subjective value for tasks are the most proximal predictors of their… learning and achievement" (Linnenbrink-Garcia & Patall, 2016, p. 92). The women's question about ROI was both legitimate and complex for several reasons. Janie summarized her concerns about higher education:

> Well, I think more and more people are, they're afraid to go to school anymore. They're afraid to commit themselves and commit the money and get the loans because there's no guarantee that you're going to get a job in what you…….They're disillusioned anymore. School, a lot of schools, it's a big business, and they're telling people, "You can do whatever you want," but then I have a friend up the street. She put her daughter through school up in [the city] for interior decorating and then the girl's worked at [a restaurant] ever since. She's never once worked as an interior decorator.

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The women faced a harsh reality of higher education – could they expect to have a job that made their investment in college worthwhile? By earning an applied associate in science (AAS) degree in a technical career area such as manufacturing, the women positioned themselves to earn more than graduates with an associate in arts/sciences as well as more than some graduates with bachelor's degrees (Schneider, 2015).

The tuition for an applied associate's degree at the community college where the Women in Manufacturing program resided was approximately $11,000, excluding fees and books. All of the women in the program received some type of financial support from various sources. Some financial support such as federal workforce funding and company-sponsored apprenticeships did not require students to payback anything; however, apprenticeships typically required employees to work for a certain period of time after completion of their academic program. Most companies required employees to sign a commitment to work for three years. Of course, students who used federal financial aid loans incurred debt for which they would begin paying upon completion of their program. If a student attended classes full-time, she could expect to graduate in two years. For a woman who attended classes part-time, she could expect to graduate in approximately four years depending on how many credit hours she completed each semester. Regardless of working full-time or part-time, apprentices typically were stable financially because they earned money while working and their companies paid for their tuition, books, and fees. The relative affordability of an AAS degree coupled with the potential earnings in a manufacturing career made it probable that the women would indeed have a favorable financial return on investment. While the apprenticeship model worked for some women, it was not a good fit for others. Women with any care-taking

responsibilities usually could not make it work because the apprenticeship required work five days a week from 7:00 A.M. until 3:00 P.M. then college classes from 4:00 P.M. until 9:00 or 10:00 P.M. This meant that most women in the Women in Manufacturing program were going to school but not working.

Despite the optimistic forecast for the women securing a high-wage job after completing a certificate or degree, many of them were skeptical. Could the women be guaranteed a job in manufacturing that would provide a livable wage for them and their dependents? The honest answer was, *it depends*. This was not an appealing answer to a jobless woman contemplating the extra challenge of completing an applied associate's degree in a nontraditional career. Similar to manufacturing companies across the United States, the Women in Manufacturing program's Midwest manufacturers also report widespread job availability. While jobs may be plentiful, they all are not necessarily high-wage opportunities. Wages for manufacturing jobs in the region often start between $12.00 and $15.00 an hour. While some companies conduct performance reviews and give incremental raises every six months, other companies do not. Depending on the company, an employee can climb quickly to $20.00 an hour, or the employee may not reach a livable wage for six or seven years. This uncertainty was troubling for the women as they weighed their options and considered the demands of attending college.

A related challenge for the women was trying to understand the connection between the names of programs in the college and the titles of jobs in manufacturing companies. Beginning with the women in the pilot program, I noticed confusion surrounding how a college program or major would translate into a manufacturing job. In some instances, such as welding, an easily understood connection exists, but typically

a shared nomenclature between college programs and manufacturing jobs is not readily apparent. This disconnect goes deeper than simply the names of programs and job titles. The language discrepancy extends to different vocabulary in the college manufacturing program descriptions and in the manufacturing job postings. Whereas a college professor and a human resources director may be able to translate the jargon, a college student and potential employee most likely does not possess that knowledge. The job posting "Maintenance Technician Trainee" (See Appendix I) is from an international company that designs and builds various types of manufacturing technology that is used in the automotive, aerospace, energy, and medical industries, to name just a few. The job description hints at the possibility of a novice coming into the position "to develop a new skill or trade"; yet, the description goes on to describe a candidate as someone who has a "working knowledge of manufacturing." Whereas the job description does not specify any formal training, a candidate who has completed either of the industrial maintenance technology tracks described in the college catalog under "Industrial Maintenance Technology" (See Appendix J) would be a well-qualified applicant. Another example of this disconnected language between job descriptions and program descriptions is in the area of machining. Even with the common term "machining" in the titles of the job posting "Machining Center Group Operator" (See Appendix K) and the college program "Computerized Manufacturing and Machining" (See Appendix L), it is not readily apparent that the college program would prepare a student for this exact job. Of course, instructors of the programs would likely understand the connection between the college programs described in Appendices G and I and the jobs described in

Appendices F and H. However, the challenge is for students and employers to understand the connection.

When the women were considering the Women in Manufacturing program, they wanted an answer to the simple question, "What job will I apply for when I graduate?" The students wanted a program title and description that aligned with a job title and description, including potential wages. As women struggled to picture themselves in college, in a manufacturing program, and in a manufacturing job, the vision became more fleeting and confusing. Certainly, the Women in Manufacturing program used several strategies to mitigate the gap between manufacturing job descriptions and college program descriptions. Human resource professionals from manufacturing companies visited classes on a regular basis to discuss job types, descriptions, and opportunities with the students. Additionally, manufacturing companies hosted tours for the women to learn about different types of manufacturing jobs. The relationships with company representatives also presented a chance for company personnel to learn more about the college, its programs, and its students. Community college programs that are traditional for women are relatively transparent to see the career connection – nursing, early childhood education, and cosmetology. Connecting manufacturing programs with manufacturing jobs is not an insurmountable obstacle, but it is another hurdle for women, and some would argue for men as well. The women who were considering earning a college degree in a nontraditional program wanted to know their potential job opportunities and their likelihood of recovering their investment in a college education.

7.3 Career Exploration

As mentioned in the previous section, students in the Women in Manufacturing program had opportunities to visit companies and talk to employees in human resources as well as those in production roles on the manufacturing floor. The company tours were helpful to the women not only because they had chances to ask questions about specific jobs, but also because the women had a chance to see the many types of manufacturing environments. While various manufacturing advocacy groups work to dispel the "dirty, dark, and dangerous" reputation of manufacturing, some manufacturing facilities are more appealing than others. The Women in Manufacturing program did not promote any one type of manufacturing environment over another, but the program did try to give students a broad perspective of industries from automotive to aerospace, of products from heavy to light, and of cleanliness from sterile to oily. In addition to company tours and conversations with women already working in manufacturing, the program also provided hands-on activities during the orientation part of the program as well as during some of the entry level classes. These activities included building and wiring a small robotic arm, building a digital camera, and building a tool box. Students learned how to read blueprints, use hand tools, solder, and do some electrical wiring as part of these projects. While these activities are not the same as running a computer numerically controlled (CNC) machine, they are ways for women to begin thinking about their interest in working with their hands, working with different types of tools, using spatial reasoning, and creating a product.

The exposure to the manufacturing environment, conversations with women working in manufacturing, and hands-on activities served as accelerated career

exploration opportunities for the women. Participants liked seeing how things were manufactured, and they eagerly learned the necessary skills to complete the building projects. Most of the women did not have experience using hand tools, and all of them reported feeling a sense of satisfaction and accomplishment. The women openly discussed their newfound excitement about mastering hand tools and confessed their lack of familiarity. The women remarked that they had just never had a reason or an opportunity to use tools as children or adults, and they suspected that was due to being a girl. Gender socialization is pervasive in U.S. culture, and its effects may linger for a lifetime and play a significant role in how women choose careers (Fassinger, 2005). Working with tools and building things introduced the women to some previously undiscovered interests.

7.4 Motivation in College

While the potential earnings were the initial draw to manufacturing, some women reported that they stayed motivated to complete college for several reasons. Some women reported a newfound love of learning unlike times in the past when they dreaded school. They attributed this to several different causes ranging from maturity to hands-on learning to career goals. Some women attributed their motivation to their desire to set an example for family members, particularly children and grandchildren. Finally, some women simply wanted the satisfaction of completing a college degree for both personal and professional reasons. For most women, a combination of these reasons motivated them.

Despite Janie's skepticism about a college education, she was quick to admit that she felt more secure about her future, and she believed in the example she was setting for

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her grandchildren. Several days each week Janie met her grandchildren at their house after school and supervised homework and made dinner. Once Janie began college, she often completed her homework right beside her grandchildren. Janie was excited when she told me her granddaughter and she were studying the same concepts: "The thing was that she had something ... almost at the same time, we were both doing levers. Levers and fulcrums and that stuff at the same exact time and she really got a kick out of that." Janie went on to say, "I was like, 'Wait a minute. Look at what you're doing, look what I'm doing!'"

I reminded Janie that she had mentioned during a panel discussion that her grandchildren motivated her to complete her education: "I remember you making the comment – it was during that panel discussion and somebody asked you what helped you persist through it when you had your moments of, 'I don't want to do this.'"

"Yeah," Janie said nodding her head.

"And you said your granddaughter, or grandchildren," I recalled.

"Just to show them that it's never too late and it's not. They can do whatever they want. Especially her."

"She can be a forest ranger," I said.

"That's right. If she wants to be a forest ranger, by golly, I'll make sure she gets there. I still want to do it, come on!" Janie laughed.

Janie believed in the importance of nurturing the aspirations of her grandchildren, regardless of what their "forest ranger" may turn out to be. In addition, Janie wanted the security of having a degree that she believed represented her skills and capabilities. When Janie's previous job in a warehouse was sent to Mexico, she had no one to vouch

for her skills and found herself beginning all over as if she had no work experience. Janie said the college degree increased her sense of security about her future if she needed to change jobs again. Janie also found herself enjoying college shortly after she began.

Similar to Janie, Sienna's children, as well as other children in her extended family, motivated her to persist through college. Sienna thought it was important for her children, specifically her son, as well as her nieces, to see her complete a college degree. Sienna talked about how her college experience caused her to push her younger son more than she had pushed her adult son and daughter. Sienna thought that her college experience had enlightened her to the importance of education, and she wanted to pass that along to her son and nieces:

> It [college] just changed my whole perspective about education, about everything. So, you know I try to push them all like hard as I can, even my son. You know, I found myself pushing him harder than I did the other two because I didn't realize the value in making him understand it early, and I take it very serious now, way more than I think I ever did. Like I really don't think they [manufacturing company] would have gave me that had I not been on this boat to already have my degree cause there's other people. You know, I talked to one of the guys, you know, he seemed like to me, you know I feel like he's probably more qualified than I am but because he doesn't have his degree it makes a difference for everything.

Sienna's commitment to finishing her degree in manufacturing was tested when she was fired from her second manufacturing employer. As I explained in Sienna's story, the

circumstances seemed unfair and racially motivated. After she was fired, she contemplated leaving manufacturing altogether, but she realized that she was close to graduation.

As mentioned previously in this chapter, family plays a role in the career development of women. Research shows that primarily parents and siblings influence the education and work choices of children and this influence lasts through adulthood (Gibbons et al., 2011). In addition to family of origin, current family status also affects women's choices, especially being a mother. Gibbons et al. (2011) found that "*being a mom* represented the profound interface between children and work and included balance, mothering as a career, and ways that children framed their mother's work (day to day) and career choices" (p. 321). Mothers described the difficult choices they had to make between work and children (Gibbons et al., 2011). The Women in Manufacturing participants often discussed the challenges of motherhood, but they also discussed their belief that attending college was going to change their children's outlook about college and career. The potential positive impact on their children was a motivating factor for the women to persist through college.

While children and grandchildren motivated Sienna and Janie, Tanya's need for financial independence remained in the forefront of her mind, but she also admitted that her husband's pride helped her stay motivated as well. Tanya had told me from the beginning of her apprenticeship that the physical demands at her particular company were challenging, so I asked her what kept her motivated when she was exhausted and stressed out: "I don't know. Whenever I start I always like to think that I always finish. My husband's a motivator. He says, 'You got to do your school work.' He always asks

me, 'Did you get everything done?'" She continued, "Brags, him and his dad both brag on me. 'I couldn't do what you're doing.' He'd say, 'I don't know how you do it. I don't know how you do it.'" Tanya also shared that she was surprised at what she had learned in her classes and how well she was doing: "I feel good. I feel good. In summary, I feel good because three years ago, I couldn't have done this. I couldn't have went and fixed my lawn mower. But I can do it now. I couldn't have put something together at home." Tanya added, "That [college] was challenging. Math was challenging for me, but I'm, I'm surprised I could do it, but I did it. I mean, I'm doing it." As much as Tanya enjoyed the support and admiration from her husband, she relished her new-found skills and confidence.

7.5 Financial Struggles in College

Some of the women in the program struggled financially while going to school and either working part-time or not working at all; some reported feeling guilty about attending college and pursuing a new career because it seemed selfish to them. The roots of this guilt may originate in several ways: "Socialized habits of caretaking and self-denial, coupled with pervasive external messages about the rewards of motherhood, can lead to feelings of guilt about nonparenting activities and pursuits" (Fassinger, 2005, p. 99). Unlike most men, women often plan their lives to accommodate their families and by doing so put their own education and career aspirations farther down the list of priorities (Betz, 2005).

Most of the women had no financial safety net to support them, and they teetered on the brink quitting school to work more. Even Samantha, who was working full-time as an apprentice, did not make enough money to absorb the cost of an untimely auto

accident: "I didn't have a way of getting another car. I was living with my boyfriend, who was extremely abusive. And that time period was just so terrible." Samantha had to rely on family and friends to help her through that time. Certainly, relying on others was something all the women did to some extent. As mentioned previously, all the informants at one time or another questioned whether the financial sacrifice would pay-off. The primary sources of funding for tuition and books were federal dollars for job seekers, federal financial aid, and employer apprenticeship or reimbursement. Each woman's circumstances dictated where her tuition funding originated and how much additional financial support she received.

This study primarily focused on women who persisted in the Women in Manufacturing program. While those who remained in college had their own challenges, some women's barriers could not be mitigated. Hailey and Bridget, who completed their GEDs in December 2013 and simultaneously participated in the original fall 2013 pilot project were two such women. They began the Women in Manufacturing program in January 2014 but relied on government assistance and had little capacity to absorb additional expenses. Neither Hailey nor Bridget had family or friends who had extra resources; their families and friends were in much the same financial circumstances. Both women received benefits from Temporary Assistance for Needy Families (TANF), a federal program administered through state agencies to assist families in becoming self-sufficient. They also received benefits from Supplemental Nutrition Assistance Program (SNAP), more commonly known as food stamps. Additionally, Hailey and Bridget benefited from public housing. Despite the financial supports of these government programs, neither woman stayed in college to the end of the spring 2014

semester. Bridget could not afford Internet service in her apartment that she shared with her children and her mother; typically, she walked to the library but the walk became too much once the snow started falling. Bridget stopped coming to class by the end of February. In March 2014, Hailey's boyfriend and father of her children lost his job when his employer found out he had been convicted of a felony. Without his income, Hailey could not make it work financially; shortly after he lost his job, Hailey learned that she was pregnant, and she stopped attending class. I include Hailey and Bridget's stories because the program could not meet their needs.

The Workforce Innovation and Opportunity Act (WIOA) of 2014 was another source of funding for many of the women. WIOA consists of a large umbrella of federal programs that are administered through state workforce systems serving job seekers and employers. WIOA funding "is designed to help job seekers access employment, education, training, and support services to succeed in the labor market and to match employers with the skilled workers they need to compete in the global economy"(WIOA Fact Sheet: The Big Picture). Fewer women in the program utilized federal financial aid, or scholarships provided through a grant to the program, or veteran's benefits. Most of them qualified for the $7,000 training benefit of WIOA.

Janie, Delores, and another woman lost their jobs when their warehousing company sent the operation to Mexico. This qualified the former employees for Trade Adjustment Assistance (TAA), which assists workers whose jobs have been lost due to competition from foreign trade. The federal TAA program provides more financial support than WIOA because TAA has money for longer-term training and additionally provides income replacement, benefits, and placement in a high-wage, high-growth job.

The three women almost missed the opportunity to use TAA benefits because no one told them they qualified: "Yeah, we didn't really know because no one ever told us that we qualified for it [TAA] when we first all went up for unemployment and signed up for WIA and everything. Actually, someone from human resources at [the warehousing company] told one of my former co-workers." Janie discussed the importance of the TAA program when I interviewed her in 2014. She was still struggling with her decision to attend college rather than find a job:

> I mean I wouldn't be doing this if it wasn't for Trade. I would be back to work. For me, it's hard to balance. I kind of feel I'm goofing off. I don't know if I want to say it that way. I'm just filling this in. I don't know. It's hard. Part of me wants to get back to work and, to me, that's normal, get back to normal. Then part of me is like, "But I can do so much more." It's hard. It was really hard this weekend with the [company tour], trying to decide whether to turn in an application or not. I'm still on the fence with that. I would not give up school for $12 an hour but for $20 an hour?

As I mentioned previously, Janie ultimately decided to complete a degree so she would have documentation of her skills, something she did not have when her job was sent to Mexico. Janie commented that workers could not trust companies anymore: "You know, companies don't take care of people anymore like they did." She also envisioned a future that demanded her to work rather than retire: "I don't ever see with the way healthcare is and so-called social security and the whole [warehouse] closing thing, kind of just wiped out my 401K and everything, so you know, starting over again in your 50s doesn't give you much time, so I don't ever see me retiring." Janie had hoped to use your

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experience as a warehouse production planner to work in the office of a manufacturing company, but she did not find a position of that nature. She also knew that she did not want to, nor had time to, begin at the bottom making minimum wage in another warehouse.

While the women in the program had access to various types of funding, they all still struggled to piece together a financial plan that made sense for their particular needs. Federal labor programs like WIOA and TAA have strict criteria, a time lag for becoming certified as eligible, and have individual case managers whose responsiveness varies. WIOAA and TAA also require recipients to participate in time-sensitive documentation that can lead to termination if the person fails to comply. Federal aid programs like TANF and SNAP have similar attributes that pose challenges to people trying to access their benefits. Some may argue that these are slight inconveniences for people to adhere, but I witnessed the challenges these regulations create for women who already have financial, transportation, and childcare limitations. Evident in this research was that women like Hailey and Bridget, who were utilizing TANF and SNAP, faced additional barriers to completing a college credential.

7.6 College and Workplace Support

Most women discussed the importance of classmates and coworkers as they progressed through the Women in Manufacturing program. The program purposefully included opportunities for students to connect with one another, with current female manufacturing employees, female manufacturing instructors, and manufacturing human resource professionals interested in hiring women. When I asked informants about their relationships with other women connected to the program, they were quick to discuss the

importance of these relationships as well as the facilitation by the program in giving them the opportunity to meet one another.

When asked about relationships with others in the Women in Manufacturing program, Sarah talked about being in class with women in different manufacturing majors and specifically about finding inspiration through meeting an older student in her math class:

> One, I think, she's on the line right now, and she's actually doing the internship at [a company]. And she's actually older than myself, so when we sat in the same accelerated math class, I'm like, okay we can do this. Even though I'm surrounded by 20 year olds, we can do this.

Sarah was referring to Tanya who is 10 years older than Sarah and in her fifties. The power of this type of connection among the women could not be overestimated. Watching other women succeed in similar classroom and work environments was a social source of self-efficacy. According to Betz (2005), beliefs about self-efficacy are connected to persistence. Low self-efficacy and math anxiety can especially be risk factors to women in a nontraditional program or career. Betz (2005) explained, "low self-efficacy, especially in relationship to male-dominated careers and/or careers requiring mathematical or technical expertise, may reduce the self-perceived career options for women" (p. 259). Women in these nontraditional situations need some combination of support from educators, peers, family, and mentors if they are going to persist and succeed. The women supported one another by sharing their fears, their successes, and their stories. They found strength in each other's ability to overcome obstacles. While Sarah actually had some experience in manufacturing, certainly more

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than Tanya, Sarah was inspired by Tanya because of age and the company apprenticeship. Tanya was the oldest and one of the few female apprentices at her particular company. Sarah added that she was surprised by the support of the college as well as the influence of the other women: "I didn't expect the connection. I didn't expect the support from [the college]. I've been to school before. I was a number. So, yeah, there's a influence there. When you see other people there, actually continue to go forward, yeah."

In addition to Sarah, several women mentioned Tanya supporting and counseling them. Faith referenced Tanya as the mother of the apprentices: "And then Tanya, she was our mom there and it was nice to go and talk to her just about life and stuff, too." Samantha said, "I love Tanya. She's such a sweetheart just on a personal level. She just cares about you. She was actually the one who first really – I actually listened when she told me to leave that boyfriend." Samantha was referring to her ex-boyfriend who was abusive and jealous of her success as a manufacturing apprentice. Samantha elaborated on how Tanya influenced her decision to leave the relationship: "We were actually leaving a [Women in Manufacturing] thing. We went and got breakfast. So that was actually when I decided. It took me a couple of months to leave, but she was the one who influenced it."

"Had you confided in her or did she just sense it?" I asked.

"Yeah, no we talked a lot. We had a couple classes together at the time. So, we talked about more than work and school," Samantha explained.

While Sarah, Faith, and Samantha looked up to her, Tanya confided in several male counterparts at her company. When I asked her about any relationships, friendships

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or acquaintances, she mentioned Michael: "Uh-huh. Michael and I started at the same time here. He's young enough to be my son but he's older so he's like 30 something. But him and I, we even talk to each other. He took the buyout too, but we still talk to each other. We're actually going tomorrow night to get together." Tanya added that she had forged good friendships with some of the older men who worked at her company, but she also talked about setting boundaries. Tanya was careful to remain independent and carry out her job responsibilities on her own.

"Do you feel like everybody, men and women at the company, are supportive of you? I asked.

"Yeah. I had to prove myself," she said.

"Do you think proving yourself as a woman is the same as the guys have to prove themselves, or is it different?"

"Oh no, I think it's different. I think going into a company with a bunch of men they're going to coddle a woman but I don't let them do that. They'll say, 'Let me carry that,' and I'll say, 'I can do it. You got your own stuff to do, go do your stuff, I'll do my stuff.'"

While Tanya worked independently, she also looked for opportunities to learn new things from her co-workers. She learned that other co-workers judged her curiosity to be threatening to their desire to maintain the status quo: "I'll be trying to learn something new and they'll come to my room because there's this one guy he's named Chad and he helps me like if I ask him questions he'll help me get it and then I can do it. He teaches me more than I really have to know."

"Is he another apprentice or is he a full-time person?" I asked.

"He's a full-time person. They [co-workers] look at me like I have 10 heads like, 'What are you teaching her that for, she don't need to know that.' Because I want to know…. I want to know why it works like that because it makes my job easier. So, whenever he's showing me something they're like, "We don't need to be doing that, we're going to do this, we're going to do that."

Tanya's co-workers seemed to exhibit a double standard toward mentoring or helping her. In one way, some of her male co-workers wanted to assist Tanya by helping her carry out her job duties, particularly duties that required lifting or any type of physical labor. Knowing that she did not want to be dependent or beholden, Tanya turned down their offers. When Tanya invited mentorship on her own terms, she was ridiculed by her co-workers for wanting to learn new things, especially things that "she didn't need to know." Her male counterparts seemed eager to fulfill the masculine role of lifting something they deemed too heavy for a woman, but they were not eager for a woman to learn more about the work. Possibly, Tanya's male co-workers did not want her to surpass them in her knowledge and skills and would have preferred that she become dependent on them.

When Sienna discussed her experiences and relationships with classmates and co-workers, she first shared her experience with the Women in Manufacturing program. Sienna's first two jobs in manufacturing did not end well because she had no support in the workplace. She landed her second job in manufacturing while she was still going to college to complete her associate's degree and encountered a supervisor who sabotaged her efforts on the production floor. When the supervisor fired Sienna, she turned to her family and the support resources in the Women in Manufacturing program:

"I'm very, very grateful to, you know, this program. I look where I started and
you know it just means a lot to my family. Now, I'm at this place where I have a
job and I can provide my children with insurance. You know I can actually pay
my bills. I couldn't do that before so, you know, I don't even know how to repay
you guys back for everything you guys ever done for me because there were times
when I didn't know where my next anything was coming from and you guys were
there for me.

Since Sienna did not have an opportunity to create a support system at that particular
company, she turned to the program when she was fired. Immediately after she was
fired, Sienna met with her academic advisor who encouraged Sienna to stay with the
program and complete her degree. The academic advisor and the coordinator of the
Women in Manufacturing program worked together to find Sienna another job.

Sienna may not have forged many relationships at her second manufacturing job,
but she did establish strong ties to the other women in the Women in Manufacturing
program. I asked Sienna if she had any relationships with other women in the program:

"Oh yeah! A couple of them because I had classes with, what was her
name? Because we had mechatronics together, and she's actually in machine tool
now. I've called her a few times and we've sat and talked for a few hours and asked her
if she was okay." Sienna shared that when she talked to women in the program, she
shared her story and encouraged the women to utilize all the support provided by the
Women in Manufacturing program. Sienna emphasized the importance of persevering
until a woman found an employment situation that worked for her circumstances. The
third company that hired Sienna elevated her to a lead position as her starting point due

to her skills and almost-completed associate's degree. Sienna's supervisor supported her work and mentored her development as a lead.

In contrast to Sienna's journey to find a company that was the right fit, Janie liked her company and her coworkers from the start: "I like [the company] because they're good people. I work with good people. There's only one shift. I never have to worry about having to go to a different shift. They don't work weekends. They're willing to work with me." Janie found her work culture to be supportive and flexible. Her daughter took a new position that required her to leave at 6:00 A.M. each weekday. Janie spends the night so she can be there mornings to take her grandchildren to school, which makes her 15 to 30 minutes late for work. Janie's company works with her: "They let me just make up my time and I have no problems, and I know there's plenty of places that would never let that happen." Janie's small manufacturing company did not pay high wages, but she was content with the trade-off to have more flexibility. From Janie's years working in warehousing, she knew this type of workplace support was not common.

Support, or lack thereof, is important for college students and manufacturing employees, and this may hold truer for first-generation women who are attending college and pursuing a nontraditional career. A mentor, similar to how Faith and Samantha described Tanya as a "mom," may act as parent or some other family member who protects and guides the mentee. A relationship like this can positively affect the trajectory of a student or coworker (Gibbons et al., 2011). Women who were on the receiving end of support often mentioned their desire to support others (Gibbons et al., 2011). Sienna emphasized how the Women in Manufacturing program was instrumental

in her success, and she specifically wanted to tell the women coming through the program behind her to utilize the many services provided by the program. Sometimes, the women's stories of support and mentoring came out during panel discussions held by the program for potential women and manufacturers. Their stories were as important, or maybe more important, for the women in the program at the time. Faith summarized: "I definitely liked all the panels that we did, just to hear all the different women, how they got into it. And I like the fact that they are, some of them are older, but they didn't give up on their career."

7.7 Conclusion

The prospect of attending college intimidated the 10 informants as well as the majority of the population of women in the program, most of whom were first generation college students. The women were fearful of failing, and they questioned whether college would be "worth it." The women worried that their completion of college might not land them a "good job" in manufacturing, which was everyone's goal for enrolling in the program. In addition to landing a high-wage job, the goal of completing a college degree became important to the women. Initially, the women viewed college as a necessary part of their journey toward a manufacturing career, but they began to see college as an opportunity to see themselves as capable students eager to learn new things. Despite the women's apprehension about college, they expressed an unexpected sense of accomplishment and confidence due to their successes in the classroom. The women also noticed their attending college piqued the interest of their children and grandchildren who often were curious. The children and grandchildren's interest served as additional inspiration for the women to stay in college and graduate. For women who had family

that were financially dependent, they reported feeling guilty and self-indulgent for

attending college because it required a tremendous amount of time and effort that could

be used for working and earning money. The women also expressed gratitude for their

relationships with other women in the program and with women overseeing the program.

CHAPTER 8: INTERSECTIONALITY AND AGENCY

To understand the women's lived experiences in education and the workplace, I have thus far discussed how the earning potential attracted women to the Women in Manufacturing program. The earning trajectory was important to the women not only for their own financial security but also for the well-being of their dependents who were children, grandchildren, spouses, and elderly parents. Except for one recent high school graduate, all of the women were coming to manufacturing as a second, third, or fourth career. Despite the life and work experiences of the women, they feared failing at college, and they worried about the promise of high wages materializing. As the first-generation college women progressed through the program, they shed their fears of failing and began feeling proud of their college accomplishments. Through the program, the women met other women currently working in manufacturing and learned about manufacturing careers and manufacturing culture. The women forged strong bonds among themselves at school and at work as they supported one another throughout the program.

In this chapter, I will continue to examine the women's experiences by discussing the data in the context of intersectionality and agency, the conceptual links between my research questions and the data derived from the narratives of the women. In what ways do intersectionality and agency affect the women's education and career choices? Intersectionality begins with the assumption that identity is socially constructed and cannot be distilled into one attribute such as gender or race. Intersectionality acknowledges the existence of social structures that place limitations and assign blame to individuals (Cho et al., 2013; Collins & Bilge, 2016; Crenshaw, 1989; Crenshaw, 1990;

May, 2015). The neo-liberal, post-feminist gaze ignores the existence of structure while assuming success or failure rests squarely on the individual (Acker, 2006; Bette, 2003; Walkerdine & Ringrose, 2006). The women in this study encountered the deeply entrenched patriarchy of manufacturing as they attempted to create space for their own ways of learning and working. Not only did their male coworkers oversimplify the women based on their gender and/or race, but also the men attempted to block the women from performing their job duties. Undermining by the men took different forms and ranged from coddling to ignoring to criticizing the women. Consequently, the women exercised agency in unique ways as they interacted with their coworkers and performed their work tasks.

8.1 Identity and Agency in a Nontraditional Work Environment

The identity constructs of gender, class, and race played out against the backdrop of the male-dominated, nontraditional environment of manufacturing. The manufacturing workplace is a space that was created by men for men over a 100 years ago. This male-dominated work environment challenged women's identity and agency as they attempted to navigate their work, their relationships with coworkers and supervisors, and their perceptions of their own knowledge and skills (Acker, 2006; Bettie, 2003). Whereas some may put the burden of success in this environment squarely on the shoulders of the women, the system of hiring, retaining, and promoting employees in manufacturing has been explicitly biased in favor of men (Rodriguez, Holvino, Fletcher, & Nkomo, 2016). The historic structural confines of manufacturing as both an idea and a physical space have been limited to a male ethos where hegemonic masculinity prevails and women are othered (Alcadipani & Tonelli, 2014).

Whereas the physical spaces in manufacturing may hold futuristic technology, these same spaces may be archaic in terms of a work environment that is inclusive of all employees. At one of the early meetings with the founders of the Women in Manufacturing program, a human resource manager for a small manufacturer shared with the group that her company had finally agreed to put a women's restroom on the shop floor. She went on to say that her company currently did not have a woman working in production, but they would be prepared if they were to hire a woman. Most of us forced an awkward laugh in disbelief, especially since the human resource manager was trying to hire people. Her company had obviously been ignoring 50% of the population. While this was a small company, the lack of a women's restroom on the shop floor sent a large message. The message was consistent with the stories shared by the women in the program: some manufacturers did not consider women to be legitimate contenders for jobs, and the companies did not want women on the production floor.

Men were not the only representatives of manufacturing companies who expressed bias against female job applicants. A woman recruiting for a manufacturing company openly discouraged women from applying for jobs at her company. Janie recounted a job fair that she and two other women attended after they had completed the MSSC Certified Production Technician credential. Janie stopped at a table to talk with a woman who was a recruiter at the job fair. In the course of the conversation, Janie mentioned the Women in Manufacturing program, and the manufacturing recruiter shared that she was one of the founding women of the program. The woman said to Janie, "You don't want to work for us. Women don't do good for us." Janie recounted the conversation: "They make fittings and stuff and I made a point of standing there and

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just raving on and on about how I would like to do that…but she had no interest in us whatsoever and flat out told us that." The recruiter was not only complicit in maintaining the status quo, but also she was doing so in spite of her involvement with the Women in Manufacturing program. This same manufacturer hosted a tour where Janie observed that "only men ran machines and what women they had work there, worked in a little room about this big and they looked through, made sure there was no damaged pieces. That was the only women that worked in that place." Janie perceived the women were doing work that was less technical and less interesting than the men's work that entailed running the machines. Janie speculated that the women were paid less, and she was probably right. Even when women choose to work in manufacturing, they are often put in positions that require fewer skills and pay less money (Deutsch & Schmertz, 2011). As previously stated, this wage stratification based on gender exists within individual companies as well as among the various types of manufacturing.

Since the human resource person was involved with the Women in Manufacturing program, I was familiar with her and her company. She often described her company's production floor as dirty, and she made the assumption that women would probably not want to work there. I had not visited the company, so I asked Janie about her impression of the work environment:

> It wasn't that bad, I didn't think. That's one thing that did kind of bother me and I think I even said one time, "Why does everybody act like we don't want to get dirty or we're not capable of getting dirty?" I can go home and wash. I don't care if it's a dirty job, if it's something I like and it pays enough.

Janie's question about women getting dirty at work was important to consider. The social construction of gender, class, and race also creates the social construction of women's work and men's work (Slutskaya, R. Simpson, Hughes, A. Simpson, & Uygur, 2016). Women hold many jobs that are dirty, but when the jobs are traditionally female jobs no one seems to question the appeal of the working conditions. Domestic work such as hotel housekeeping, cleaning, and personal care have a history of being gendered, racialized, and classed, and few question the appropriateness of these jobs for women based on workers' exposure to dirt (Slutskaya et al., 2016). The construction of women's work and men's work is often contextualized within institutions, which further normalizes the status quo. Janie's experience illustrated that in the context of manufacturing, the male status quo was engrained, so much so that a female recruiter discouraged a woman from applying for a manufacturing job. I asked Tanya how many women worked on the production floor at her company. She estimated four or five women had been employed for the last 20 years or so. As for apprentices, Tanya and Samantha were the only two women. Originally, two additional female apprentices worked at the company, but one woman was fired for failing her college courses and the other woman took a buy-out. This particular manufacturer had 450 total employees, including production and office workers.

The number of men and women in the manufacturing classes at the community college reflected a similar ratio to the manufacturing floor with only 10% female students. I asked Faith, who was the youngest Women in Manufacturing student, about her interactions with the instructors and her classmates:

In my first class, I only talked to the few that I knew from [my company]. But

then by December of last year I had more classes with guys from different

companies and stuff. And I could just talk to them because I worked with guys all

the time, so I understood the guy mentality and all their weird comments and

stuff. They didn't faze me anymore.

Faith described how she was initially quiet but became more vocal as she grew more

comfortable working among a mostly male classroom and workforce. Faith said her

coworkers on the production floor routinely used foul language, and she picked up the

habit and began using the same foul language. Her male coworkers would express shock

when she used the vernacular she learned from them.

"Sometimes I'd just chime in. They'd be like, 'Wow, I didn't think you'd say

that.'" Faith continued, "'I work with you all day. You woulda said it.'"

The language of the shop floor both shaped and reflected the male-dominated

culture in manufacturing. Bourdieu asserted that most societies are androcentric and that

often times male dominance is acted out through language as symbolic violence rather

than through physical violence. Bourdieu claimed that symbolic violence towards

women goes largely unnoticed because it is carried out in small ways and is normalized

(as cited in Alcadipani & Tonelli, 2014, pp. 324-5). The symbolic violence of language

was one of the ways that men were able to dominate the social setting of the shop floor.

When Faith exercised agency by using the foul language of the shop floor, her male

coworkers' responses indicated their view of the language as belonging to them as males

specifically rather than to just anyone doing the work on the floor. Faith had the choice

to resist adopting the dominant culture language and remain on the periphery or to attempt to assimilate, to whatever degree possible, by using the language.

Tanya and Samantha were both apprentices at the same company as Faith. During a group interview, Tanya mentioned that the "shop" language bothered her, and she dealt with it by speaking up: "It's like, if you can't tell the story in front of me, then don't be telling it." Tanya speaking up was consistent with her assertive approach to the dominant male culture on the floor. Tanya seemed to draw confidence and fortitude from her age, and the other women in the program often looked to her for guidance. Samantha, on the other hand, was more passive when she encountered crude language:

> I just laugh. I'll walk up on the boys telling a story, and they're like, "Oh, sorry. I didn't mean to say that," and I just laugh at them. "I'll go away so you can finish your story in peace." Even though it really wouldn't have bothered me.

Each of the three women chose a different response: adopt the foul language and assimilate, call out the foul language and demand it not be used, or express indifference and laugh. The women exercised agency by choosing how they wanted to participate in the language, in the culture, of the shop floor. Whereas the divergent responses of the women to the shop floor language could be brushed aside, the heterogeneity within the group of women matters. Intersectionality, both as concept and as praxis, calls for examination of not only the broad categories of race and gender but also the complexities, the diversity and dissent, within broader categories (May, 2015). The three informants who experienced the foul language were all White, working-class women, yet they had unique reactions that could not be described as homogenous. Constructed identities of gender, race, and class are not prescriptive or predictive, and the tendency to

use the concept of intersectionality at the surface level as simply a descriptive term undermines the potential for intersectionality to be practiced (May, 2015).

8.2 Agentic Responses to Gender and Sexual Harassment

Gender and sexual harassment were, and continue to be, barriers to equity for women in the workplace, regardless of sector or workplace environment (Betz, 2005). Women can sexually harass men, and same-sex harassment can also happen; however, 90% of workplace complaints are about men harassing women (Betz, 2005). After discussing the shop floor language, I asked Faith if she ever dealt with comments that were connected to her gender or any sexual harassment:

> No, I didn't have any of it. Our boss, Phil, he would not tolerate any of that. I know it was bad for the first couple of girls that went through there. And so, they would go and talk to Phil, and he made it pretty clear that if you did any of that, he wasn't going to take it. You'd pretty much be kicked out.

Faith was not the first woman in the program to say that Phil, who was the main supervisor of the apprentices, was demanding, strict, and serious. All of the informants viewed Phil favorably as someone who would not tolerate any type of unprofessional behavior and certainly not any type of harassment.

Despite Phil's commitment to a fair and safe work environment, sometimes he could only be reactive to an employee's behavior. Samantha encountered harassment several times. The first example Samantha shared was a male coworker who initially tried to take the crane she was using by asking her repetitively, "Are you done yet?" Samantha asked the coworker to leave her alone and told him she would bring it to him when she was finished. He continued to come to her work area and proceeded to ask her

"all kinds of stupid questions." Samantha clearly told him to leave her alone, but the coworker disregarded her request: "And that was stopped the same day. He didn't talk to me for two years." Samantha went to her supervisor: "Phil, thankfully, has been very protective of the women in the apprenticeship, so anytime that anything, just like that, he stops that right away."

In addition to this situation with the pestering male coworker, Samantha described another situation that had "to do more with sexuality." Another male coworker in Samantha's work area would say things to her like, "Hey, you coming home with me tonight?" Samantha said it did not bother her because she "never let it go anywhere." However, she described another "girl" who reported this same male coworker to human resources:

> There was a girl…actually, the one time I worked in the same area as a female, she would let it get too far. And she ended up going to HR about it. And I went in and witnessed. I said, "Yes, he does say these inappropriate things, but I think it's very much she runs with it."

I was surprised that Samantha was quick to blame the female coworker even though Samantha had experienced the same sexist behavior of their male coworker. I asked for clarification of what Samantha meant by, "she runs with it." Samantha explained that the "girl" did not make it clear to the male coworker that she wanted the harassment to stop; therefore, from Samantha's perspective, the woman was complicit in perpetuating the problem. Similar to the women's different responses to the shop floor language, the women's responses to the harassment by a male coworker were also divergent. I did not ask Samantha about why she referred to her coworker as a "girl," but it may have been

relevant to how Samantha viewed her. Although Samantha experienced the same harassment as her female coworker, Samantha judged the female coworker's response simply to be wrong.

Research has revealed that through their reactions to their male coworkers and supervisors, women do and undo gender: "The performance of gender was particularly evident through the strategies that the women were found to adopt for coping in a male-dominated environment" (Powell, Bagilhole, & Dainty, 2009, p. 418). Research has shown that in a male-dominated work environment, women often choose to respond to situations in varying ways. For example, some women may choose to act like one of the guys by performing masculinity blended in with being feminine enough or may accept the gender discrimination by making excuses for their male coworkers (Powell et al., 2009). Additionally, women may work to gain a reputation as excellent at their work in order to minimize their gender, or women may reject femininity altogether and not associate with other women (Powell et al., 2009). The latter response might even be celebrated as a show of strength or toughness.

Samantha also described a situation where a male supervisor harassed her: "I had a supervisor one time who picked on me, who would yell at me if I was talking, or I sing when I work, and he came up and asked me, told me to shut up." Samantha started keeping a log of all the times he would yell at her for things that other people could do but she could not. She added, "But that only went on for two months, and they just moved me to a different area because they're not gonna fire a supervisor over that." I asked her why she thought the company moved her instead of the supervisor: "I think because they didn't want to deal with it. It's easier to move me and shut me up than to

deal with a supervisor who is picking on the woman." Samantha said the supervisor did not have any consequences for his behavior. Samantha put a positive spin on the move and said she had been in that department for nine months and was ready to go onto something else: "So, I was happy about it, but, yeah, it's crap that he didn't have any kind of backlash from his behavior." Samantha commented that the company seemed to hold coworkers more accountable for their behavior than supervisors. When asked about any type of sexual harassment prevention training, Samantha said, "No, we don't do that."

Janie who worked at a light manufacturing company said she heard the topic of sexual harassment come up at some of the Women in Manufacturing events, but she had not witnessed or experienced sexual harassment. When she commented to me about it, she said, "And some people made me really kind of uncomfortable about it [sexual harassment] because they were so militant about it and it's like it's not an issue unless you make it an issue." I do not discount Janie's experience or statement; however, I think her point of "it's not an issue unless you make it an issue" perhaps summarizes the complexity of sexual harassment. Janie seemed to believe that sexual harassment was not an issue unless the victim made it an issue. In other words, the victim must address the situation either directly or indirectly. Janie viewed sexual harassment as something women could leverage to gain an advantage:

> There're very few times that I can ever think of that I had to play the girl card
>
> because, and most men that I knew, it didn't matter to them, you were at work.
>
> You know? And, actually the incidents that I can think of, it was usually the

woman using it as an advantage, trying to get an advantage. And I never wanted

to say that in the meetings, but I think it's more what you take into it.

Janie's perspective was unique among the women.

Regardless of how the women chose to handle the harassment, most women acknowledged experiencing varying degrees of harassment in the manufacturing workplace. Powell et al. (2009) pointed out that women's "coping strategies," (be one of the guys, make excuses for male coworkers, be exemplary at the job, or reject femininity altogether), were women using their agency: "Women used their agency to act within these social constraints by consciously and subconsciously adopting the coping strategies" (p. 422). Although women were exercising agency by deploying various coping strategies, the women were not solving the ongoing problem of working in a male-dominated space where men were the default and women were othered. This limited agency where women were choosing among available, either/or options allowed for women to make choices but only within the existing power structure: "…all readily available means of action or agency entail forms of self-annihilation on some level – a signature aspect of systemic oppression" (May, 2015, p. 46). In other words, the women were not free to exercise agency of their own invention. These limited options also meant women could not exercise agency in a way that would challenge the hierarchy of the shop floor as well as the power structure of the company.

8.3 Intersectional Identities Among and Within Categories

An intersectional approach to understanding the complexity of the social construction of identities can provide a multi-level analysis to illuminate systems and structures of power. The practice of intersectional work can be applied among different

groups as well as within a group or category to identify areas of oppression and inequity (May, 2015; McBride et al., 2014). May (2015) explained that a category does not indicate sameness among its members, but it does indicate solidarity among members as they work to disrupt a given power structure. In other words, women can work together and in support of one another to address inequalities but do not have to do so at the expense of subjugating other intersecting identities. May (2015) provided an example of looking within the category of women to examine the economic difference between White women and Black women: "An intersectional focus on within-group differences is also valuable for identifying intensifying economic disparities among women" (p. 84). In the following two sections, I use intersectionality to analyze the socially constructed identities of two of the informants in the Women in Manufacturing program.

8.3.1 Middle Class Femininity and Blue-Collar Work

Janie discussed her experience of not seeing women like herself portrayed on television. She recalled seeing a commercial for a television program, and the commercial said something about strong women. Janie described the women in the commercial: "And of course, they worked in a office, and they were all concerned about what they're wearing and their makeup and their hair. Do they have the right handbag? And they were in the corporate world, and they don't show women in other jobs." Janie related this commercial to her own life when she began to talk about her grandson playing football for a team whose players and families were from an affluent area. She described sitting with other parents when one of them asked Janie what she did. Janie explained:

Most of them don't even have jobs. Most of them are stay-at-home moms, or if

they have a job, it's, I don't know. But I tried to explain what I did, and they're

like, "Oh, you lost me at electrical." It was like it was such a ... It is kind of, I

don't want to say intimidating, because they're all, a lot of them are well to do. I

don't know what their husbands do. I don't care what their husbands do, but it

does bring out the difference, you know? They're not people that I'm used to. I

would never be ashamed to say what I do for a living, no. I don't know if I'd

advertise it. And it kind of makes me mad that I would feel that way, you know? I

don't know.

"Do you feel a little bit, though, like when they say, 'You lost me at ...,' doesn't

that make you feel a little bit superior, like you know things and you have a skillset that

they couldn't do?"

"That they don't have? Yeah, that's true. That's true. Yeah, I'd like to see how

many of them know how to use a ratchet. Took me forever to learn how to use a ratchet.

It's not as easy as it looks."

Janie and I discussed why she hesitated to tell people about her work. Janie

shared that while she admired people who worked with their hands, she knew that other

people do not share her point of view. I asked Janie why she thought some people do not

value jobs where people work with their hands. Janie said:

I don't know because actually I, myself, admire someone who works with their

hands much more than somebody that works with a pencil. Hands is one of the

first things that I look at on a person. I think it tells you a lot about that person.

Soft hands are a big turn off.

Janie recognized some of the differences between the working class and the middle class, but she used the terms blue-collar and white-collar to distinguish between the two of them. While Janie was proud of her work and her skills, she felt shame in front of the middle-class parents at the football game. Janie was angry with herself because she felt that way, but at the same time she could not pinpoint its origin. Janie sensed that the middle class may look at her work, her education, and her skills as somehow "less than" (Bettie, 2006; Luttrell, 1997; Skeggs, 1997; Weis, 2004).

Janie had learned to navigate college and shared that completing a college degree had given her confidence and satisfaction. Despite her accomplishments in the classroom and at work, Janie perceived a difference between the privileged, middle-class women at the football games and herself. Janie contrasted her manufacturing work and her femininity with that of the middle-class women. Janie realized whether women were on television or in the bleachers, many of them did not resemble her. Janie commented that women on television wore their make-up, their hair, and their clothes for jobs in the corporate world, and women at her grandson's games mostly were stay-at-home moms whose husbands supported them and their children. Janie did not see herself reflected in either group based on her blue-collar work and her femininity: "They're not people that I'm used to." Janie completed a college credential as a first-generation, working class adult, and experienced the hybridity (Lucey, et. al, 2003) between working class and middle-class identities. Janie's experiences, education, and femininity were marginalized by the oppressive gender norms of the middle class. The White middle-class women were privileged to stay home with their children, which contrasted sharply with Janie losing her job and attending a community and technical college out of

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necessity. Janie was a White woman, but an intersectional analysis of Janie's other intersecting identities revealed the inner-group differences.

8.3.2 The Whiteness of Manufacturing

In addition to the underrepresentation of women in manufacturing, people of color are also underrepresented. In 2018, 80% of workers in manufacturing were White (Bureau of Labor Statistics, 2019). Sienna who was African American talked openly about the sexism and racism she faced at two different manufacturing companies. Sienna believed that coworkers and supervisors who did not want to work with African Americans targeted them, particularly if the White men sensed some sort of threat from their Black coworkers. Sienna said:

> It's like when they figure out that you kinda know what's going on then it's like
> we got to hurry up and get rid of you because, you know, you smart enough to
> know what's going on. So that was one of the main reasons. I used to have to
> fight for my job like every year. Like if I made a simple mistake that anybodyelse
> would make, it was a big deal. I would be like reprimanded, wrote up, all that
> made a big deal about nothing.

Sienna shared that she was accused of "no call, no show" despite having signed paperwork granting her time-off to take her son for surgery. The company used this incident to fire Sienna. Sienna commented, "If you are not White, they do not treat you well at all." Sienna recounted that when she was first hired, a husband and wife were the only African American employees in the company including on the floor and in the front office. This manufacturing company employed 500 workers at this site. The woman befriended Sienna and offered advice: "She taught me just watch yourself because she's

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like I have been here for a long time and they have been after me trying to get me for a long time and they can't find nothing to get me on. So, she said just be careful." Eventually, the husband became ill and the wife was terminated, leaving Sienna as the only person of color in the company. Sienna felt she was constantly scrutinized by coworkers and supervisors, and Sienna sensed that any missteps she made were attributed to her being Black and a woman. Sienna added, "Mostly Black." The men on the shop floor helped one another but never assisted Sienna.

Sienna's second job in manufacturing did not prove any easier. In fact, Sienna felt she was aware of the culture at her first company but was somewhat taken aback at the second company when her coworkers warned her about a supervisor whom employees openly described as racist:

> They was like, they all knew it, they was like oh yea, he's a bigot. They known that for I don't know how long. I was like this is crazy. I've never worked at a place where somebody would tell you somebody was a bigot and you allow them to train me and you know that. Wow. And the supervisors, some of them know it too. And they still allow him to train people. Why?

While Sienna's coworkers warned her about this person, the company did not protect her and, in fact, assigned this particular supervisor to train Sienna. The supervisor would not speak to her and after several weeks, the company fired Sienna. The human resources manager told Sienna that she was too slow in performing her job duties.

At Sienna's third and current manufacturing company, she began as a lead, which required her to perform some supervisory tasks as well as to know all of the machines in her area and have the ability to fill-in when necessary. Sienna thought she had found a

place that valued her skills and believed in the strength of a diverse workforce. Interestingly, Sienna had one situation at her new job that she believed was a result of being an African-American female. Sienna trained a new employee, a female African-American, who took liberty in thinking that she and Sienna had an unspoken connection. The young employee first wore jewelry on the floor and then took off her safety glasses. Sienna asked her, "Do you see me take my glasses off? No. Well, what do you think about that? You probably shouldn't take them off either." Sienna admonished her several times before the younger employee began to take Sienna seriously. Sienna explained,

> She's young. She thinks because I'm Black and I am a female and she is too, that we have [a connection]…you got the wrong person for that. I don't care. That has nothing to do with nothing personal. You just have to understand that this is a place of business.

The concept and praxis of intersectionality can be utilized in countless situations, but its origin is rooted in Crenshaw's (1989) recognition that efforts to dismantle racism and sexism were focused on Black men and White women but not Black women. Sienna's experience illustrated the challenges of being a Black woman working in the White, male world of manufacturing. All the informants from the Women in Manufacturing program reported various challenges as women working on the production floor, but Sienna's experience was different due to her identity as a Black woman.

8.4 Representing All Women, Shifting Standards, and Shop Floor Masculinity

Whereas the women found working with their hands a source of pride and knowing how to fix things satisfying, they simultaneously felt pressure to perform job tasks perfectly as representatives of all women. Several women reported feeling like they had to be better than most of the men with whom they worked to earn respect from those same men. Samantha felt strongly about her role as one of very few women on the manufacturing floor: "I really feel that I've had to earn respect there. It's not something that's given that it may be to another guy. I double check and triple check just to be sure because I don't want them to complain about it [her work]." Samantha believed that if she made a mistake, the blame would be on the fact that she is a woman rather than a coworker who simply erred. The women expressed their initial feelings of inadequacy and intimidation both in the classroom and the workplace as they began the program. Once they began learning new skills, the women began to gain confidence and even look forward to learning more and more. Their thirst for mastering new skills and new tools was not always met with mutual enthusiasm at their workplaces.

In most new jobs a certain amount of on-the-job training and mentoring is expected from seasoned workers who are asked by managers to assist new hires acclimating to their new position. Manufacturing certainly is an environment that requires such tutelage from experienced workers, but companies vary widely in how they orchestrate this download of knowledge and skills. Sometimes, formal assignments are made to connect mentor and mentee, but most frequently these relationships are informally encouraged and loosely organized. I shared in a previous chapter Tanya's story about her coworkers wanting to lift heavy items for her and her telling them she

could take care of her own work. Tanya noted that the same coworkers found it suspicious that she wanted to learn new things beyond her basic job duties. Male coworkers in Tanya's company were inclined to keep her dependent on them.

Sienna's experience at the first manufacturing company where she worked also had its complexities when it came to working as a team. Sienna's male coworkers did not offer to assist her with lifting, yet they routinely helped one another. Sienna described the manufacturing environment as physically demanding and her coworkers as "good ol' boys":

A lot of the men kind of have that old guard mentality and they are lazy. They will stand there and watch you lift heavy stuff and just look at you. Won't offer to help, you know. And it's heavy. That stuff is heavy. You are probably lifting between 50 and 70 pounds. They help each other but not the women. No, we kinda helped each other like certain ones. Some of the other ones would get the easy job because they would buddy up with the supervisor and they kinda liked them. So, they would play around with the system a little bit. So, they don't have to get the jobs that are a lot harder on you. You run into that too. I don't always think that's fair.

With coworkers who were unwilling to offer assistance with things that were routinely accomplished in pairs, Sienna knew not to expect much assistance with learning her new job. Sienna thought that her male workers chose to ignore and exclude her due to her skin color and gender. White men on the shop floor used tactics that excluded women and people of color from workplace meetings or discussions. These exclusionary practices were often difficult to document, and they perpetuated inequalities

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(Acker, 2006). Shop floor masculinity is a way for workers not only to maintain the status quo of a male-dominated culture, but also it is a way to push back against the power structure of management: "Shop floor masculinity can be performed when manual workers display a willingness to swear and be dismissive of women, white-collar workers and managers" (Alcadipani & Tonelli, 2014, p. 323). Work-related skill, seniority, knowledge, and strength demonstrate masculinity on the shop floor. Additionally, production workers on the floor tended to emphasize the value of masculine shop floor work over office work, or white-collar work, that could be characterized as not masculine (Alcadipani & Tonelli, 2014).

Informants also discussed their experiences with shifting standards on the production floor. Sienna, Tanya, and Elizabeth reported that they were treated differently, and from their perspective held to a much higher standard than the status quo standards of the men. As explained above, Sienna felt that she was not only held to a higher standard, but also Sienna believed she was being watched more closely than the men on the floor. Women also reported being treated differently by supervisors. During a group interview with Tanya and Samantha, Tanya described a specific incident where she and a male co-worker were not held to the same standard. Tanya started by saying that her male coworker was present each day but only put in one day's worth of labor. "I'm serious. He might work one day a week."

Samantha agreed, "Yeah."

"I mean really do something one day a week. Most of the time, every time I look at him, he's standing around talking, or on his cellphone, or in the bathroom, or out on a smoke break. Then Trent comes up to me the other day. I was, we were joking about

him. I said, 'Does anybody know where Donny is? Does anybody know where Donny is?' You know that song, 'Does anybody really know what time it is?'"

"Yeah," I said, acknowledging that I knew the song.

"I was singing that. 'Does anybody really know where Donny is? Does anybody really care?' Because nobody says anything to him, I mean," Tanya said.

"Yeah," Samantha agreed.

Tanya went on, "I mean, even Jeff will say it, 'I guess he's in the bathroom again.' But then he won't say anything to him."

"Oh, yeah. They're a bunch of push-overs," Samantha said, referring to the supervisors.

"And then one kid didn't know what the song was, so I just, I'm never on my phone unless I'm using it for a calculator. I got my phone out and I was looking up the song, and Trent came over to me, and mind you, I built 22 turrets last month in three weeks," Tanya said.

"Wow!" Samantha said.

Tanya continued, "And he says, 'You use your phone for, save your phone for lunchtime.'"

"Wow." Samantha said with surprise.

"I said, 'Are you kidding me?'" Tanya said.

"What did he say back?" I asked.

"Nothing," Tanya said.

"Is he a supervisor?" I asked.

"Yeah," Tanya said snorting an incredulous laugh.

"He's a joke," added Samantha.

The manufacturing culture is a microcosm of the patriarchal culture that permeates society at-large and perpetuates double standards for men and women. Donny, the worker who was consistently absent from his work area to be on his cell phone, in the bathroom, or on a smoke break, was not confronted about his behavior – at least not in a way that forced him to change his behavior. When Trent, the supervisor, saw Tanya with her phone out while on the job, he immediately reprimanded her. In contrast, Trent ignored the behavior of Tanya's coworker, Donny.

8.5 Women's Agency in a Patriarchal Work Environment

Patriarchy is pervasive in American culture but often times goes unnoticed; however, the impact on women's lives, particularly their financial opportunities, can be profound (Enloe, 2017; Isaacs, 2002). The patriarchic setting of manufacturing inhibits the agency of women due to the structural and social imbalance of power that forces women to perform job duties in ways that male superiors and co-workers approve. Like the larger culture of the United States in which manufacturing companies in this study are situated, the patriarchal culture of manufacturing privileges the voices, opinions, and methods of men. Women's agency and subsequently women's economic potential can be greatly diminished in a patriarchic workplace that provides no space for a feminist perspective and yet supports and rewards the stereotyped performativity of idealized femininity. Women's agency may also be diminished by limited options through preconceived notions of appropriate and acceptable behaviors for women on the shop floor (Powell et al., 2009). Women carried out the tasks of their work under the watchful gaze of their male coworkers and supervisors. In nontraditional occupations like

manufacturing, men sometimes viewed women as either "honorary men" or "flawed women" (Powell et al., 2009, p. 412).

Informants shared examples of men not offering to help a woman in the same situation that they would help another man. Informants also share examples of men wanting to do their female co-worker's job for her rather than teaching women the necessary skills to be self-sufficient. These two paradoxical options given by men to women on the manufacturing floor indicated that men wanted to maintain the status quo by controlling their female coworkers. In the examples below, women were provided only one way to interact and perform – the way in which men approved. Tanya's coworkers wanted to complete her work for her and became suspicious when she wanted to learn skills and gain a broader understanding of the work beyond her specific job. The men working with Tanya wanted her to be dependent on her male coworkers to lift heavy objects. In contrast, Sienna's male coworkers ignored her when heavy lifting was part of her work. Whereas the men would help other men with heavy lifting, they ignored Sienna when it came time for her to lift. From Sienna's perspective, the message from the White men on the floor was, "You don't belong here, and we don't want you here." Tanya and Samantha both talked about a workplace culture where male production workers on the manufacturing floor would purposefully increase the time to completion of an assigned task. The goal would be to push management into approving overtime since the task was not completed within the 40-hour work week. Tanya estimated that the majority of workers spent half of their day, 4 hours, standing around and talking. I asked them about supervisors overseeing the work, and Samantha said most of the production workers do not respect their leads. Tanya said workers say, "We've got to

make this last. We've got to make this last half the day. We'll make this last until three o'clock, so we don't have to do anything else." Samantha nodded her head in confirmation of Tanya's description. I asked how many people participated in this strategy, and Samantha said six or seven workers out of every ten. Tanya added mockingly, "Let's not do anything all week, so we can work Saturday and get overtime."

Samantha and Tanya did not participate in the work slow-down and did not provide any insight as to whether the few other women on the floor participated. The hegemonic masculinity of the shop floor was a strategy to maintain the status quo by creating peer pressure on coworkers to undermine management (Alcadipani & Tonelli, 2014). In this particular case, the men on the shop floor wanted the women to exercise agency in response to management, but once again the men had a narrow definition of how they wanted the women to act.

Samantha and Tanya also discussed the lack of women in management at their company. Five women, in addition to Tanya and Samantha who were apprentices, worked on the production floor, and none of the women were even leads, much less supervisors. I asked Tanya and Samantha if any of the women could be in management, and Samantha immediately declared her interest in moving up in the company: "I want to be. I would like to be, but I don't know if that will ever happen, because of how outspoken I am, and how I wouldn't be okay with just dealing with the problems there. I would want things to be fixed." I was curious why Samantha felt she was too outspoken for a management position, so I asked what she meant.

"Why didn't so-and-so do their job? That's 90% of it," she said. Samantha added that her feedback was not welcomed and was certainly not encouraged. She also believed

that some men were in management who should not be. I asked Samantha if she thought managers lacked the technical skills or the managerial skills, and she thought they lacked both skill sets. Tanya added that even the women who had been with the company for many years had not reached the status of a lead. Tanya noted that after all those years of working for the company, the women who had been there only had seniority over herself and Samantha. Tanya speculated on why the company had not promoted women: "I'll tell you why there are no women in the supervisor position, it's because we're not yes people but these men that are in the supervisor position are, 'Whatever you want me to do I'll do.'"

I asked for clarification, "To management?"

"Yeah. They don't challenge the management, they don't take up for the people underneath of them," Tanya answered.

Samantha added, "Yeah, but that and there's still a lot of old school men there who, 'I'm not going to listen to what a woman has to say.'"

Tanya and Samantha were not the only Women in Manufacturing students who noticed the lack of women in leadership positions in their manufacturing companies. After describing her experiences at her first manufacturing company, Sienna added, "That's the thing. You never see women in management there." Sienna went on: "There is none. They are all men. My friend tried to put in for it, but they try and tell you that you don't have enough skill or you know make up something."

"So, they don't even let you get as far as applying for a different position internally? They tell you right up front that you are not qualified?" I asked.

"Yeah. And these are people who have been there for over 10 years. And you tell me that they are not qualified?" Sienna asked rhetorically.

The patriarchy of manufacturing maintains the power structure and would have female workers believe that they are simply not as qualified as their male coworkers for any leadership positions. By discouraging women to even apply for lead or supervisory positions, the coworkers and supervisors of the women send the message that women are not capable. This message reinforces other signals sent by the men to the women on the manufacturing floor: Women need to be helped; women need to be ignored; and, women need to be disciplined (e.g., "Put your cell phone away."). The "success" of the manufacturing patriarchy is due to its pervasiveness. Since there are so few women in manufacturing, they often question and doubt their own experiences as individuals and have few opportunities to share their experiences with one another and see the patriarchy from the perspective of a collective group of women. The social connection with other women who are experiencing similar circumstances has the potential to create collective agency "through shared beliefs in the power to produce effects by collective action" (Bandura, 2000, p. 75). Collective agency is one of three forms of agency identified in social cognitive theory along with personal and proxy being the other two forms (Bandura, 2000). Self-efficacy, a person's belief about her ability to bring about desired outcomes through her actions, is a cornerstone of human agency:

> Perceived efficacy plays a key role in human functioning because it affects behavior not only directly, but by its impact on other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perception of impediments and opportunities in the social environment. (Bandura, 2000, p. 75)

The Women in Manufacturing provided some opportunity for women to share experiences with one another, but the program was not enough for women to form an agentic coalition once they were on the production floor in such low numbers.

8.6 Policies and Practices

Some of the women had care-taking responsibilities for dependents and found that workplace policies and practices were barriers to working in manufacturing while trying to fulfill their duties as care-takers. As early as the pilot study, women identified the rigid cadence of the manufacturing workday as an obstacle. Early in the pilot study, a human resources person visited the group of women in the Women in Manufacturing program to discuss hiring practices and workplace policies. She shared the wage schedule based on employment time and performance, first day benefits including health insurance, and the attendance policy. The manufacturing person explained that the probation period was 90 days and an absence during the probation period typically resulted in termination. The women in the class were visibly surprised by the rigid policy and began asking questions about a sick child or a missed wake-up alarm. The HR woman responded, "Anything short of hospitalization of the employee or the death of a close relative will result in termination." This was difficult for the women to process, and they continued to ask questions: "What if someone is just two or three minutes late?" The HR woman quickly answered, "Late is late – 7:01 is the same as 7:15." For some of the women, this rigidity was intimidating and off-putting.

While some apprenticeship companies paid for their apprentices' entire applied associate degree, other apprenticeship companies only paid for technical classes within the manufacturing major. Also, once the apprentice completed the technical classes, she

was subject to working overtime. Samantha said, "I'll be finished with the apprenticeship after this semester, but I've still got my science, public speaking, and business classes to take. I'll finish those after probably working 50 hours a week." Samantha added, "He [a coworker] finished the apprenticeship, and they wouldn't let him stay in it to take those classes. They kicked him out of the apprenticeship. They said, 'You're done. You finished our requirements.'" The apprentices still benefited from having part of their degree funded, but the company benefited from the apprentices as well. Typically, apprentices signed an agreement with their companies to work for a certain period of time, usually around three additional years upon the completion of the required coursework. If apprentices chose to leave before completing the terms of their agreement, most companies required them to payback all the tuition cost to the company.

Janie worked at a small, light manufacturing company where the pay was relatively low but the smallness was seen as an asset by employees. As mentioned previously, Janie was able to adjust her work day, so she could take her grandchildren to school when her daughter was working. Janie attributed that flexibility to the size of her company and the involvement of company management. Janie commented, "I guess because it's smaller and [the company president] is right there, and you do feel more loyalty, whereas in big corporations, so many of them are now, everybody's just a number. You're just a number. So, these companies don't feel like they owe you. I don't want to say, 'Owe you anything,' but your loyalty and dedication mean nothing to them anymore. You're expendable." Janie's perspective was also informed by her job loss at the warehousing company where she previously worked. Janie had traded in a higher wage for flexibility and a more worker-friendly environment at a small company.

While Janie landed in manufacturing due to her previous job ending, Sienna had chosen manufacturing. Sienna's first foray into manufacturing was through a temporary staffing agency. Some of the larger manufacturers have adopted the use of temporary staffing companies to fill in gaps in their workforce. Many unskilled employees enter into manufacturing jobs through temp agencies, filling 8% to 10% of all production jobs in manufacturing (Nicholson, 2015). The temporary workers make a lower hourly wage and are not eligible for benefits provided by the company for full-time employees. Sienna, like many others in the same situation, believed the company misled temporary employees by promising full-time employment if the temp employee had good attendance and good work habits. Sienna stayed in this cycle for two years: "They want to keep everyone temporary. At the end of your cycle they just bring in the new group. And that's like oh, so I went through that for about 2 years before I landed the job at [a manufacturing company]."

While the policies and practices that I have discussed thus far have posed challenges for the women, Title IX supported Sarah, a single mom taking care of a son with special needs. A part of the Education Amendments of 1972, Title IX states, "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance" (U.S. Department of Education). This includes the nondiscriminatory treatment of parenting students. Sarah brought up Title IX when I asked her how she dealt with the rigid deadlines and class meetings of college along with the demands of parenting a child with special needs, some of which could be life threatening. Sarah said that at the beginning of a course she notifies the instructor

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immediately about her potential need to exercise her Title IX rights. Sarah also talked

about the necessity of keeping her phone within reach at all times: "And this, I will put it

on silent, but I cannot put it away." I asked Sarah how she became aware of the Title IX.

She said at first, she would just explain her situation to her professors, and they would

work with her when she needed to miss class. When Sarah approached her English

professor, the professor asked her if she was aware of Title IX. Sarah said yes but asked

the professor how Title IX could help her as a college student. The professor explained

to Sarah that any absences related to her son could not be held against her. Sarah met

with the college's Title IX coordinator to learn about the process, which required her to

notify the Title IX coordinator in addition to her instructors each time she need to

exercise her rights.

8.7 Women's Ways of Working

As often is the case in a patriarchy, the male way of doing things is the default –

the male modus operandi is normal, right, or better. All else is other, different, wrong,

and less than. Manufacturing has historically been a bastion of maleness, and it

continues to be just that. In the previous section, "Patriarchy in Manufacturing," I

discuss how a patriarchy limits women's ability to exercise agency and share the

women's stories that exemplify this point. In those particular stories, I provided

instances when women were simply trying to do the work in the same way as their male

coworkers – lifting heavy objects, using a cell phone, talking to coworkers on the

production floor, learning new skills – yet, the women suffered negative consequences.

In this section, I share examples that go beyond the women simply replicating the work

methods of their male coworkers. The women asserted that they had ways of working that were different from, and they would say superior to, the men's ways of working.

Once women in the program began working in manufacturing companies, they started forming opinions about their experiences and observations with their coworkers and supervisors. As the women progressed and gained more work experience, they became critical of the status quo maintained by the patriarchal order that privileged the voices and the ways of working of White males at all levels in the companies. The women gained confidence, both in their skills and knowledge of the work, and they began to question efficiency of operations and fair treatment of all employees. The women's experiences in the manufacturing workplace led them to recognize differences in the ways they worked in contrast to the ways their male counterparts worked. Three themes emerged in the data representing the women's ways of working:

The women expressed ownership in their work and wanted it to matter and contribute to the larger goals of the company.

The women believed their style of problem solving and collaborating could benefit the company and their male coworkers.

The women informally asserted their leadership to foster a culture of inclusiveness and teamwork, yet they knew their companies would not formally elevate them to a leadership position.

The women in the study often expressed a sense of ownership in their work. Many of them began their manufacturing program with doubt in their ability to learn new skills, much less use those skills in a manufacturing job. Mastery of the work was important to the women, and they were confounded when they encountered male

coworkers who purposefully underperformed. The women also wanted their work to matter and to contribute to the larger goals of the company as they readily embraced the team concept that is pervasive in manufacturing. Yet, the culture on the manufacturing floor did not always support the women. As discussed above, Tanya and Samantha described men in the company who prolonged tasks and stalled completion for the sake of creating the need for overtime. Tanya talked about how the men could not, and possibly would not, keep up with her: "I'm up there by myself. I got three machines going at one time. I see the same thing on each one, and they still can't keep up with me." Tanya continued to say that she worked hard but that her supervisors did not appreciate or acknowledge her effort: "They [supervisors/management] don't give a shit. They'll come right over, if the guys, one of the guys are working alongside me, they'll come over and say, 'How's it going?' I looked at him one day and I said, 'What am I? Chopped liver?'" While Tanya's example may sound inconsequential, it is this type of subversive behavior by her supervisor that allows micro inequities to grow and add up to alienating women by making it clear that they are not valued – not even worthy of acknowledgement. Once Tanya called out the supervisor with the "chopped liver" question, he stammered: "Oh, oh, yeah, Tanya. How's it going?" She said to the supervisor, "I'm the one training him how to do it." Despite her supervisor's silence toward her leadership, Tanya discussed with joy her willingness to mentor and teach newer apprentices, both male and female.

Tanya and Samantha pondered how their company managed to profit with employees sabotaging timelines while supervisors ignored production and quality issues. Tanya said, "I just, I don't know how they stay in business." Samantha agreed, "I don't

either. Honestly, I don't." I asked why they felt the way they did, and Tanya replied,

"Waste of resources. Product. Waste of time putting things together, and then have to

tear them back apart, and put them together again, and tear them back apart. Just a waste

of man hours." I asked Tanya, "Why do you think it's that way?" Tanya fired back,

"Because they're men, and they think they know it all." Samantha added, "They don't

know how to make a schedule." Both Samantha and Tanya agreed that quality was an

ongoing issue with the CNC machines manufactured by their company. Samantha said,

"Oh, yeah. We've had a couple, quite a few machines in the last year come back, and

we've sent them brand new machines for free with updated controls and programs." A

CNC machine can cost hundreds of thousands of dollars.

 While Tanya pointing at her male coworkers may oversimplify the issues around

production and quality, most women discussed their enjoyment of collaborating with

coworkers to solve problems. All of the women believed their communication and

collaboration could improve processes and products on the manufacturing floor. As

Tanya explained, processes may span across four or five departments before completion.

Samantha talked about some of her male counterparts who were not willing to own

mistakes: "And they're too stubborn to admit that, 'Oh, yeah, we didn't do this right.'

It's, 'Oh, well, so-and-so didn't do that. It's this person's fault.'" Tanya added, "Then

ship it without all these parts, and then they put the sheet metal on, and then they take the

sheet metal off and put the parts back on, because nobody communicated that it doesn't

have them parts. It's a joke." Despite the frustration, Samantha and Tanya enjoyed the

challenge of working in manufacturing. Samantha liked how the work set her apart from

other women who had more traditional jobs:

Other women just don't understand it. They don't know what it's like. They work in offices and hospitals. You have to come up, what's the word I'm looking for? Creative solutions. You have to think all day. How am I going to fix this? How am I going to go about that? What's the best process to get this done in the fastest amount of time? You know.

Tanya added, "It's fun to be a problem-solver."

In addition to Tanya and Samantha, Faith welcomed the challenges of problem-solving on the manufacturing floor. Faith also contrasted the women's collaboration and positive attitude with men who quickly grew frustrated. I first heard Faith make this comparison while she was participating in a panel discussion. In an interview with Faith, I asked her to elaborate on her comment.

"I thought it was really interesting that you made the comment that guys typically become angered if they can't solve a problem and that women tend to collaborate. Can you talk a little bit more about that?" I asked.

"Well it's just like, they just get mad and they go get their boss and they want to get it recut. But whenever I ran into a problem, I would always go ask somebody else to come check it, make sure I just wasn't doing something wrong. And if they couldn't do it, we'd usually go ask our lead man or whatever. And then, at that point, if it's no good to him, then we go and get the supervisors, and then we go and get the other department that needs to fix it."

Faith continued describing the contrast in work styles. "But it's like the drop of the hat, it doesn't work for them, they don't start to think about the ways they could fix it.

Maybe they're doing something wrong, they should go ask somebody else to help them. It's like, nope, it's wrong. We gotta get the whole thing recut. That sort of thing."

Sienna also talked about her enthusiasm for problem-solving and how those skills evolved in the manufacturing labs at the college: "Yeh, I surprised my own self but a lot of that is taking that class with that robot and we had to go in and fix that thing every day. They [the instructor] would jack it up, and we had to figure out how to do it." Sienna went on to say that at her current manufacturing job, the training is similar for employees to learn troubleshooting and repairing. Sienna said she pays attention to how things run and how things work. Each employee must complete the training and testing at her company within certain time limits: "First, you gotta identify what the problem is and then you have to fix it and then get it back to the home station. Then, they stop timing you." I asked her if she liked the testing and problem-solving. Sienna said, "Yeh, that's the thing. I really, really like it. I think that's the best part. It's a challenge, and I love a challenge. There's something that I can't figure out, I'll figure it out after a while. It'll take me a little bit, but I'll figure it out."

The women believed their style of problem-solving and collaborating, in addition to other skills, made them excellent candidates for leadership positions on the manufacturing production floor; however, their companies did not see it that way. In addition to embracing problem-solving, the women described themselves as open to collaborating with coworkers even when that meant being vulnerable to criticism. The women were less about receiving credit or assigning blame and more about the satisfaction of solving the problem. They recognized their integrity and openness as valuable leadership skills. Despite being overlooked, the women informally asserted

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their leadership to foster a culture of inclusiveness and teamwork. All of the women commented on the lack of female leadership at their companies, and their belief that women in leadership positions would serve manufacturing well. As mentioned in a previous section, Samantha and Tanya were surprised at the lack of women in management at their particular employer. Samantha remarked, "There's not one woman in management there. Except for HR, but that doesn't really count." Samantha added, "They're [HR] people organizers, not machine organizers." Some women argued that many male supervisors lacked the technical skills and the managerial skills to be in a leadership position.

CHAPTER 9: CONCLUSION

To bring this study full circle, I will revisit the research questions and why these questions matter. In summary, I wanted to know what motivated some community college women to begin a manufacturing program, how their experiences in college and manufacturing influenced their choices about education and careers, and how to understand the women's lived experiences in the theoretical context of intersectionality and agency. These questions matter because women who attend community colleges and enroll in traditionally female programs fare no better financially than their counterparts who simply graduate from high school. Nontraditional careers for women, like those in manufacturing, often provide a livable wage sooner in an employee's tenure than traditionally female careers. While I initially thought the questions mattered primarily because of the financial implications, I learned through the research that the women's experiences in college and manufacturing were transformational regardless of their decision to continue with the work.

The informants for this research were women who participated in the Women in Manufacturing program, which was created to recruit, train, place, and support any woman who entered one of six manufacturing programs at a Midwestern community college. I collected data from informants in three different phases. A list of the informants and the phase(s) in which they participated are listed in Table 1 (p. 56). I began collecting data during the Phase One pilot study in the fall of 2013 through the summer of 2014. I continued to gather data during Phase Two from fall 2014 through fall 2016. Finally, I collected data during Phase Three in spring and summer of 2017. Phase Three was the formal data collection for the dissertation and included two

interviews that I conducted with each informant as well as one group interview. Some of the women whom I interviewed began the Women in Manufacturing program as early as January 2014. Due to this relatively long-term opportunity to work with the women in the program, I had additional data from Phases One and Two leading up to the formal interviews in 2017. This data included individual and group interviews, field trips to tour manufacturing companies, classroom observations, journal entries written by the women, periodic conversations with the women as well as with their instructors and academic advisors. I coded the data during Phases One and Two by using the initial codes developed in Phase One and then expanding them as I continued to gather data.

I conducted a thematic narrative analysis, which focused on what was said during interviews with the informants (Riessman, 2008). After completion of the interviews, I transcribed the audio recordings and began thematically coding the transcripts. As themes emerged, the data were disassembled and reassembled through several iterations for analysis. I used intersectionality and agency as a conceptual framework to gain insight into how the male-dominated manufacturing environment attempted to control and regulate the women under the watchful eye of their coworkers and supervisors. Despite the stifling gaze of their male coworkers, the women exercised agency and pushed back the dominant culture by finding their own ways of working.

9.1 Findings

The data generated in qualitative research has the ability to tell the story a researcher anticipates and also has the potential to tell a story a researcher is not expecting. The data generated from the interviews with the women tells a complex story about women pursuing an education and a career in manufacturing. I have worked on

and off with women in nontraditional programs over the last 30 years, and I anticipated some of the story, but I encountered several surprises that challenged my own thinking about the value of nontraditional careers for women. The women all came to the program because they needed money; they needed a *good job* where they could make *good money*. They progressed through various stages of education, work, apprenticeships, more work, and more classes while keeping the financial goal front and center. The women came to the program for the money, and the ones who persevered left with newfound confidence and a strong sense of agency.

9.1.1 The Women in Manufacturing Program

Without the Women in Manufacturing program, most of the women would not have considered attending college, and they certainly would not have considered a manufacturing program and subsequent job. Shortly after the program began, the program staff learned that providing a one-hour information session did not come close to familiarizing women with the world of manufacturing and the pathway from college to a career. After all, the college was asking women, most of whom were first-generation college students, to enroll in college for the purpose of landing a job in manufacturing – two tasks that were quite unfamiliar to the women. All the women shared in their interviews that the program was the reason they were able to persevere through the ongoing challenges and sometimes frequent setbacks. The women believed they would not have succeeded in college or in the manufacturing environment without the program. They cited three things that the Women in Manufacturing program provided: peer support, career coaching, and academic opportunity. The women cited their female peers, both those in class as well as those at work, as lending a great amount of support

to them. Some of the women also mentioned certain individuals, particularly two of the older women, as having influence on all of them as they moved through the program. Peer support was vital as women gained confidence in their abilities and supported one another (Bandura, 2000). The women believed the coaching from the Women in Manufacturing staff was also a valuable support provided for them. The program assisted the women in numerous ways such as finding financial support for childcare, connecting with academic tutors, accessing additional resources in the community, and offering emotional support by listening to the women's stories. Finally, the women agreed that the opportunity to attend college was life-changing, and the women knew their success would inspire their children and grandchildren to complete a college credential (Adair, 2001; Lucey et al., 2003). The women reported initially feeling intimidated and doubtful of their abilities to meet the challenges of college. However, as their doubts faded when they began experiencing success, the women discovered a new sense of confidence that they had never felt prior to attending college.

While I reiterated the importance of providing criticism about the program, the women were animated and emotional when they vehemently insisted that the Women in Manufacturing program's support was vital. This sentiment was true even for women such as Sarah and Faith who changed college programs and planned to seek employment outside of manufacturing. However, I do not have data to represent the experience and perspective of women who dropped out and stopped communicating. During the interviews, I pushed back by citing others who had helped them, including children, parents, and friends, who supported them during their journey; however, the women believed the assistance and support provided by the Women in Manufacturing program

was different. The women cited the staff's knowledge and guidance about both academic and non-academic barriers as key factors in assisting them as they navigated the challenges presented by the manufacturing classes and work environment. Sometimes, program staff were simply listening to the women's doubts, fears, excitement, or satisfaction. Even the women who eventually left the program described the support as instrumental in assisting them when they began thinking about a different college program and career.

9.1.2 The Transformative Power of a College Education

Women learned the technical skills they needed to be successful on the manufacturing floor, but more importantly they became aware of their ability to be lifelong learners and decision makers. In Janie's first interview, she laughed when she recounted how she enrolled in college. I was curious why the memory made her laugh, and then Janie reminded me that she had not anticipated "signing up for college." In fact, her WIOA case manager and a college admission staff member completed all the online forms while Janie sat watching them rather passively. Janie contended that she would never have enrolled on her own because she did not think she could be successful. Despite her misgivings in the beginning, Janie not only excelled in the classroom, but she also thrived on learning new things. She discovered that she was good at math, and she liked working with her hands. Consistent with the other women in the program, Janie identified attending college and earning a college degree as the most satisfying and impactful part of the entire experience. The women said earning a college degree had given them a newfound confidence and sense of accomplishment that positively affected their overall self-worth (Bettie, 2006; Luttrell, 1997; Skeggs, 1997; Weis, 2004). Their

growing confidence was evident as they began making decisions, questioning authority, and creating a life fashioned by their own vision. The cyclical experience of struggling, learning, and succeeding increased the women's confidence and self-efficacy. Subsequently, the women began exercising agency more often both in their personal lives and their work lives (May, 2015).

9.1.3 Exercising Agency in a Patriarchal Work Environment

The manufacturing floor is a microcosm of patriarchal culture in the United States (Enloe, 2017). The physical space for the production work has been, and still is, created by men for men. The strict patriarchy of the production floor was alien to the women as they struggled to navigate the invisible, gendered maze. The women discussed their experiences with the informal rules and hierarchy, or pecking order, that was obvious to the men but nebulous to outsiders, including all new employees (Isaacs, 2002). Assimilation for men usually included some sort of hazing, joking, or nicknaming, ultimately culminating in submission and acceptance into the informal hierarchy. The path to assimilation for women was not as evident.

As the women tried to connect and fit-in with their male coworkers, they often found themselves in the midst of two extreme situations: male coworkers who wanted to do the work for women on the floor, or male coworkers who simply ignored women and excluded them from team-oriented tasks (two men teaming up to lift a heavy object instead of using the mechanical lift). Using a mechanical lift to move heavy objects was a viable option, but it was far more time consuming than just two workers lifting together. This example may seem petty or insignificant, but using the lift required more time resulting in lower productivity. The women faced some tough choices between the

two extremes of being rescued or being ignored. In both cases, the women were subjected to the normative boundaries of how to perform their job duties under the gaze of their male coworkers. Trying to fit within either scenario would mean the women were either incapable or unworthy – incapable of doing their jobs or unworthy of being part of the production team. Despite these narrow parameters of prescriptive, acceptable female performativity, the women exercised agency by creating their own ways of working (May, 2015).

9.1.4 Women's Ways of Working

Shortly after the Women in Manufacturing program began, the women discussed how they worked differently than their male coworkers. This data first surfaced during a panel discussion when one woman contrasted how she and her female coworkers approached problem-solving. According to the women on the panel, they solved problems in a collaborative and patient manner, a style that contrasted with that of their male peers. The women described the men as becoming frustrated easily and unwilling to ask a coworker for assistance. Other women on the panel began sharing similar examples of how they worked differently, and this was a reoccurring theme that surfaced during the interviews as well.

The women described themselves as better managers of time and more committed to completing their assigned tasks than their male peers on the production floor. Their work ethic and curiosity about learning new things were not received well by their male coworkers. For the men who did show interest in mentoring or teaching the women, they also met resistance from their male peers. As previously mentioned, the behavior of the women's male coworkers oftentimes fell into one of two categories, either rescuing a

woman or ignoring her. The men who chose to support their female coworkers by teaching, befriending, or mentoring sometimes found themselves being questioned or scrutinized by other men on the production floor.

In order to be successful in the manufacturing environment, the women had to assimilate to some degree with the existing environment while at the same time carve out a space to be themselves and to work in ways that made sense to them. Some of the women expressed confusion as to management touting teamwork and efficiency but not holding all production workers accountable. The women understood that the male ways of working were the default; the men had the privilege of setting the norm. Despite being seen as the "other," the women exercised agency and learned to assert some of their own ideas and ways of doing things. This was a balancing act between forging work relationships with the men on the production team yet maintaining their identity and their ways of working as women. The women believed that their ways of working, which were collaborative, expeditious, and inquisitive, were not only different than their male coworkers but also better. Throughout the interviews and discussions, the women made comments like: "If we ran the department, things would be different. We would get more done."

9.1.5 Exemplar Attributes for Women in Manufacturing Careers

Throughout the five years of research, I noticed that women who persevered in the nontraditional manufacturing environment possessed a shared combination of work experience and mindset; conversely, the women who did not persist through the program lacked some of those experiences. Overwhelmingly, but not surprisingly, women who had formal work experience were more likely to adapt to the rigid demands of the

manufacturing sector. Women who lacked work experience struggled to understand the strict attendance rules, the lack of flexibility in work schedules, and mandatory overtime. The women who persisted in the program and succeeded in the workplace also had some history of manual labor, either in a formal work environment or in their personal lives. These women anticipated the physical demands of standing on concrete all day, working long days, and lifting relatively heavy objects. Additionally, the women also knew how to be self-reliant and solve their problems on their own. Some of the women who had little to no work experience of any kind struggled to solve problems even in their personal lives, much less in a formal work environment (Adair, 2001; Adair, 2008).

The women in the program who succeeded in the workplace also had a mental and emotional toughness that enabled them to move past the patriarchal and often times misogynist manufacturing environment. Some women had developed their ability to absorb harsh conditions through personal experiences as well as work experiences. Most women were part of one if not several of the following demographics: single mother, widowed, divorced, bankrupt, recovering addict, displaced worker, disabled spouse, handicapped child, and domestic abuse. I would not say these life experiences made the women impervious to challenges in the manufacturing workplace, but the women certainly expressed a steeliness that had been hard won. This toughness was an underlying trait more commonly found in the older women. Their previous work experience coalesced with their newfound success in college and gave them confidence in their ability to do the work. These women learned to exercise agency on the production floor in order to complete their work in a way that made sense to them.

While I have not explicitly discussed the informants' experiences with sexual harassment as part of the mental and emotional toughness, I would be remiss not to share how the women, particularly those who demonstrated the exemplar attributes, talked about sexual harassment. During the course of the interviews, several women discussed unwanted attention from male coworkers, supervisors whose behavior ranged from ignoring them to harassing them, and hearing numerous inappropriate conversations and remarks. Despite these experiences, the women were quick to deny any such incidents having an effect on them. They were dismissive; one informant said, "I don't give a shit about that stuff. They can say what they want to say." I would argue that the patriarchy on the production floor is normalized to such a degree that misogyny, and even sexual harassment, are part of the status quo. The women did not deny its existence as much as they claimed immunity from it. Maybe that is what it takes for a woman to work in the manufacturing environment.

Listed below is a summary of the exemplar attributes for women who thrive in manufacturing work:

- Formal work experience
- Manual labor experience
- Self-reliant problem-solver
- Mental and emotional toughness
- Academic success
- Agency

The attributes listed above are ones that would serve a woman well in many sectors, nontraditional and traditional. However, for a woman to persist in a job in

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manufacturing, she needs most, if not all, of the experiences and traits that are listed. It may be useful to understand the characteristics of women who are successful in manufacturing, but it may be just as important to think about the women who do not share the attributes on the list. What if a woman is not armored with a certain mindset to endure the consequences of an unchecked patriarchy? This raises an important question: If a woman does not have the exemplar attributes, should she have to develop them in order to work in manufacturing?

9.2 Limitations and Future Research

Originally, in addition to the interviews, I planned to gather data through direct observation of the women on the manufacturing floor as part of this study. During the pilot study, I initially gathered data from direct observations; however, I became concerned that my presence could be problematic for the women. I discussed this with the women, and they were also concerned about the potential complications of my bringing unwanted attention to them. An additional limitation was losing contact with the women who completely dropped out of the program and the college. I wanted to stay connected with them; however, most of the women who left had somewhat transient lives and frequently changing contact information.

While I think four years was sufficient time for this initial research, a longitudinal study would yield additional data about the women's continued experiences in the manufacturing sector. Specifically, I would like to know the following about the women: if they continue to work in manufacturing; if they change manufacturing companies, and if so, why; if their wages increase at the same rate as their male co-workers; if any of them apply for supervisor positions, and if so, how did they fare; if

they are satisfied with their education and job in manufacturing; if they have regrets about their choices; and, how have their thoughts about manufacturing changed, or not changed, over time. I believe my current research can be used by manufacturers to improve the tenor of the manufacturing environment and the onboarding of new employees, particularly women. A longitudinal study would provide data to assist in retaining and promoting women in manufacturing jobs.

9.3 Programmatic Implications

The findings from this study are instructive and useful for future programs or initiatives whose aim is to increase the successful education and employment of women in nontraditional careers. Whereas the context for this study is manufacturing, the strategies to recruit, train, place, and support women are applicable to programs for women in other nontraditional sectors. This section provides suggestions based on the Women in Manufacturing program.

9.3.1 Exploring a Nontraditional Career

For women to consider nontraditional careers, they first need to know they exist. Initially, recruitment into the Women in Manufacturing program consisted of sharing electronic flyers via email with the founding women and their organizations and offering one-hour information sessions to potential students. The women's organizations included the Career Center, the community college, manufacturing companies, community-based organizations, and workforce development intermediaries. Neither effort was effective. The founding women and the program staff quickly learned they needed to build capacity for recruitment by educating case workers and outward-facing personnel at these organizations as well as additional entities. The program staff offered

one-hour professional development sessions to case workers, college advisors, employers, and others who interacted with women seeking jobs. Women in Manufacturing staff frequently provided the one-hour sessions to build capacity among partners who were visible in the community. The following list provides suggestions for how to engage community partners in workshops as well as what to present to workshop participants:

- Connect with institutions and organizations serving women and invite the organizations' employees to a workshop

- Provide training to caseworkers and others about the benefits and requirements for participants to be in the program

- Educate local community groups and workforce agencies about the benefits and challenges of nontraditional jobs for women

- Present wage and workforce data

- Address myths and stereotypes surrounding nontraditional careers

- Invite current program participants to speak about their experiences in the program or organize a panel discussion with program participants

- Organize a tour of a manufacturing company

All of the above topics typically would not fit into a one-hour workshop. Workshop organizers can determine which topics to cover depending on who is attending the session. Periodically, workshop sessions could be extended to two or three hours; however, the one-hour format workshops were better attended.

The workshops should be offered frequently because this grassroots education and recruitment effort takes time to become known to prospective partners and then for

attendees to learn about the program and to determine its value for their clients or students. Furthermore, program staff need opportunities to build relationships with these community partners who will want to connect their clients directly to someone at the college. In addition to inviting community partners focused on serving job seekers, the Women in Manufacturing staff began inviting employers to the one-hour sessions as well. The employers also learned about the college program, the benefits of hiring women into the manufacturing workforce, and the challenges posed by working on a predominantly male production floor. The opportunity for program staff to build relationships with employers is vital. The Women in Manufacturing program conducted additional workshops that targeted employers more than community partners. In this case, program staff would organize a panel discussion of representatives from other manufacturing companies who were engaged with the program and hiring women.

This section on exploring nontraditional careers began with the following statement: "For women to consider nontraditional careers, they first need to know they exist." The one-hour workshops were originally intended for potential participants; they evolved into an information session for people who had the connections with women who might be interested in manufacturing careers. The community partners who attended the one-hour workshops were the people who usually then recruited women to attend the full-day workshop. The Women in Manufacturing program staff replaced the one-hour workshop for prospective students with a full day of career exploration. The goal of the all-day workshop was to familiarize prospective students with all aspects of manufacturing, both positive and negative. The following list provides suggestions for what to present at workshops for prospective students:

- Educate women about the benefits and challenges of nontraditional jobs

- Provide information about types of manufacturing and related manufacturing jobs

- Describe education programs that lead to manufacturing jobs

- Explain stackable credentials with multiple entry and exit points

- Inform and explain options for funding including federal financial aid, apprenticeships, and employer tuition reimbursement

- Explain wage structures and timeline to achieve self-sufficient wages

- Share information about typical benefit packages

- Address myths and stereotypes surrounding nontraditional careers

- Invite current program participants to speak about their experiences in the program or organize a panel discussion with program participants

- Invite women who have worked in manufacturing for more than five years to discuss their experiences

- Provide a tour of one or two manufacturing companies

- Ask human resource managers for manufacturing companies to describe the types of jobs at their companies and the employees they are recruiting.

Another important part of the workshop was the experiential activity that required the women to use hand tools. The hands-on project varied but participants particularly liked building a small, battery-operated robotic arm. The activity was certainly not a manufacturing simulation, but the women liked working with tools, wiring the arm, and completing the project.

9.3.2 A Program of Support

The data from the interviews revealed the need for a specific program that provides support for women who are attending college in a nontraditional area. In this case, the program was not a particular major; instead, the program was for any women in any manufacturing certificate or degree program at the college. The support offered through the program was available to the women from the beginning. It included support for academic success as well as support for non-academic barriers. Academic support ranged from borrowing a laptop computer for the duration of the student's program to providing tutoring for general education and manufacturing courses. Examples of non-academic support included financial assistance for groceries, childcare, and transportation. A non-profit funder committed to improving the economic well-being of women through job training awarded a grant to the program for non-academic support. One crucial policy within the Women in Manufacturing program was the freedom of program administrators to use unrestricted grant funding to support the women. Amounts less than $100 were given to the women immediately in the form of gift cards for food, diapers, gas, and other small items. Financial support for childcare was paid directly to the childcare provider that was rated by a local nonprofit as a high-quality daycare. The willingness of the grantor to allow the Women in Manufacturing administrators to decide how the funding would be used to support the women was a major factor in keeping the women in the program.

In addition to the financial support of the women, the Women in Manufacturing program also assisted the women in creating a network of peers. The program organized events to connect the students to each other as well as to women who were currently

working in manufacturing on the production floor and to women in human resources who were recruiting. These small networking events were helpful to the students in numerous ways, but perhaps the best outcome was connecting the women to one another. The data from the interviews were clear that the peer support continued beyond the classroom into the workplace and personal lives of the women. Women reported meeting for breakfast or coffee, calling and texting to stay in touch, and tracking one another's progress. Students typically knew when someone was struggling in either the classroom or the workplace. The women's network grew in organic ways that transcended the program and created both professional and personal relationships that served the women in numerous ways. The networking aspect of the program is replicable and vital to the success of the women.

9.3.3 Case Management and Community-Based Partners

To launch a similar program to Women in Manufacturing, a case management model should also be considered. Incoming students initially met with a staff person who was trained to conduct an intake assessment to learn about the potential barriers facing a student. Some examples of self-reported barriers included financial issues, family life, learning differences, childcare needs, and transportation. The college was not able to meet all of the students' needs, so program staff forged relationships with community-based organizations and referred students to the appropriate partners who could mitigate the students' challenges. Women in Manufacturing staff periodically provided training for staff of community partners to educate them about the program and about manufacturing. Parts of this training included discussions about the myths and stereotypes surrounding nontraditional career pathways as well as the realities of

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nontraditional jobs. These relationships became a two-way conduit for the Women in Manufacturing staff to refer students to community-based support partners and for support partners to send women searching for a good job to the program.

9.3.4 Earning a College Credential

The opportunity to earn a college credential was paramount to the success of the program. Most of the women, particularly the older women, expressed doubt in their abilities when they initially enrolled in classes, but as they progressed from one class to the next, they gained confidence. In fact, they reported that their classroom success changed the way they saw themselves and their abilities both at work and at home. The women said that earning a college degree was the most impactful part of their experience. A non-credit training program could have prepared the women for certain jobs in manufacturing but earning a college degree was transformational. In addition to boosting confidence, a college degree provided lateral mobility in employment and upward mobility in earnings.

9.3.5 Conclusion of Programmatic Implications

This study about women and nontraditional careers was situated in the manufacturing sector; therefore, the examples of programmatic best practices were primarily in manufacturing. Regardless of the workforce sector, the key components to recruit, train, place, and support women in nontraditional careers are consistent across additional sectors:

- Recruiting strategies must include opportunities for women to explore nontraditional careers through immersive experiences

- Training programs must lead to a post-secondary credential that is both stackable and portable

- Support programs and related personnel must assist women in overcoming academic and non-academic barriers by utilizing a case management model

- Relationships among program personnel, community-based partners, and target sector employers must be established and cultivated

9.4 A Final Word

The founding women of the Women in Manufacturing program observed two problems in their community, and they identified one mutually beneficial solution. Manufacturing companies needed trained employees for production jobs that paid well. Unemployed and underemployed women needed *good jobs* that would pay well and provide benefits for their families. Women who enrolled in the program were willing to take a chance on themselves, the community college, and the companies for the potential financial payoff. Due to the women's self-reliance and the support of the program, many of the women completed training and landed a *good job* in manufacturing. The classroom and manufacturing labs prepared women for the job, but the women were not prepared for the sexism, racism, and ageism on the shop floor. The culture of the shop floor varied among companies; some got it right while others did not get it at all. Despite the barriers often created by male coworkers and supervisors, the women exercised agency by finding their own ways of working. Regardless of each woman's experience, none of the women who completed a college credential and landed a manufacturing job regretted her decision to pursue a career in manufacturing. The Women in Manufacturing program was not a panacea for women choosing a

nontraditional career, but it certainly increased the likelihood of women succeeding. The next step may very well be a complementary program that creates a shop floor culture that is conducive for all people to have a *good job*.

APPENDIX A: Demographics of Population

Women in Manufacturing Participants			
Total Number			77
	Ages		
		Youth (13-18)	6
		Adults (19-24)	13
		Adults (25-55)	52
		Mature (56+)	6
	Household Income		
		0-20,000	44
		20-30,000	27
		30-40,000	6
		40-50,000	
		50,000 +	
	Number Dependent Children		
		Ages 0-2	6
		Ages 3-5	7
		Ages 6-12	12
		Ages 13-17	12
	Highest Level of Education		
		8th Grade or Less	
		Some High School	
		High School Diploma/GED	50
		Some College	21
		College Degree	6
		Other	
	Ethnicity		
		Unknown/Unreported	
		African American/Black	12
		Asian/PAI	
		Hispanic/Latino	3
		Multi-ethnic	
		American Indian/AN	
		White	62

APPENDIX B: Training and Job Placement of Population

Women in Manufacturing Participants			
Total Number			77
	Training		
		Air Conditioning Technology	3
		Associate of Applied Science	2
		Computer Aided Drafting & Design	1
		Computerized Manufacturing & Machining	2
		Electrical Technology	3
		Enhanced Operator Certificate	16
		Manufacturing Engineering Technology	25
		Non-credential	20
		Supply Chain Management	3
		Welding Technology	2
	Employment		
		Employed in Manufacturing	33
		Employed in Non-sector	18
		Pursuing Education Full-time	9
		Disengaged/Lost Contact	17
	Wages		
		Average Wage at Placement	$12.00 hourly
		Average Wage at 180 Days Post-placement	$18.00 hourly

APPENDIX C: Guiding Questions for Pilot Study Interviews

1. Describe the types of jobs you have had. How did you learn about them? How did you choose these jobs? Have you worked in places that mostly employed women, men, or both genders?

2. What influenced your decision to enroll in the community college? What was it like for you to start college? What has been easy and what has been challenging?

3. In your short time at the community college, have you thought about any specific programs or careers that you might like?

4. What influenced you to participate in the manufacturing career exploration workshop? What influenced you to participate in the Women in Manufacturing program?

5. What do you want to learn by participating in the career exploration workshop? What do you want to learn by participating in the Women in Manufacturing program?

APPENDIX D: Phase One Pilot Data Inventory

Date	Data	Informant(s)	Topic
Oct. 18, Oct. 25, Nov. 1, Nov. 8, 2013	Journal prompts & responses	Workshop participants	Reflections on workshop activities
Nov. 8, 2013	Q&A dialogue; field notes; memo	Workshop participants & women working in manufacturing Q&A	Types of jobs & employer expectations in manufacturing
Nov. 15, 2013	Field notes from observations & conversation	Workshop participants	Camera assembly activity; hands-on learning
Nov. 15 – Nov. 20, 2013	Individual interviews; transcribed audio; memos	Bridget, Catherine, Hailey	Job history & thoughts on college & manufacturing
Nov. 22, 2013	Field observations of tour of manufacturing companies	Workshop participants	Manufacturing environment, hiring practices, employer expectations
Dec. 2013	Workshop write-ups from conversations	Workshop participants	Workshop
Jan. 29, 2014	Group interview; transcribed	Workshop Participants	Name of the program
Feb. 12, 2014	Field observation of speaker	HR representative & workshop participants	HR in manufacturing; expectations
April 16, 2014	Group interview; transcribed; memo	Women in Manufacturing students	Various
April 2014	Data write-up for two informants after conversation	Bridget, Janie	Women in Manufacturing program
July 16, 2014	Interview notes	Sienna	Pain points & positive points
2013-2014	Voice memos from conversations	Bridget, Hailey, Catherine, Tanya, Janie, Sienna	Various

APPENDIX E: Initial List of Codes from Pilot Study

LEG	Legal Issues – women with criminal background or family member with criminal background
AR	Academic Readiness – self-efficacy, experiences of adult learners
FAM	Family – family education history, family work history, parental influence, influences by children, siblings, partners, etc.
DEP	Dependents – children, adult children living at home, dependent parents, dependent partner
CC	Community College Culture – first-generation college, cultural capital, agency
EDU	Education – education history (GED, diploma, previous attempts at postsecondary), college academic readiness
SWH	Student Work History – previous work (formal and informal), previous career choices and interests, working with hands, knowledge of trades
SWR	Work Readiness – drug-free, absenteeism/tardiness, clothes and personal safety equipment, transportation plan
POL	Policy – College, classroom, work, support systems (WIOA, financial aide)
FIN	Financial Issues – homelessness, transportation, access to public benefits, current income, potential income, other benefits
NONAW	Nontraditional Work/Career Awareness and Exposure – female family and/or friends working in nontraditional areas such as manufacturing, role models in nontraditional jobs, exposure to nontraditional work in other sectors
NONCU	Nontraditional Culture in Program and Workplace – reality of workplace and classroom culture, support systems and/or barriers in these environments

APPENDIX F: Guiding Questions for Phase Three Interviews

1. Describe the types of jobs you have had. How did you choose these jobs? Have you worked in places that mostly employed women, men, or both genders?

2. Describe your experiences with education/schools?

3. How would you describe the education and work experiences of your parents or guardians and siblings?

4. How did your family support and/or not support your decision to enroll in college?

5. Have you had any mentors or role models in your life?

6. What influenced your decision to enroll at Gateway? What was it like for you to start college? What has been easy and what has been challenging?

7. What influenced you to enroll in the advanced manufacturing program?

8. What did you want to accomplish by enrolling in an advanced manufacturing program?

9. Have your experiences in manufacturing program changed these goals? If so, how?

10. Describe some of your experiences in your training program (in class, with advisors, at job training sites) and your job.

11. How has your family helped you since you enrolled in the manufacturing program? In what ways has your participation in this program been a challenge for your family?

12. Do you know other people who work in manufacturing? If so, have you discussed your current program with them, asked them for advice, compared experiences with them? Give examples.

13. How have the other women in the Raise the Floor program influenced you?

14. When you need to make a decision about your studies in the program or about work, whom do you ask for advice? Can you give an example of a situation when you needed advice since you enrolled in the advanced manufacturing program?

15. When things are challenging, what motivates you to persist in this career path?

16. What are the most challenging aspects of your job? Why?

17. How would you describe your ability to complete the tasks of your job? In what ways do you feel prepared and/or unprepared?

APPENDIX G: Phase Three Data Inventory

Date	Data	Informant(s)	Interview Time
Mar. 9, 2017	Audio recording of interview; transcript	Sienna 1	1:52:57
Mar. 13, 2017	Audio recording of interview; transcript	Tanya 1	1:05:21
Mar., 14, 2017	Audio recording of interview; transcript	Janie 1	1:27:13
April 25, 2017	Audio recording of interview; transcript	Samantha 1	1:06:38
April 26, 2017	Audio recording of interview; transcript	Faith 1	1:08:06
May 18, 2017	Audio recording of interview; transcript	Sarah 1	1:21:21
May 24, 2017	Audio recording of interview; transcript	Delores 1	1:15:16
June 2, 2017	Audio recording of interview; transcript; memo	Samantha, Tanya (Group)	1:28:30
June 8, 2017	Audio recording of interview; transcript	Sienna 2	2:30:19
June 12, 2017	Audio recording of interview; transcript	Samantha 2	1:11:17
June 21, 2017	Audio recording of interview; transcript	Faith 2	1:30:51
July 24, 2017	Audio recording of interview; transcript	Janie 2	42:24
August 3, 2017	Audio recording of interview; transcript	Tanya 2	58:45
August 8, 2017	Audio recording of interview; transcript	Sarah 2	1:20:14

Code System	Memo
Stress/Harassment	
Blue Collar Pride	
Family and Friendships	
Family Background	Parent education history, work history, support; siblings
Dependents	Children, adult children living at home, dependent parents, dependent partner
Friendships/Mentors	At school, at work, in general
Education History	Overall attitude about education, GED, diploma, previous attempts at postsecondary
Work History	Previous work (formal and informal), previous career choices and interests, working with hands, knowledge of trades
Nontraditional Awareness	Female family or friends working in nontrad jobs, role models in notrad, exposure to nontrad in other sectors
Manufacturing Decision	Why manufacturing, influences, thoughts, motivation
Women's Ways of Working	Collaborative, supportive
Nontrad Environment	Classroom, workplace, supports, barriers
Manufacturing Sector	Culture, physical environment, general realities (shift work, expectations of company)
Motivation	Persisting at college, at work; making it through the tough times
Financial	
Potential Earnings	Income, benefits in manufacturing
Financial Barriers	Homelessness, transportation, access to public benefits, current income
Retirement	
Policy/Work Practices	College, classroom, work, support systems (WIOA, financial aid)
College Impact	
College Experience	Experiences as young student and experiences as adult learners

APPENDIX I: Job Posting – Maintenance Technician Trainee

We are currently seeking candidates who are looking to develop a new skill or trade. Candidates should have working knowledge of manufacturing, mechanical aptitude, basic computer and communication skills. Background in repairing electrical or mechanical equipment would be a plus. Must have the desire to learn how to become a Maintenance Technician. Candidate will have a great attitude. After the completion of the training you will be placed on a permanent second (2) shift Maintenance Technician position. At this time you will continue to develop your skills as a Maintenance Technician. If interested please e-mail your resume.

Source: Company website

APPENDIX J: Program Description in College Catalog –
Industrial Maintenance Technology

A. Advanced Manufacturing Technician Track

Advanced Manufacturing requires demonstrating multiple skills and competencies. Students accepted into this program gain valuable workplace experience, working three (3) days in a manufacturing environment and two (2) days on campus in a manufacturing-based classroom. Critical conceptual components of the track include embedded Safety Culture, Workplace Organization (5S), Lean Manufacturing, Problem Solving and Maintenance Reliability, coupled with Personal Behavior development (Attendance, Communication, Diligence, Teamwork, Initiative, and Interpersonal Relations) within the program pathway. Successful students apply learned skills throughout the program in the campus classroom, campus laboratory and manufacturing workplace. The advanced manufacturing technician (AMT) track develops multiple skills within the industrial maintenance pathway for manufacturing employers.

B. Industrial Maintenance Track

An understanding of the requirements and opportunities in maintenance, good safety practices, pride in workmanship, and an understanding of the principles and accepted practices of the maintenance trade are covered in this program. Students are trained to hold positions in factories, hospitals, hotels, etc., where multi-skilled maintenance personnel are needed. Included are courses in air conditioning, carpentry, electricity, machine tool, metal fabrication, and welding.

Source: Community College Catalog 2018-2019

APPENDIX K: Job Posting – Machining Center Group Operator

Primary Responsibilities:

- Sets-up and operates CNC controlled machines to perform machining operations.
- Secures drawings, sets-up sketches and programs.
- Inserts specified preset cutting tools in rotary tool magazine
- Sets up piece making close measurements with precision tools such as blocks and indicators.
- Observes machining operation from beginning through initial stops after each machining operation. Verifies dimensions, using such tools as bore gauges and micrometers.
- Frequently operates machines manually determining changes in regard to operating more efficiently, improving speed, feeds and sets-up without aid of sketches.
- Maintains a clean and orderly work area including equipment and performs all assignments in a safe manner and accordance with established quality procedures.

Helpful Experience:

- High School Diploma with some years' experience as a machinist.
- CNC experience, preferably on Fanuc controls
- Computer and G&M code skills are a major plus
- Must be proficient with blue prints, measuring instruments and reading programs.
- Willingness to cross train and assist other work areas when needed. Individuals will be trained to run multiple work centers.

Source: Company website

APPENDIX L: Program Description in College Catalog –

Computerized Manufacturing and Machining

Work activities in machine shop involve applying knowledge of machine capabilities, the properties of materials, and shop practices to set-up and operate various machines. The skills needed to position work pieces, adjust machines, and verify the accuracy of machine functions and finish products are taught by classroom instruction, demonstration, and hands on experience.

S*ource: Community College Catalog 2018-2019*

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VITA

Carissa Bradley Schutzman

Education

Master of Arts in English and Education
Northern Kentucky University – 1995

Bachelor of Arts in English
Centre College – 1989

Professional Positions

Associate Vice President, Adult and Graduate Education
Thomas More University
2017-present

Vice President, Workforce Solutions
Gateway Community and Technical College
2015-2017

Dean, Workforce Solutions
Gateway Community and Technical College
2012-2015

Division Chair, Developmental Education and Orientation to College
Division Gateway Community and Technical College
2009-2012

Assistant Professor, Arts & Humanities Division
Gateway Community and Technical College
2009-2012

Freelance Writer and Photographer
2002-2008

Editor, Writer, and Adjunct Instructor
Northern Kentucky University/Women's Re-entryCenter
1998-2002

Editor, Writer, Project Director, Trainer
Northern Kentucky Technical College
1998-2002

Teacher, Curriculum Developer, Tech Prep/School-to-Work Coordinator
Kenton County Board of Education, Simon Kenton High School
1989-1999

Awards and Honors

2016 Spirit of Innovation Award – Gateway Enhanced Operator Team
2012 Gateway New Horizons Faculty Award
2012 Greater Cincinnati Consortium of Colleges and Universities Excellence in
     Teaching Award
Kenton County Schools Teacher of the Year
The Kentucky Post Golden Apple Award