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# The Sky's the Limit: Factors That Affect Females' Decisions to Become Professional Pilots

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# The Sky's the Limit: Factors That Affect Females' Decisions to Become Professional Pilots

## **Abstract**

Despite evidence of males and females having generally comparable abilities as pilots, very few women choose this career path. According to the Federal Aviation Administration database of aviators, approximately 7% of the total pilot population in the United States is female, and 5% of professional pilot ratings are held by women. These statistics have been consistent for several decades. The purpose of this qualitative phenomenological study was to gain a better understanding of why females decide to become professional pilots. Semi-structured interviews were conducted with 12 women who, at the time of this study, were employed or had been previously employed as professional pilots. Interviews with the participants revealed how they became interested in an aviation career and what factors played the most significant role in their decision-making process. Analysis of the data show that the participants became interested in flying for one of three reasons: influence of a role model, experience of a lived event, or a personal epiphany. These findings were then considered in a discussion of how to attract future women pilots. The information obtained from this study may contribute to an understanding of what factors are the most influential in the choice to enter aviation and how to increase the number of female pilots. Recommendations include increasing the number of role models and outreach events and educating girls about career possibilities in aviation.

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Professional Pilots

By

Debra Henneberry

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Supervised by

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## **Dedication**

Thank you to my dissertation committee, Dr. Josephine Moffett and Dr. Janice Girardi, for your patience and guidance in completing this journey.

My heartfelt thanks is extended to my fellow aviators who contributed their time and experience to my research, especially Dr. Penny Hamilton, Ms. Bonnie Tiburzi Caputo, and Ms. Linda Sollars. I am equally grateful for my colleagues at Vaughn College who helped with my study, including Dr. Peter Russo and Jo Ann Jayne.

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Most especially to my family, thank you for accompanying me through this achievement. You instilled in me a profound appreciation of education, which always inspires me to further myself. I share this accomplishment with you.

This study is dedicated to anyone who has ever been told they cannot do something.

## **Biographical Sketch**

Debra (Deb) Henneberry is a professional pilot and a flight instructor. She currently serves as Assistant Professor in the Aviation Department at Vaughn College of Aeronautics and Technology in New York City. As an undergraduate student, she attended the University of East Anglia in Norwich, United Kingdom, and graduated from Dickinson College, cum laude, with a Bachelor of Arts degree in History and Music in 1998. Prior to graduation, she was inducted into the Phi Alpha Theta honor society. She earned her Master of Arts degree in Mass Communications from the University of Leicester, United Kingdom, in 2000. Ms. Henneberry enrolled in St. John Fisher College's Ed.D. program in 2015. She was initiated into the Kappa Delta Pi honor society in 2017. Her research focused on the lack of female pilots. Under the guidance of Dr. Josephine Moffett and Dr. Janice Girardi, Ms. Henneberry completed her dissertation in 2018. Her Ed.D. degree was conferred the same year.

## **Abstract**

Despite evidence of males and females having generally comparable abilities as pilots, very few women choose this career path. According to the Federal Aviation Administration database of aviators, approximately 7% of the total pilot population in the United States is female, and 5% of professional pilot ratings are held by women. These statistics have been consistent for several decades.

The purpose of this qualitative phenomenological study was to gain a better understanding of why females decide to become professional pilots. Semi-structured interviews were conducted with 12 women who, at the time of this study, were employed or had been previously employed as professional pilots. Interviews with the participants revealed how they became interested in an aviation career and what factors played the most significant role in their decision-making process.

Analysis of the data show that the participants became interested in flying for one of three reasons: influence of a role model, experience of a lived event, or a personal epiphany. These findings were then considered in a discussion of how to attract future women pilots.

The information obtained from this study may contribute to an understanding of what factors are the most influential in the choice to enter aviation and how to increase the number of female pilots. Recommendations include increasing the number of role models and outreach events and educating girls about career possibilities in aviation.

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## **Chapter 1: Introduction**

Since the dawn of aviation, women have been largely absent from the cockpit. In 1912, Harriet Quimby, the first female licensed pilot in the United States, commented:

In my opinion, there is no reason why the aeroplane should not open up a fruitful occupation for women. I see no reason why they cannot realize handsome incomes by carrying passengers between adjacent towns, why they cannot derive incomes from parcel delivery, from taking photographs from above, or from conducting schools of flying. Any of these things it is now possible to do.

(Planck, 1942, p. 22)

Over a century later, Harriet Quimby's remark is still relevant. Global events have shaped an enduring image of the professional pilot. The outbreak of World War I transformed the public's awareness of aviation. Innovative tactical possibilities caused airplanes to be in high demand, as well as people who were proficient with this new machinery. The first substantial group of pilots were a byproduct of the war, and these men were willing to continue flying after peace was restored (Anderson, 2001).

Thus began a cycle whereby pilots retiring from the military would seek jobs in civilian aviation as a second career. These pilots were associated with their heroic and brave missions during their service. Commercial airlines used this image as part of their brand, and, soon, a professional pilot inexorably developed as a masculine character. Wartime experience and courage became a reassurance to passengers (Mills, 1998).

This trend continued throughout the 20<sup>th</sup> century until it became unsustainable. Changes in foreign policy and improvements in technology reduced the number of pilots trained by the military, diminishing the pipeline of talent to airlines and charter companies. The last sizeable number of military pilots are a product of the Vietnam and the Cold Wars (Anderson, 2001). Unfortunately, these aviators are now nearing the mandatory airline retirement age of 65, and there are not enough younger aviators to fill these vacancies. This demand for new pilots is further exacerbated by the continuous growth in the aviation industry (Boeing, 2018).

In 2018, Boeing released an industry forecast projecting that to meet increasing demands, 206,000 new pilots will be required in North America by the year 2037. Emerging markets, especially those recovering from the post-global economic crisis, in Asia Pacific, Europe, the Middle East, Latin America, Africa, and the Commonwealth of Independent States, will generate a need for another 584,000 pilots (Boeing, 2018). These regions often recruit pilots from the United States because of the advanced aeronautical infrastructure and training resources available here. Stated another way, a new pilot must be created every 14 minutes to keep up with the global demand.

Similar to Boeing's (2018) projections, aviation industry spokespersons have warned with increasing urgency that a shortage of professional pilots will occur if a robust generation of new aviators is not recruited. The October 2016 *Pilot Workforce and Training Update Issue Briefing* by the Regional Airline Association (RAA, 2016) states that regional airline service has already been reduced in hundreds of communities, and airline service has been suspended, altogether, in dozens of areas due to the pilot shortage. Regional airlines comprise a large percentage of overall airline operations in the

United States. For example, in 2016, regional airlines provided service to 95% of the airports in the United States, with scheduled passenger service representing 44% of all scheduled departures (RAA, 2016).

The pilot shortage issue has become so prevalent that it has grown from being a common topic at industry conferences and publications to a talking point in the mainstream media. An interview with aviation experts in a 2016 *Time Magazine* article revealed that the shortage experienced in the regional airlines may progress to the mainline airlines such as United, Delta, and American (Fitzpatrick, 2016). Mainline airlines typically replace their retiring pilots with senior pilots at smaller regional airlines, which often act as subcontractors for the mainline carriers. This practice cannot continue indefinitely if a substantial number of regional airline pilots are not available (Fitzpatrick, 2016).

Initiatives taken to address the pilot shortage have not yielded the desired outcome. The overall number of certificated pilots in the United States has stagnated since the latter part of the 20<sup>th</sup> century. Annual statistics released by the Federal Aviation Administration (FAA, 2017) report various demographics of pilot certificates issued in the United States. In just the past 10 years, there has been a net loss of approximately 4,500 pilots, with many of the losses representing pilots with professional ratings (FAA, 2017). At the same time, FAA data show fewer people commencing any level of flight training, either amateur or professional. During 2017, 28,699 fewer original pilot certificates were issued than in 2008, although some of this decrease can be attributed to a change in the FAA's issuance of student pilot certificates (FAA, 2017).

When analyzing the pilot population, the FAA provides separate statistics for male and female aviators. Using the numbers reported as of December 31, 2017, females represent approximately 7% of the total pilot population (FAA, 2017). This percentage has been steady since 1980 (Strand, 2014). Regarding pilots holding two professional ratings, the Commercial certificate and the Airline Transport Pilot (ATP) certificate, women represent just over 5% of that total population (FAA, 2017).

These numbers indicate that the talent pool of future pilots has not reached its potential magnitude and diversity. Harriet Quimby's observation in 1912, that women can and should become pilots, may hold some of the answers to the pilot shortage. Females need to be aware that flying is a career option—not only for their personal and professional fulfillment—but also because the aviation industry must significantly increase its supply of new pilots.

The male dominance of aviation stands out as a professional anomaly. During the second half of the 20<sup>th</sup> century, many highly specialized professions experienced an increase in the number of females (Strand, 2014). Women represented 3.7% of law school enrollment in 1963 and 47% of total enrollment in 2006. Females attending medical school made up 5.8% of the class size in 1960 and increased to 49% in 2005 (Hamilton, 2014).

Conversely, the number of female pilots does not correlate to these other occupations, which have been historically male dominated. The emergence of aviation happened at a time when women did not have the legal ability to vote or enjoy many of the civil rights that American society values deeply today. In this context, women would not be expected to embark on a career so closely associated with males and war. Yet,

after 100 years of social and cultural progress, females are still mostly absent from the cockpit. During the women's liberation and other civil rights movements of the 1960s, the number of female pilots in general aviation tripled from 9,966 to 29,472 (Novello & Youssef, 1974). When this era ended, the increase of women receded shortly thereafter, and the increase has not occurred again (FAA, 2017). The potential for women to become professional pilots has been overwhelmingly absent from popular culture.

### **Problem Statement**

Despite evidence of females being capable pilots, the FAA database of aviators demonstrates that very few women choose this career path. Research suggests that men and women have generally comparable abilities in flight training. A seminal study performed by the United States Air Force in 1979 showed few significant differences between males and females beginning and successfully completing Air Force Undergraduate Pilot Training (Kantor, Noble, Leisey, & McFarlane, 1979). Subsequent studies have been consistent with these findings (Walton & Politano, 2016).

Aviation is a male-dominated industry with a limited number of female role models. The lack of gender diversity among pilots perpetuates the absence of women from this career. In spite of a culture that tells children they can accomplish anything; gender stereotypes remain in place for certain occupations. For the relatively small number of women who choose to become pilots, they do so regardless of the fact that aviation is still being a nontraditional vocation for females (Gibbon, 2014).

There is little research that investigates the reasons why women become pilots. A few studies have examined this issue for the total population of pilots, and they have included a differentiation between male and female responses (Anderson, 2001;

Anderson & Pucel, 2003). Much of the prominent research of female pilots has discussed the barriers women have experienced during their flight training or in their flying careers (Ashcraft, 2005; Davey & Davidson, 2000; Hynes & Puckett, 2011; Mitchell, Kristovics, & Vermeulen, 2006). A handful of these studies have incorporated questions about factors that may have influenced females to commence flight training (Cristofich, 2014; Depperschmidt, 2008). Only a limited number of studies have suggested and examined recruitment techniques with the objective of introducing young girls to aviation (Germain & Hamilton, 2012; Gibbon, 2014).

Even if these proposed strategies have been effective, they have not been implemented with enough frequency, yet, to influence the percentage of females entering flight training—a number that appears to be stagnant. In 2007, females made up 9,559 of the 84,339 actively held student pilot certificates, or 11.3% (FAA, 2017). By the end of 2017, females represented 19,219 of the 149,121 actively held student pilot certificates, or 12.9% (FAA, 2017). Increasing the number of professional female pilots cannot be achieved without increasing the number of females who begin flight training.

The combined effects of mandatory retirement age in the airlines, the proliferation of regional airlines serving small markets, and the development of foreign markets have created an enormous demand for new pilots (Boeing, 2018). General initiatives aimed at growing the supply of pilots cannot be delayed much longer, as hopeful student pilots will need years to earn their degree, obtain their pilot ratings, and build experience by logging flight hours. This is relevant for both males and females who are considering a career in aviation (RAA, 2016).

This study focused on women whose careers included professional piloting. They knowingly chose a career that is not aligned with traditional female employment. These participants offered insight regarding the factors that attracted them to an aviation career. Information gained from this study may be used to understand what dynamics are the most influential when females consider becoming a pilot.

### **Theoretical Rationale**

This study incorporated two theoretical rationales that are related to the lack of female pilots, Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory. Both theories explore the process by which children and young adults resolve what career possibilities are an appropriate fit for their demographic. While each theory focuses on different elements of this complex decision-making process, both offer insight regarding the importance of career selection being consistent with perceived gender-appropriate behavior. This phenomenon may influence a female's choice to become, or not to become, a pilot.

Gottfredson's (2002) theory of circumscription, compromise, and self-creation most closely informs this investigation of female pilots. Gottfredson's theory addresses why people from similar backgrounds make different career choices. The theory also examines why some individuals do not choose a career path that is consistent with their sense of self (Gottfredson, 2002).

According to Gottfredson (2002), adults and adolescents share a cognitive map of occupations, which differentiate careers by masculinity/femininity, prestige, and field of work. Humans start developing these maps in early childhood, but the maps change with cognitive development as the individual approaches adulthood. When the time comes to

choose a field of employment, individuals consider the compatibility of vocations. It is very rare that a job will be compatible with all of an individual's characteristics, but people desire finding the closest match possible. Gottfredson (2002) believed that job seekers will highly value the perceived masculinity/femininity of an occupation.

Social role theory is consistent with Gottfredson's (2002) theory in its postulation that assignment of gender roles is an integral part of socialization. One of the essential concepts of social role theory is that most behaviors are rooted in the observations of daily life. When a disproportionate number of people from one group are seen engaging in a type of behavior or occupation, an overall stereotype is created that is then generalized to the entire demographic. Social role theory emphasizes that these observations are taking place in the most mundane and rudimentary situations, which may result in strong correlations being formed. These stereotypes can refer to a number of demographics including age, ethnicity, social status, disability, and gender (Koenig & Eagly, 2014).

### **Statement of Purpose**

The purpose of this qualitative phenomenological study was to gain a better understanding of why females decide to become professional pilots. The population studied were females who had worked as professional pilots during at least one phase of their careers. Interviews with the participants revealed how they became interested in a flying career. Research on this topic is insubstantial, and the information gathered can be further used to increase the number of female pilots.

Gottfredson (2002) highlighted the importance of matching jobs with a person's unique characteristics. When people are in jobs that are not well matched to their

personality, self-actualization will not be obtained and potential will not be fulfilled (Gottfredson, 2002). With so few females becoming pilots, one implication is that not all individuals who have the discipline, desire, and motivation that is needed to become a professional pilot are actually pursuing this career. It might be possible that women who are in the larger population of non-aviators may not attain self-actualization because they have disregarded a career that is suited to their character.

Furthermore, if the pilot shortage comes to fruition as predicted, transportation and its associated economies will be drastically affected (FAA, 2017). Since the military is no longer producing an adequate number of skilled pilots, the aviation industry is forced to look elsewhere for employees. Suitable pilots can be found outside the military in general aviation, but they are no longer in sufficient numbers. Women are an untapped source of future aviators who could alleviate this shortage. In order to increase the number of female pilots, women must first be aware that piloting is a viable career option for them.

In order to restore the pipeline of future pilots to the aviation industry, the first step is to ensure there are people considering entering the pipeline (Turney & Maxant, 2004). The hope is that this study will contribute to an understanding of why women decide to become pilots and what factors are most influential in the process. This information can be used to inform all sectors of the aviation industry about measures that can be taken to increase the number of female pilots.

### **Research Questions**

As part of this study, the reasons that motivated females to pursue flight training with the intention of becoming professional pilots were explored. Interviews were

conducted with female pilots who had a commercial rating or higher and whose careers included professional flying. Female pilots, who have less than a commercial rating and therefore cannot fly legally for compensation, were not considered for this study because this research is aligned with career choice. The participants' flight ratings were verified through the FAA's (2017) online database of pilots.

For this study, the participants came from different segments of aviation. Airline pilots, banner towing pilots, military pilots, and corporate pilots all qualified as potential subjects. These participants offered insight into their decision-making process of becoming a pilot.

Based on an extensive literature review, the following research questions guided this study:

1. What factors influence women to become pilots?
2. What strategies can be used to improve the recruitment of female pilots?

### **Potential Significance of the Study**

This study contributes to the limited amount of research that exists regarding women and their lack of participation in aviation. Only a scarce number of researchers have written about this topic, and much of their work is at least 15 years old. There are tremendous gaps in the literature concerning female pilots, and the hope is that this study will fill part of the gap.

This study will be significant to various stakeholders in many ways. First, it discloses the reasons why a group of women chose to pursue a career as a pilot. The reasons are ranked in terms of their effect on the decision-making process, and the most influential factors are identified. Second, this information can be used to inform young

women who are unsure if an aviation career is a good match for them. The results of this study can be shared with guidance counselors, college recruiters, and other people who help adolescents plan for their future. Third, the results of this study may contribute to the recruitment of female pilots, which can help grow the stagnating pilot population. Human resource departments at airlines, charter operations, cargo companies, and any other enterprise involved with the hiring of pilots may benefit from this study. Lastly, the results of this study may help other disciplines that are also seeking to increase the number of females working in their field. In particular, the science, technology, engineering, and math (STEM) domains have been attempting for some time to increase female involvement (Ma, 2011). Aviation is considered a STEM subject area. The results of this study may apply to other fields, such as the physical sciences, engineering, and computer science, which are still experiencing low numbers of female participants.

### **Definition of Terms**

The definitions specific to this study are listed below.

*Aviatrix* – a female pilot.

*STEM* – an acronym for the study fields of sciences, technology, engineering, and mathematics.

*Troposphere* – the lowest region of the atmosphere, extending from the earth's surface to a height of about 3.7-6.2 miles.

### **Chapter Summary**

At a time when the aviation industry is experiencing enormous growth and demand for pilots, females are pursuing flight training in disproportionately low numbers. This is in stark contrast to other professions that have undergone a proliferation of female

participants over recent decades. In spite of attempts to increase the number of professional female pilots, FAA (2017) records indicate that even the number of student pilot certificates being issued to women is only marginally improving.

In order to investigate this problem further, this study includes a literature review that examines the personalities and abilities of female pilots, the presence of women in other technical disciplines, the effects of role models and mentors, and the recruitment strategies for attracting more women to aviation. This information is framed by Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory, and they help to explain why more young females do not consider a piloting career. The literature provided the researcher with background information for this study.

This work encompasses five chapters. Chapter 2 is a review of literature pertaining to female pilots. Chapter 3 explains the research methodology. Chapter 4 presents the data collected and results of this study, and Chapter 5 offers the implications of this research and suggestions for the aviation industry and future research.

## **Chapter 2: Review of the Literature**

### **Introduction and Purpose**

The FAA's database, ending December 31, 2017, shows that females represent 5% of the professional pilots and 12.9% of the student pilots in the United States. While these numbers reflect that some women do not move on to more advanced levels of flying, they also demonstrate that a significantly lower number of females are considering piloting as a career—or even as a hobby. For the number of professional women pilots to increase, more females must enter the pipeline as student pilots (Gibbon, 2014).

The absence of females from the cockpit and strategies to increase the number of women pilots must be explored (Gibbon, 2014). This literature review investigates the problem of lack of female pilots in the workforce from different, but related, aspects. These include talent management; Gottfredson's (2002) theory of circumscription, compromise, and self-creation; Eagly's (1987) social role theory; gender identity role in education and career choice; the effects of role models and mentors; aviation faculty; and outreach initiatives. Each of these themes are better explored for the lack of female pilots to be better understood.

### **Review of the Literature**

**Talent management.** In a discussion of occupational gender equity, Heppner (2012) asserted that allowing males and females to engage fully in society through the pursuit of meaningful employment is the clearest means to achieve the mission of social justice. While this in itself is a worthwhile cause, for many developing industries, suitable

talent in sufficient numbers must be identified to fill employment demands (Heppner, 2012). Aging workforces worldwide, compounded by increasing job vacancies, demand that untapped talent sources be examined (Heppner, 2012). Females remain one of these chronically underrepresented groups (Heppner, 2012).

The lack of female pilots does not appear to be attributable to women's inability to fly. Rather, it is a talent-management issue (Gibbon, 2014). Research suggests that there is such a thing as a "pilot personality," and it is found in both males and females (King, Callister, Retslaff, & McGlohn, 1997). King et al. (1997) stated that this personality is not the mythical "right stuff," which is great for Hollywood, but not for science. In fact, in modern-day United States Air Force missions, as well as in civilian aviation operations, desired personality traits are aligned with sound decision-making processes, good communication abilities, and solid interpersonal skills (FAA, 1991). The FAA contends that both male and female pilots are capable of learning these good habits, and that either gender is capable of the same bad habits. For example, when describing one of the pilot pitfalls of a macho hazardous attitude, the FAA stated, "while this pattern is thought to be a male characteristic, women are equally susceptible" (FAA, 1991, p. 11).

When comparing the performance of men and women, both during and after flight training, the general aviation accident statistics provide telling information (Bazargan & Guzhva, 2011). The majority of aircraft accidents happen under general aviation operations and for a wide variety of reasons, which is useful for learning more about male and female proficiency (Bazargan & Guzhva, 2011). The National Transportation Safety Board (NTSB) provides a database of information on these accidents, which is available

to the public. Many researchers, along with the FAA, analyze this data to investigate why these accidents happen and how they can be prevented from happening again.

In a 2011 study, Bazargan and Guzhva compared general aviation accidents that took place between the years 1983-1992 and 1993-2002. The accidents were separated according to demographic information about the pilot, such as gender, age, and experience. After performing chi-square tests on the data, the researchers found that for all levels of experience, females had a much smaller chance than their male counterparts of having a fatal accident (Bazargan & Guzhva, 2011). This is most likely because accidents involving female pilots typically occur due to mishandling of the aircraft (Mitchell et al., 2006). Male pilot-induced accidents are usually the result of inattention and flawed decision making, which is often at the root of more serious events (Mitchell et al., 2006). These studies suggest that in terms of safety and ability, females have earned their seat in the cockpit. FAA (2017) statistics indicate that women may not be aware the seat is available to them.

**Circumscription, compromise, and self-creation.** Gottfredson's (2002) theory of circumscription, compromise, and self-creation describes the evolution of career choice not as a process of selection but, rather, as a process of elimination. Children gain a better understanding of self as they mature. The earliest concepts they can identify relate to size, strength, and power. Abstract and complex elements, such as gender and social class, are added later. Gottfredson (2002) contended that as components are incorporated into the formation of self-identity, beliefs are created about career compatibility.

The circumscription component of Gottfredson's (2002) theory explains how children begin eliminating various career possibilities based on their perception of themselves and their social environment. Although young children have only the most basic understanding of these concepts, they are already perceiving what types of work would be suitable for them. Children will eliminate certain careers according to their limited understanding of social norms (Gottfredson, 2002). These decisions often have permanent consequences, given that a child is very unlikely to consider the originally eliminated careers again, even after further cognitive development has taken place. A very specific prompting may have to occur for the child to reconsider an already rejected possibility (Gottfredson, 2005).

Gottfredson (2002) described four stages of circumscription that affect the development of self-image and occupational aspirations. Stage 1 takes place between the ages of 3 and 5 years. Children in this stage categorize people according to size and power. Cognitive development is not advanced enough to understand gender-related roles. Young children can ascertain differences in appearances and behaviors between genders, and they will often prefer to play with same-sex peers (Gottfredson, 2002).

Alignment with gender roles does not begin until Stage 2, from ages 6 to 8 years. Children view gender on a visual and simple level, such as the clothing people wear. Children will start eliminating potential careers upon reaching this nascent understanding. This age group is typified by rigid thought and belief that their own gender is superior. Sex-appropriate behavior is essential at this cognitive stage, and children are strongly influenced by this rationale when considering their adult selves (Gottfredson, 2005).

Stage 3, which takes place between ages 9 and 13 years, is when children become aware of social evaluation (Gottfredson, 2005). These children are very close to adults in how they evaluate careers. Gender considerations are still present, but they are now accompanied by judgments based on status, income, education, and prestige. Children in this stage will not explore careers outside of what they have already chosen as being appropriate for themselves (Gottfredson, 2005).

Stage 4, which occurs at age 14 years and older, is a culmination of the first three stages (Gottfredson, 2005). These individuals are capable of processing complex ideas, such as personality, values, and needs. Their consideration of career possibilities are already limited to those they found acceptable when they were in Stages 2 and 3. Stage 4 behavior will further confine which vocations are most preferred according to the individual's private and public sense of self. Gottfredson (2002) called this a "progressive elimination of options."

As children advance through the stages of circumscription, they continuously rule out career options based on their current stage of development. Once an occupation is ruled out because of a perceived mismatch of gender, class, or ability, the individual is not likely to reconsider that job again (Gottfredson, 2002). This elimination is a one-way process. The only circumstance under which a previously eliminated career option will be reconsidered is if an individual has a change in his or her environment or a new life experience (Gottfredson, 2002). If the event is that significant, it will prompt the individual to reflect on previously dismissed options.

Although elimination is generally irreversible, Gottfredson (2002) made an important distinction about the reasons why a vocation is deemed unsuitable. A job is

most likely not to be reconsidered if it is of little interest. A career is less likely to be reevaluated if its perceived level of prestige is lower than desired, and it is least likely to be chosen if it is the wrong sex type. Of the occupational mismatches, gender is the greatest perceived threat to self-concept. Women appear to be more willing than men to perform cross-sex-typed work (Gottfredson, 2002).

During the compromise process of Gottfredson's (2002) theory, young individuals select among careers they have considered as possibilities for themselves. In many instances, the most preferred alternatives will have to be relinquished for less preferred, but more feasible or accessible, choices. If the individual weighs the options among relatively comparable alternatives, Gottfredson (2005) considered this a career choice. When the only options available are those that are minimally acceptable to the individual, Gottfredson (2005) labels this career compromise.

Gottfredson (2005) offered several reasons why compromise takes place with countless young people. Information is often not readily available about the preferred alternatives. Details, such as how to access training programs, may be time consuming to ascertain, especially if a trusted source, such as a friend, family member, or mentor, is not already somewhat familiar with this information. The time and effort that must be invested to learn about entryways into new careers can result in an individual not looking beyond his or her social circle to discover fresh possibilities (Gottfredson, 2005).

Furthermore, certain professions do not exist in particular geographic locations or they have not been accessible to groups of individuals due to other extenuating circumstances. A complete offering of potential careers is not available to all people. At the same time, if a person has the freedom to search for a job that suits her interests, she

must have the motivation and energy to seek it out. Individuals do not expand their options when they are merely passive consumers of information. When career choices are limited in this way, there are fewer alternatives to elect from and a greater likelihood that a vocational decision will be compromised (Gottfredson, 2005).

The process of self-creation expands upon this point. Gottfredson (2005) stressed that humans are not passive observers of their own development. As children mature, they choose activities consistent with their genetic inclinations. While engaging in their surrounding atmosphere, individuals have unique experiences as they evoke responses from those around them. Consequently, one's environment is a function of both nature and nurture. As children engage in these environments, they develop personality traits and gain insights into their preferences. These experiences should improve their decision-making abilities and ultimately build toward self-creation (Gottfredson, 2005).

**Social role theory.** Eagly's (1987) social role theory was built upon concepts from an extensive group of disciplines. These subjects include correspondent inference, behavioral confirmation, status construction, gender identity, and self-regulatory processes (Eagly & Wood, 2012). Social role theory also appreciates how changes in technology and demographics have impacted society, and it notes how women's social and professional activities have changed over time (Eagly, 1987).

According to social role theory, in addition to various biological processes, gender behavior derives from sociocultural factors of identity and expectations (Eagly & Wood, 2012). These expectations are observed most immediately by family and employment roles held by men and women in society. Traits are inferred from these observations. Another possible inference is that social interactions are overall more likely

to be smooth if one does not strongly deviate from an already established gender role (Eagly & Wood, 2012).

Young children begin developing these beliefs while observing the behavior of individuals around them, and these assumptions are elaborated on throughout adolescence (Eagly & Wood, 2012). Behavior that is indirectly observed through the media can also be highly influential in the development of stereotypes (Koenig & Eagly, 2014). This psychology is not necessarily fixed, as it can be altered by interactions with individuals from different backgrounds. (Eagly & Wood, 2012). An impressive encounter with an individual can be more persuasive than a perceived social stereotype (Koenig & Eagly, 2014).

In a given society, gender roles are a shared construct. Social role theory assumes that behavior consistent with these roles is more likely to be rewarded, and men and women will seek out these incentives (Eagly & Wood, 2012). Compliant behavior results in social approval. Nonconformity with accepted gender roles can cause judgmental or negative reactions in the public and professional realms (Eagly & Wood, 2012).

At the same time, individuals can vary in the extent that their self-concept incorporates cultural gender roles. Individuals may deviate from the established norm if they recognize that the benefits of new rewards and opportunities outweigh the apparent costs. As members of the perceived subordinate gender, women may have access to previously unavailable prospects by deviating from a traditional role (Eagly & Wood, 2012). Following this, women may choose to express their self-concept of gender outside of their employment. For example, while working in a traditionally male-dominated

occupation, a woman could channel her feminine traits in the home (Eagly & Wood, 2012).

Building on the social role theory, in 1999, Cejka and Eagly performed a quantitative study on gender-stereotypic attitudes and their effects on segregation of employment. Cejka and Eagly (1999) tested whether these beliefs affected success, prestige, and earnings, and if so, to what extent. Participants were shown a total of 80 different occupations, ranging from male-dominated to female-dominated types of employment. One of the occupations was airline pilot. Participants used a 5-point Likert-type scale to rate the importance of six gender-stereotypic dimensions and the likelihood the male or female had those attributes. The six dimensions were masculine physical, feminine physical, masculine personality, feminine personality, masculine cognitive, and feminine cognitive (Cejka & Eagly, 1999).

For occupations that were seen as male dominated, the participants ranked success as being determined primarily by male cognitive characteristics, followed, respectively, by female cognitive, masculine personality, masculine physical, feminine personality, and feminine female qualities. Throughout the study, physical characteristics were largely associated with sex distribution of work but, to a lesser extent, with occupational success. Cejka and Eagly (1999) noted that this perception implied that their participants assumed a degree of congruence between the gender of the employee and the occupation, which could result in segregation.

In certain disciplines, the professional role can be more highly regarded than the gender role. In a job that has specific rules that determine performance, gender roles are relegated to a lower level of influence (Eagly & Wood, 2012). Aviation safety relies on

following specific rules and procedures. In this circumstance, the more discretionary behaviors would be more affected by gender roles. As the number of women increase in nontraditional education and employment roles, male and female attributes may converge (Eagly & Wood, 2012). This leaves open the possibility that piloting does not have to be defined as a masculine vocation and the social construct can be changed.

**Gender identity role in education and career choice.** Many of the dynamics of Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory can be applied in an examination of the absence of women in STEM areas. This discussion can provide a broader understanding of the lack of female pilots. Many of the STEM subjects, particularly those not related to life sciences, have a low number of female participants (Ma, 2011). Granted, these numbers are not as low as the number of female pilots, but a discrepancy is clearly present.

According to the 2016 science and engineering indicators listed on the National Science Board (NSB) website, a disproportionately low number of females have been earning degrees in computer sciences, engineering, and the physical sciences. Women earn the overall majority of bachelor's degrees awarded in the United States, and yet they represent 17.9% of computer science degrees, 19.3% of engineering degrees, and 39% of the physical science degrees (NSB, 2016). This data provided by the NSB show that these statistics have been relatively constant since 2000, with the exception of computer sciences. In 2000, women earned 28% of computer science undergraduate degrees—over 10% more than they do at the time of this publication (NSB, 2016).

Correll's 2004 examination of gender, status, and emerging career aspirations agrees with Gottfredson's (2002) theory of circumscription, compromise, and self-

creation regarding gender segregation commencing in childhood, substantially before an individual chooses an undergraduate major. In Correll's research on gender and the career-choice process, she measured differences in levels of performance that occurred after male and female subjects are told they were naturally superior with a particular skill. Correll (2004) posited that cultural expectations, both explicit and implicit, are responsible for students enrolling in high school classes and activities that are more closely aligned with their impending career choice. The result of this phenomenon is that gender segregation in career choices appears to happen naturally, and it is not necessarily due to any tangible discrimination in hiring practices (Correll, 2004).

Ma (2011) agreed with Correll (2004), especially regarding high school classes, where a message is sent to females that math ability is a masculine trait. Math experience prior to college may be a significant deciding factor in whether females choose STEM majors. Ma studied gender differences in high school achievement, attitude, and course taking. Her findings suggest that females may have very little interest in STEM by the end of high school. When this is the case, men are three times more likely to declare a STEM major in college (Ma, 2011).

According to Eagly's (1987) social role theory, females may unknowingly contribute to this segregation, and the cause of the cycle may be more social than academic. Humans desire a sense of belonging. When their acceptance into a group is uncertain, a person may decide to avoid the group altogether. Chen and Moons (2015) argued that social acceptance is a fundamental form of motivation. Their study focused on how women responded to a brochure from an MBA program based on how many females were pictured in the literature. A quantitative assessment showed that women

were less likely to enroll in an academic program when female students were not depicted in the advertising materials. They found that role models, or at least the potential of role models, was essential for recruitment (Chen and Moons, 2015).

Chen and Moons (2015) suggested that a lack of belonging to a group may cause women to believe they will have less interpersonal power in that setting and will attempt to avoid the situation. Low interpersonal power implies that a woman does not think she will be able to influence those around her and affect any change in her workplace. When someone anticipates low interpersonal power in her career, she will seek a more comfortable environment.

Chen and Moons (2015) described the incoming female STEM employees as a leaky pipeline. Problems exist not only in getting people into the pipeline but ensuring that they come out the other end. While not all female students finish a degree in a STEM subject, Chen and Moons contended that women are just as persistent as men when they are planning on majoring in a STEM area. Interestingly, after declaring their major, women are even more persistent in their studies than men (Chen & Moons, 2015).

The theories put forth by Chen and Moons (2015) underscore the relevance of Gottfredson's (2002) theory. Bringing women into the pipeline is the most challenging element of integrating females into traditionally male occupations. In their conceptual paper on combating gendered perceptions of careers, Bourne and Özbilgin (2008) pointed out that gender relations can be found in every element of an individual's public, personal, and professional identities. The ubiquitous role gender plays in one's personal construct makes it an integral part of work and life experiences (Bourne & Özbilgin, 2008).

Although constructs can be strong, they are also constantly in motion. Bourne and Özbilgin (2008) offered three strategies for using construct psychology as a method of counteracting negative gender perceptions of certain professions. First, individuals should be exposed to varied experiences and contexts, which are essential for building self-esteem. Second, career repertoires should be extended, allowing people to challenge their constructs and improve their creativity. Third, career counseling should include many options in vocational settings. Individuals with high cognitive complexity are more likely to choose a career that suits their personality, regardless of perceived gender stereotypes (Bourne & Özbilgin, 2008).

**Role models and mentors.** The psychological importance of role models dates back to Sigmund Freud (1933), who argued that the superego is created through strong identification with others and by profound assimilation of parts of other's personalities (Freud, 1933). In effect, role models can be composites created from multiple actual sources. Gibson (2004) defined a role model as a "cognitive construction based on the attributes of people in social roles an individual perceives to be similar to him or herself to some extent and desires to increase perceived similarity by emulating those traits" (Gibson, 2004, p. 136). Individuals select their own role models and choose the extent to which they will emulate the qualities of those role models (Gibson, 2004).

The choice and impact of role models is noteworthy. Quimby and DeSantis (2006) performed multiple regression analyses of 368 female undergraduates to determine the influence of self-efficacy and role modeling as predictors of career selection among Holland's six occupational typologies: realistic, investigative, artistic, social, enterprising, and conventional (RIASEC). The research suggests that role

modeling accounted for a significant contribution to the prediction of career choice for all six typologies. As a result, Quimby and DeSantis (2006) recommend increasing female students' exposure to role models from a variety of careers.

Gibson (2004) observed that a role model does not have to be someone who is encountered in real life. The *charismatic* model is one who is admired from afar. If the models have extraordinary accomplishments to their credit, they may be assigned a status similar to a cultural deity (Gibson, 2004). At the same time, a study by Stout, Dasgupta, Hunsinger, and McManus (2011) measured women's identification with same-sex experts from their own academic discipline. Some participants were instructed to read biographies about the same-sex experts, while others interacted with same-sex peer experts, or they were taught by same-sex professors. One of the findings of the study shows that reading biographies was the least effective of these three treatments for increasing students' identification with the subject matter. Stout et al. (2011) believed this occurred because learning about experts in the field is not as psychologically powerful as interacting with the individuals.

Lockwood and Kunda (1997) also studied the effectiveness of role models. Participants in their research were undergraduate students who were given information about either outstanding teachers, outstanding graduates of their program, or outstanding fellow students. Self-views, such as enhancement, inspiration, and deflation, were measured after the treatments. Lockwood and Kunda suggested that the ideal role model should be someone who is older and at a more advanced career level. The role model, they stated, must also be relevant. The accomplishments of the role model must be

attainable by the target individual who wishes to emulate this success (Lockwood & Kunda, 1997).

Females often have fewer same-sex role models, particularly in STEM-related disciplines. Gibson (2004) cautioned that the use of male role models may result in lower-quality information for females. The use of a different sex role model requires the additional cognitive step of translating one role-model behavior into a different, better-matched, role-model behavior. The result is that a different sex role model may not have the same effectiveness as a same-sex role model (Gibson, 2004).

Stout et al. (2011) supported this observation. In their study of contact with same-sex experts, they found that female students' self-concept was protected through personal contact with their role models. They also suggested that interaction with same-sex role models decreased participants' negative stereotypes about their group, without creating a distance between the individual female participants and their overall female group. Working with an advanced female peer resulted in more positive implicit attitudes toward the subject area and an increased effort in test preparation compared to when the participants worked with an advanced male peer (Stout et al., 2011).

According to statistics cited in Irvine and Vermilya (2010), female role modeling has already contributed to a growing number of women in various STEM fields. Females represented 8% of practicing veterinarians in 1971. By 2008, the number of women veterinarians increased to 50%, with 79% of the applications for veterinary medical schools coming from females. The feminization of veterinary medicine is the result of many factors, but an accumulating number of role models is included among the explanations (Lincoln, 2010).

In the case of architecture, the Bureau of Labor Statistics (2013) reported that in 2011, 20.7% of working architects in the United States were female. Within 5 years, that number grew to 24.2% (Bureau of Labor Statistics, 2017). Likewise, in the United Kingdom (UK), there were 4,339 female architects in 2004. As of 2014, that number increased to 7,538, representing 22% of all architects in the UK (Mark, 2014). A female past president of the Royal Institute of British Architects, who is noted for her work in diversifying the profession, believed in continuing the strategy of promoting more female role models by adopting a school and showcasing the talents of women architects (Mark, 2014). In the United States, the Women in Architecture Awards have been embraced for the same reason. Demonstrating the achievements of females in architecture allows other women to see that a significant career in that field is possible (Booth, 2016).

Aviation researchers have often commented that role models and mentors are essential in increasing the number of female pilots. Mentoring is so influential that Hamilton (2014) listed the lack of a female mentor or support system as the fourth-most-common reason why women do not complete flight training. If female mentors are difficult to locate, which is probable considering the low number of women pilots, Hamilton (2014) suggested creating a free database of mentors who would make themselves available to counsel female pilots. Additionally, an online support community should be available for students who need to talk to a pilot other than their flight instructor (Hamilton, 2014).

Hynes and Puckett (2011) agreed with the significant effects of mentoring in their study regarding female leadership and commercial aviation. Online interviews were conducted with five women who belong to the International Society for Women Airline

Pilots in order to gain a better understanding of the lack of female pilots. All of the respondents cited mentors as being integral to their career success. It is worth noting that not all of these mentors were pilots (Hynes & Pucket). Many of the mentors were authors, teachers, public figures, and military leaders. Mentors do not have to be pilots in order to be effective (Hynes & Puckett, 2011).

Furthermore, as stated by Gibson (2004), pilots do not have to be personally known to the student in order to make an impression. The public's image of a pilot is slowly beginning to change after 100 years of pilots being only one gender and one race. Deanne Gibbon (2014) proposed that a television series featuring women pilots may encourage girls to consider a flying career, much like the increase of recruits to the United States Navy in the years following the release of the movie *Top Gun* (Gibbon, 2014).

Hamilton (2014) also recommended that aviation organizations utilize photographs of women on their advertising literature and training materials. Boeing (2018) already subscribed to this idea, with the cover of their 2016 Pilot & Technician Outlook report featuring a young female as the first officer, previously known as a co-pilot, of a jet. In addition, the military is broadening the people shown in their recruitment materials. Most notable is the United States Air Force's 2012 campaign entitled, *I Am an American Airman*. The 30-second clip showcases four women serving in the Air Force; the last clip shows a female a pilot with the rank of captain.

Just as Boeing (2018) and the Air Force have demonstrated, other stakeholders in the aviation industry, such as colleges and universities, need to be inclusive when recruiting pilots (Anderson, 2001). College education is becoming increasingly necessary

for a piloting career. Individuals who do not hold at least a bachelor's level degree may be less competitive for certain flying jobs (FAA, 2013). In many cases, pilots may have to substitute their lack of an aviation degree with more flight hours logged before applying for a job with an airline or other carrier (FAA, 2013).

In 2008, Ison performed a qualitative study of females and minorities enrolled in undergraduate aviation degree programs using the Integrated Postsecondary Education Data System. Ison (2008) tracked the number of women and minority students at these institutions from 1996 through 2007. He found that enrollment at the associate level increased by 10% during that period, from 27.8% to 37%. This number does not nearly approach the global demand for new professional pilots projected by Boeing (2018).

Foster's 2003 dissertation examined the relatively small number of women and minorities employed in aviation maintenance. While the training and work environment of a mechanic differs from that of a pilot, Foster's recommendations are equally relevant with other aviation disciplines that are male dominated. His research investigated the concerns and opinions of faculty at aviation maintenance schools. Foster (2003) surveyed 43 faculty members and department chairs, nine of whom were female. Descriptive statistics were used to analyze the information.

The Foster (2003) study participants identified the lack of role models, mentors, and personal contacts as the major barriers to a career in aviation maintenance. Most of the respondents attributed their vocation to one of these three avenues. Nearly 80% of the participants reported becoming interested in an aviation maintenance career between the ages of 15 and 22. Foster (2003) asserted that exposure to career opportunities must be introduced during primary schooling and reinforced throughout secondary school. There

are many ways to accomplish this, but the use of a role model or mentor is usually quite effective (Foster, 2003).

**Aviation faculty.** In their study of role models, Stout et al. (2011) paid particular attention to the effectiveness of same-sex professors. During the course of the study, female students verbally participated more in class with female professors and displayed increasingly avoidant tendencies with male professors. The researchers surmised that the same-sex faculty members may have motivated the females to remain in their chosen field of study. A relevant classroom professor could serve as a powerful mentor (Turney et al., 2002).

Turney et al. (2002) gathered from their survey of 390 aviation college students that in place of, or in addition to, outside mentors, students can be influenced by college faculty. The way in which a student is influenced depends on the professor (Turney et al., 2002). Some female students reported in the survey that they felt unwelcome in the classroom and intellectually inadequate—especially in the science classes. Whether this circumstance was real or perceived, the result will not increase the number of women entering aviation (Turney et al., 2002). At the same time, positive faculty support can be essential for student success (Turney et al., 2002).

Ideally, aviation college faculty would be a tremendous encouragement to female students (Turney et al., 2002). In addition to the research about same-sex role models, the survey performed by Turney et al. (2002) suggests how women in an instructional capacity could encourage females entering flight training. Responses from the female pilots reflected a desire for women to mentor novice women, an ambivalence from

women as to whether they belonged in aviation, and an agreement that women faculty members are more supportive than male faculty members (Turney et al., 2002).

The findings of Turney et al. (2002) may be explained by the shared experience of women in flight training. Some flight instructors have found commonalities of females at the beginning stages of instruction (Sitler, 2004). According to Sitler (2004), women are typically slower than men in gaining confidence in the airplane. This can result in a female student needing to log extra hours before she is comfortable flying the plane by herself, with no flight instructor on board. Delay of the first solo flight may also be caused by women taking longer to master maneuvers that are required in the beginning stages of flight training. These maneuvers involve relatively sudden changes of the plane's pitch in relation to the horizon. Many females can be apprehensive about performing these maneuvers at first (Sitler, 2004).

Sitler's (2004) observations are balanced with the phases of flight training that females readily grasp. Women are typically faster at being able to control an airplane solely by reference to instruments, which is an essential skill for professional pilots (Sitler). Females generally fly the plane with smoother use of the controls, they are quite cautious about flying near dangerous weather, and they have fewer fatal accidents than men (Sitler, 2004).

Female instructors and professors have a firsthand understanding of being a novice woman pilot. They are acutely aware of the unique challenges and advantages offered by being an aviatrix and can offer guidance that other individuals cannot (Ison, Herron, & Weiland, 2016). Just as there is a lack of female student pilots, there is a lack of females at the other end of the pipeline, offering instruction and mentorship (Hamilton,

2014). As part of increasing the number of female students, aviation colleges and flight schools may first have to increase the number of female mentors, instructors, and support systems (Hamilton, 2014).

Depperschmidt's 2008 dissertation, in part, examines the influence of faculty at aviation colleges. His study considered the lack of women pilots by interviewing students enrolled in aviation degree programs from 60 aviation colleges. Mixed methods were used to evaluate demographic information and student perceptions.

The majority of the female flight students in Depperschmidt's 2008 study stated that the underrepresentation of female flight students should be a primary concern for their collegiate aviation program (Depperschmidt). Females comprise no more than 25% of all students enrolled at any of the aviation program institutions, with 70% of the respondents reporting that 0-10% of enrolled students in their flight program were female. (Depperschmidt, 2008).

Regarding the faculty at these colleges, 53% of students have received training from a female flight instructor at least once. When asked how many women flight instructors work in their program, 75% of students reported five or fewer. Students also remarked that only 8% of their colleges had a female member of their school's administration. Depperschmidt (2008) concurred with Hamilton (2014) that the presence of additional female professors, flight instructors, and other professionals could be a source of support and encouragement for female students.

With so few women faculty at aeronautical colleges, accomplished females in aviation are not always discernible to flight students. Ison et al. (2016) investigated this problem and presented their findings at the Women in Aviation International Conference

in 2016. Their study encompassed 356 full-time aviation faculty members at 60 baccalaureate institutions. Only 36 faculty members, or 10.1%, were women. While this number is small, it has grown from 5.2% in 1990. As a comparison, 49% of all faculty are female for higher education in its entirety. This truncated number of female aeronautics faculty is consistent with other figures, which reflect the low participation of women in aviation (Ison et al., 2016).

Ison et al. (2016) provided five recommendations to increase the number of females in higher education. These include recruiting and retaining women, conducting broader studies on this issue, monitoring the status of women's participation in higher education with follow-up studies, informing women about becoming faculty, and existing faculty encouraging female students to pursue graduation and teaching. While increasing the number of female faculty in aviation programs is a goal unto itself, the benefits of doing so create a positive influence in the classroom that is critical for the success of female students (Ison et al., 2016).

**Outreach initiatives.** Maintaining this pipeline of future pilots requires that people become interested in aviation at a young age. For girls who are already in Stage 4 of Gottfredson's (2002) theory, an event is needed to incorporate flying as a career possibility. Different events have varying degrees of influence on girls, meaning the aviation industry will need to create a number of campaigns to capture the interest of as many girls as possible (Davey & Davidson, 2000).

One method that appears to be effective in motivating young girls to consider a career in aviation is interaction with female pilots (Davey & Davidson, 2000). In their seminal research on women pilots in commercial aviation, Davey and Davidson (2000)

conducted in-depth interviews with 40 airline pilots, 23 of whom were female. Their study contributed to the body of knowledge regarding when women join the airlines, their acceptance or lack thereof by male pilots, and their company's policy for equal opportunity (Davey & Davidson, 2000).

According to the Davey and Davidson (2000) study participants, their employers made many gestures in the interest of equal opportunity that were not well received by the target audience. The female pilots considered the initial attempts by management to be a waste of resources. Distribution of pamphlets and awkward conversations initiated by management only seemed to cause more tension by allegedly creating an environment of positive discrimination. The participants desired to blend in with the preexisting cadre of pilots instead of being singled out for their gender (Davey & Davidson, 2000).

Instead, Davey and Davidson's (2000) recommendations to management emphasized taking a more hands-on approach of encouraging women to become pilots within their airline. Literature distributed to potential employees should include case studies from female pilots regarding their career and work/life balance (Davey & Davidson, 2000). Furthermore, an ongoing program should be established whereby male and female pilots visit high schools and colleges and share their experiences with students (Davey & Davidson, 2000). An airline could even sponsor a student to shadow a pilot for the day so that the actual responsibilities of a pilot could be observed (Davey & Davidson, 2000).

Anderson and Pucel (2003) agreed with this strategy. They performed a force-field analysis on 600 pilots regarding the positive and negative factors that resulted in an individual's choice to become a pilot. Anderson and Pucel also investigated if these

factors were the same for both men and women. Their research showed that males are most influenced by salary, the technical aspect of the job, and the glamour of flying. Women are more influenced by a desire for a nontraditional and challenging career and the ability to prove themselves.

Building on this research, Anderson and Pucel (2003) created a list of suggestions that may be effective in recruiting new pilots. For high school students, teachers and guidance counselors are typically influential regarding career choice in general (Anderson & Pucel, 2003). However, research has shown that people in these positions do not have the same effectiveness when a student is deliberating becoming a professional pilot (Anderson & Pucel, 2003). This suggests that students may require direct communication with pilots to assist with their decision. Also, younger high school students may benefit from career fairs that feature aeronautical organization and aviation summer camps (Anderson & Pucel, 2003). These programs would allow students to receive information directly from the pilots, rather than using a guidance counselor as an intermediary (Anderson & Pucel, 2003).

### **Chapter Summary**

During the past century, aviation has revolutionized the way people work, communicate, and spend their leisure time. For such a dynamic industry that is growing in demand and technical ability, the pilot population has stagnated demographically (FAA, 2017). The appearance of modern pilots is similar to the people flying planes 100 years ago. The need for new aviators requires that they be selected from a more diverse talent pool (Turney & Maxant, 2004). While the numbers may be small, women have

proven over the years that they are just as capable and safe as male pilots, and, according to the research, possibly even safer (Bazargan & Guzhva, 2011).

In order to increase the number of female pilots, several initiatives will have to take place (Turney & Maxant, 2004). Popular culture generally does not depict a pilot as anyone other than a Caucasian male (Gibbon, 2014). When children who are anything other than Caucasian and male see this mass media representation of a pilot, they do not readily identify with this image (Hamilton, 2014). Female pilots should be reaching out to young girls to help guide them with their career aspirations (Hamilton, 2014). Yet there are not enough female pilots who can meet the demand for outreach (Hamilton, 2014). Until there is a break in this cycle, it will be quite difficult to convince girls that piloting is a viable and appropriate career choice (Hamilton, 2014).

For women who are already professional pilots, it is worth examining their journey into aviation (Anderson, 2001). According to Eagly's (1987) and Gottfredson's (2002) social role theories, they chose to pursue a career that many females excluded as a possibility at an early age. What factors set these females apart and caused them to be outliers to those theories? Understanding the phenomena that brought women into aviation may help increase the number of women pilots (Hamilton, 2014).

Chapter 2 reviewed the literature pertaining to female pilots. Chapter 3 explains the research methodology.

## **Chapter 3: Research Design Methodology**

### **Introduction**

Females have the potential to become professional pilots, but very few do so (FAA, 2017). According to the FAA database of aviators, as of December 31, 2017, females represent approximately 7% of the total pilot population in the United States. This number raises concerns because it implies that not all individuals who have the discipline, desire, and motivation needed to become a professional pilot are actually pursuing this career (Sitler, 2004). Studies of long-term performance of female flight students have shown that they are just as competent in the cockpit as male flight students (Sitler, 2004).

The purpose of this study was to gain a better understanding of why females decide to become professional pilots. The central research question explored the factors that influence women to become pilots. Research on this topic is lacking in quantity and depth (Cristofich, 2014; Depperschmidt, 2008), and the information gathered may be used to increase the number of female pilots.

This study followed a phenomenological qualitative design. Other dissertations about women in aviation have used quantitative research methods (Anderson, 2001; Depperschmidt, 2008). Unlike those studies, this research examined the phenomenon of deciding to become a pilot as experienced by the participants, and it suggests the impacts that those decisions had on the female pilots' lives, on their careers, and on the field of aviation. These questions were most appropriately analyzed using a qualitative approach.

Creswell (2014) described qualitative research as “a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (p. 246). This design was characterized by the augmentation of specific details into general themes and the interpretation of those themes to gain insight into a condition. By speaking with individual women who had chosen a career as a professional pilot, prevailing reasons were discovered as to why the female participants decided to pursue a career in aviation.

Phenomenology is a subset of qualitative research that describes a common lived experience of its research participants. A phenomenological study collects information from participants who have shared a phenomenon and then the researcher creates a composite of the experiences described by all individuals (Creswell, 2013). This universal context of a phenomenon is referred to as its *essence*. In order to construct an essence, a researcher must have access to a detailed and rigorous understanding of the complexities surrounding a phenomenon (Creswell, 2014).

### **Research Context**

This study took place at The Ninety-Nines (2018) annual international conference in Philadelphia, PA. The participants in this study were professional pilots attending this conference as part of their awareness of being a female aviator. In the interest of maintaining confidentiality and minimizing distractions, the interviews were held in private areas at the conference site.

### **Research Participants**

This study focused on female pilots who had a commercial or airline transport pilot rating and whose career included professional piloting. Female pilots were not

considered if they had less than a commercial rating because they could not legally fly for compensation because this study was aligned with career choice. Prior to confirming each interview, the participants' flight ratings were verified by the researcher through the FAA's (2017) online database of pilots. For this study, the participants came from different segments of aviation and were all qualified as interviewees: airline pilots, banner tower pilots, military pilots, and corporate pilots.

While delimited to focus on professional female pilots, this study included a range of other related descriptive information and demographics about its participants. Pilots of various ages, ethnicities, and cultural backgrounds were interviewed. This diversity provided a better overall understanding of why the females chose to become pilots and minimized the chance of interviewing a group of women who attributed their pursuit of aviation to a popular event or cultural anomaly.

The participants were selected through a purposeful sampling. This strategy allowed the researcher to choose the subjects who best helped to increase the understanding of the phenomenon and address the research question, given that they had the experience for the phenomenon being studied (Creswell, 2013). For a phenomenological study, Creswell (2014) suggested a range of three to 10 participants. This study incorporated interviews with 12 participants, at which point saturation was reached.

The primary source of the research participants was the female aviation organization, The Ninety-Nines (2018). According to their website, The Ninety-Nines were founded by Amelia Earhart in 1929, and they were named after the 99 female pilot charter members. Membership in The Ninety-Nines continues to only be available to

female pilots. The participants in this study were identified at the annual conference of The Ninety-Nines in 2018.

### **Instruments Used in Data Collection**

The research was conducted using semi-structured interviews (Appendix A), wherein the dialogue followed a guide but was not rigid in manner. As Brinkmann and Kvale (2015) suggested, a script of questions was prepared beforehand, ensuring that certain topics germane to the research were discussed. By the nature of their work, pilots often have unique stories to share about their experiences. For this reason, the interviews were less structured and more spontaneous in technique so that the subjects had the flexibility to talk about their own personal history with aviation.

Furthermore, the researcher budgeted a longer timeframe than the recommended 1 hour for each interview to take place so that a particularly forthcoming participant could be accommodated. The researcher allowed for each interview to last closer to 90 minutes. Interviews that resemble conversations between two people with a mutual interest can reveal a profound world view from the subjects' perspective (Brinkmann & Kvale, 2015). Interviews were conducted by the researcher. She is a commercially rated pilot and flight instructor, which facilitated rapport with the interviewees and encouraged them to provide additional narratives. At the same time, the researcher guarded against bias and remained aware of her positionality.

The main interview questions and ensuing subquestions were derived from themes encountered in the literature review. In addition, some of the questions were adapted from Germain and Hamilton's 2012 survey of female pilots, pilots in training, and mixed-gender flight instructors. Creswell (2013) suggested that for qualitative

interviews, a total of five to seven questions should be prepared. The researcher pilot tested these inquiries with female aviation colleagues. The questions were amended after consideration and review.

Phenomenological studies typically use broad questions. The subjects are commonly asked to describe their experiences as a strategy to uncover the essence of a phenomenon (Creswell, 2014). Responses to open-ended questions may require the researcher to modify subsequent inquiries. Different participants will offer varying contexts of their experiences, all of which the researcher must accommodate by maintaining a flexible set of questions (Creswell, 2014).

Although each interview had unique elements, the researcher ensured a certain amount of consistency with each participant. Adherence to a preplanned protocol helped organize the manner in which the interviews were conducted. The researcher made an audio recording of each discussion using an iPhone. An additional video recording was used once consent from the subjects was given. Brinkmann and Kvale (2015) encouraged video documentation because capturing facial expressions and postures can add deeper meaning to an interviewee's narrative. The researcher also took handwritten notes during each meeting.

### **Procedures for Data Collection and Analysis**

Prior to the interviews taking place, the researcher provided letters of introduction (Appendix B) and informed consent (Appendix C) details for review and signature to the women identified as potential participants. These women were familiarized with what they would be asked to talk about before the interviews were conducted. At the start of each interview, the researcher, again, explained the nature and purpose of this study,

including all volunteer participants' rights, risks, and potential rewards, and the researcher asked the participant if she has any questions or concerns. This exchange served as a way to begin the discussion.

Throughout the interviews, the researcher asked for clarification and follow-up descriptions as needed. When the conversation was approaching its end, the researcher summarized the main points of the interview and asked the participants if there was any other information they wished to share. This practice allowed the participants to add more narrative after a question was initially asked and answered (Brinkmann & Kvale, 2015). At the conclusion of the interviews, the researcher informed the participants of the next steps in completing her research, along with a projected timeline for each phase.

After each of the interviews concluded, the researcher sent the recordings out for professional transcription. The transcriptions were analyzed line by line by the researcher. This method of horizontalization provided the researcher with a better understanding of the phenomenon's essence (Creswell, 2013). The data were then prepared and organized according to themes. These themes were correlated with one another, and their meaning allocated the data into codes. Saldaña (2016) recommended that a preliminary version of coding happen while the data were being collected. Notes taken by the researcher during the interviews assisted with this process.

Three rounds of coding was performed in order to obtain a thorough comprehension of the data. Multiple analyses of the data resulted in saturation, the point where no further information can be obtained (Saldaña, 2016). After this was completed, the researcher interpreted the essence of the phenomenon of why women become pilots, and the researcher presented her findings.

As part of the data analysis and final report, the researcher checked for validity. One method the researcher employed for accuracy was by member checking. The participants were consulted and asked to comment on the research findings (Creswell, 2014). For an additional level of the validation effort, peer debriefing was utilized. The researcher was not fully able to triangulate the data to verify its validity. Little research exists on this topic, so while the interviews and data analysis were trustworthy, there were few examples that could be used for data comparison.

The identity of each participant was maintained with confidentiality during all stages of this study, and it will be maintained in perpetuity. While the researcher knew the names of the women interviewed, they are otherwise labeled in this work. A simple way to do this was to refer to each participant using a code word derived from the phonetic alphabet as assigned by the North Atlantic Treaty Organization. This alphabet was adopted by the International Civil Aviation Organization, and it is spoken by all pilots when communicating on radio frequencies. The 12 participants were identified using the first 12 letters of the phonetic alphabet, “alfa” through “lima.”

As part of the informed consent process, all participants were made fully aware of the measures taken to protect their confidentiality. Preceding each interview, the researcher obtained a letter of informed consent. This document disclosed the researcher’s motivation for holding the interviews and how the data were to be used. The participants were informed that their participation was voluntary and that the interview could be stopped at any time if they wished to terminate their involvement without penalty. Confidentiality was further ensured by only the researcher having access to the all materials collected in this study. Transcripts, recordings, and all notes, whether

electronic or paper, are and will be stored in a locked, secure location within the researcher's private home for 3 years, after which time they will be destroyed.

### **Summary**

The purpose of this study examined qualitatively the various factors that led women to a career in aviation. It was a phenomenological study whose data collection and analysis procedures focused on semi-structured interviews in order to develop findings that explained the phenomenon of why some women became commercial pilots. Professional female pilots were interviewed regarding the reasons why they decided to pursue a career in aviation. A purposeful sample of female pilots attending The Ninety-Nines (2018) international conference were recruited (Appendix D). Data provided through semi-structured interviews were analyzed and coded for themes and subthemes. The findings from the interviews are presented in Chapter 4, and the recommendations for further study are discussed, along with implications and other conclusions, in Chapter 5 of this work.

## Chapter 4: Results

### Introduction

The purpose of this study was to explore the reasons why women become professional pilots and how these factors can be used to increase recruitment of future female aviators. In 2017, women represented approximately 5% of the professional pilot population in the United States, a statistic that has been steady for decades (FAA, 2017). Women gained entry into many disciplines during the latter half of the 20<sup>th</sup> century, but the numbers demonstrate that aviation remains elusive (FAA, 2017). One implication of the lack of women pilots is that females who desire to become pilots but never attain their goal, may not achieve self-actualization. Another issue related to this phenomenon is that aviation is an expanding industry with new pilots being in constant global demand. Boeing's (2018) *Pilot Outlook 2018 - 2037* indicates that 790,000 new pilots will need to be produced during that 20-year time period. The addition of more females to the pool of eligible candidates would help meet staffing demands (Turney & Maxant, 2004).

This chapter is organized by the research questions, the data analysis, and the findings. Themes that were identified during the analysis of the data are discussed in detail. Quotations are used from the participants to support these themes and to accentuate the narratives that were shared. The chapter concludes with a summary of the results.

## **Research Questions**

The following research questions guided this study:

1. What factors influence women to become pilots?
2. What strategies can be used to improve the recruitment of female pilots?

## **Data Analysis and Findings**

After receiving written and verbal consent from The Ninety-Nines (2018) to utilize their resources and membership for this study, the participants were interviewed during the organization's 2018 international conference in Philadelphia, PA. The Ninety-Nines were founded in 1929 and named after the 99 charter members, who were all female pilots, including Amelia Earhart, their first president. Today, the organization has grown to thousands of members from 44 countries. The membership exclusively consists of women who hold any level of pilot certification. The Ninety-Nines mission has remained dedicated to promoting the "advancement of aviation through education, scholarships, and mutual support" (The Ninety-Nines, 2018, para. 1). In recent years, the Ninety-Nines have sponsored numerous programs that educate the public about flying opportunities, such as the Girl Scouts of America's Aviation Day (The Ninety-Nines, 2018). The membership, activities, and mission of The Ninety-Nines are aligned with the topics investigated in this study.

The participants were chosen by a purposeful and snowball sampling. The women were intentionally selected so that a wide variety of ages and types of flying careers were represented. This method reduced the likelihood of collecting data that was entirely associated with one generation or aviation career. A total of 12 women volunteered to participate in this study. Letters of introduction were provided to all individuals upon

volunteering for participation. Prior to the start of each interview, informed consent forms were reviewed and signed by all parties. Semi-structured interviews were conducted with each of the participants. All interviews were recorded, and the recordings were transcribed immediately following each conversation.

The transcribed interviews were analyzed several times by the researcher. Each line of the transcription was coded, with the data undergoing three phases of coding. The first phase performed was in vivo coding, which captured frequently used words and phrases by the participants. The second round of coding utilized a priori codes. These codes were derived from the research discussed in Chapter 2. Many of the a priori codes were focused around role models and the support of family and friends. The third round featured emergent coding, and it was performed to ascertain the themes that emerged from the data. A total of four themes and 10 subthemes were identified, and they are expanded upon in this chapter.

After completion of the data analysis, the researcher consulted with two peer debriefers. Both women were airline pilots, one of whom was the first female pilot at a major American commercial airline. Her work was published, and at the time of the interview, she had spoken on the topic of women pilots for years. The other peer debriefer had been actively involved with a foundation that attracts young students to aviation.

The use of a peer review increases the accuracy and validity of qualitative research by having an interpretation of data extend beyond just the researcher (Creswell, 2014). Both debriefers reviewed the research tool, the coding, and the preliminary

findings. The recommendations of the peer debriefers are incorporated into the findings of this study.

**Participants.** The 12 female pilots who were interviewed in this study represent a diverse sampling of geographic origins, ages, and professional experiences. One pilot was born in Chile and immigrated to New York City as a child. The remainder of the pilots had roots in California, Illinois, Iowa, Kansas, Maryland, Nebraska, New Jersey, North Carolina, Pennsylvania, and South Dakota. These women had resided in other areas as they have progressed through their careers.

The ages of the participants covered a span of 71 years, with the youngest participant being 26-years old and the oldest being 97-years old. The researcher intentionally sought out pilots from different generations to gain a better understanding of how women's experiences have changed or remained the same over time. As discussed in the literature review, women have become more prevalent throughout much of the workforce, while the number of female pilots has remained stagnant. The ages of the participants covers this time period during which women entered new careers. Narratives from pilots of different ages captured the various responses the pilots received from others regarding their decision to go into aviation. Changes in public opinion are reflected in the quotes provided by the participants. Implications of these statements are expanded upon in Chapter 5.

Other demographic data collected about the participants reflected that seven pilots were married or widowed, and five were single. Seven participants reported having no children, four had at least one child, and one participant was pregnant with her first child at the time of the interview. Several of the participants who reported not having children

were among the younger pilots interviewed. Future plans regarding motherhood were not discussed. Also not addressed were unfulfilled wishes to have children. The age ranges and parental status of each participant are detailed in Table 4.1.

Table 4.1

*Demographic Information of Participants*

Pseudonym	Age Range	Children
Alfa	20-29	Yes
Bravo	50-59	No
Charlie	40-49	No
Delta	20-29	No
Echo	30-39	No
Foxtrot	20-29	No
Golf	60-69	No
Hotel	20-29	Yes
India	60-69	No
Juliatt	80-89	Yes
Kilo	70-79	Yes
Lima	90-99	Yes

While interviewing the participants and collecting their demographic data, several trends appeared that might be useful in identifying future female pilots. As previously mentioned, all but one of the participants had at least a 4-year college degree. Many of the participants made reference to flying during their college years. Some participants mentioned saving money and delaying flight training until they had the necessary funds. For those students who cannot afford college tuition and flight lessons at the same time, colleges and universities may be an effective setting for recruiting women.

When asked about their high school and college activities, nine participants reported that they had played sports. Tennis and softball were the most common sports played, with three participants confirming they had played each sport. Three participants also stated they had played in the marching band.

The participants came from a variety of aviation careers. While airline employment might be one of the most visible types of flying to the general public, it represents only one career option available to the holder of a commercial or airline transport pilot certificate. The following is a description of each of the participants' aviation careers at the time of the interviews:

Pilot Alfa previously worked as a charter pilot and flight instructor. She was a first officer at a regional airline. At the time of the interview, she was employed as a first officer at a major airline.

Pilot Bravo primarily focused her work in aviation as a flight instructor. At the time of the interview, she was also employed as an aerial application pilot.

Pilot Charlie's aviation career had taken place entirely within the military. She spent 10 years flying for one branch of the military, and then she switched to another branch of the military.

Pilot Delta had worked as a flight instructor. At the time of the interview, she was a first officer at a regional airline.

Pilot Echo was a career military pilot. At the time of the interview, she was employed as a military instructor pilot.

Pilot Foxtrot had been previously employed as a flight instructor. At the time of the interview, she was working as a captain at a regional airline.

Pilot Golf, at the time of the interview, was retired from her flying career. She worked as a regional airline captain. Later, she flew as a corporate pilot.

Pilot Hotel had formerly worked as a flight instructor. At the time of the interview, she was a first officer at a regional airline.

Pilot India worked for many years as a banner tow pilot. At the time of the interview, she was now retired from that type of flying and remained a part-time flight instructor.

Pilot Juliett, at the time of the interview, she was retired from a long flying career. She was a flight instructor and owned a flight school. She was also a demo pilot for an airplane manufacturer, assisting with sales and ferrying aircraft.

Pilot Kilo had flown for a major airline during her career. Prior to that, she was a corporate pilot and a rescue and smokejumper pilot. At the time of the interview, Pilot Kilo was retired from the airlines and was a flight instructor.

Pilot Lima began her aviation career as a member of the Women Airforce Service Pilots during World War II. Afterwards, she continued flying as an instructor and airplane dealer. At the time of her interview, Pilot Lima was retired.

Regarding socioeconomic status as a child, 10 participants described themselves as a subset of the middle class, and two participants identified themselves as members of a lower class. The participants were also asked to report their highest level of formal education. Half of the respondents had obtained at least one graduate degree, five participants held a bachelor's degree, and one participant had a high school diploma.

**Themes.** Following several rounds of coding, four common themes and 10 subthemes emerged from the data. These themes are associated with the factors that

initially motivated the participants to enter the field of aviation and the factors that encouraged them to continue flying. Table 4.2 provides a list of the emergent codes associated with the themes and subthemes, along with the percentage of the frequency of the associated statements.

Table 4.2

*Qualitative Themes, Subthemes, and Codes with Frequency in Participant Interviews*

Theme	Subtheme	Number of Times Subtheme was Discussed	Emergent Codes
Motivation to Fly	1. Strong emotion associations	11	Love of aviation Childhood dream Personal mission Patriotism
	2. Need for challenge	12	Personal growth Constant testing Endless possibilities
	3. Freedom	11	American freedom General aviation Freedom Escapism
Role Model	4. Public figure	11	Real person Fictional character
	5. Personal acquaintance	10	Immediate family Distant family Friend Male Female Encouraged Did not encourage
Event	6. Rode in a plane as a passenger	3	Visited the cockpit Positive experience
	7. Piloted a plane	4	Immediately hooked Continued studying Positive control
Support	8. Support from family	8	Close with family Known aspiration Early childhood aspiration
	9. Support from friends	6	Camaraderie with other pilots Adult friends
	10. Family did not nurture interest	4	Training deferred Closeted aspiration Regained initial focus

*Motivation to fly.* During some part of their interviews, every participant made a reference to the emotions she derived from her aviation career. Many expressed their love of flying. Pilot Delta stated, “It’s all I want to do, because then it’s not like working if you enjoy it.” Pilot Golf reminisced, “It was a dream. I really enjoyed flying so much, and I thought, ‘I want to be able to do this all day, all night, all year, forever.’” Pilot Juliett concurred:

I just loved flying. It was a lot of fun, it was inspiring, it was challenging, it was adventuresome. And I had so much to learn, and people were generous in teaching me. And I just fell in love with flying airplanes.

The challenge presented by flying was also noted by each participant. Every pilot viewed this as a positive aspect of aviation and part of its allure. Pilot Foxtrot shared, “I enjoy the fact that every day is different, and there’s always something else to look forward to—a new airplane or a new rating. The possibilities are endless in flying.” In the same way, Pilot Alfa observed:

As a professional pilot, you’re always looking to challenge yourself in different ways, in learning new things, new techniques, new procedures to evolve with technology that changes. I would say that I challenge myself in order to learn more and to be more proficient in the aircraft that I fly.

The participants understood that challenges should be a part of every flight. Pilot Charlie believed, “you create your own challenges.” Pilot Golf said, “If all you do is a takeoff and a landing, the challenge is doing a good landing.” As a military aviator, Pilot Echo related these sentiments to her entire career. “I’ve been able to see so many

different things, had so many once-in-a-lifetime experiences. It's always interesting. I get the satisfaction of service to my country, and I have the best office view in the world."

The subtheme of freedom was supported by most participants. The former and current military pilots associated freedom with their motivation to fly. Pilot Lima remembered, "We were in a world war. I wanted to do something for my country other than working in a job that was military related." Pilot Echo also saw the relationship between military flying and patriotism.

While being in the military, we give up some of our personal freedom, but I think that flying for the military is one of the most freeing things. I feel like I'm directly supporting freedom for myself and for other women.

The civilian pilots interpreted the concept of freedom of flight differently. Pilot Foxtrot reflected:

I think, for me, what flying meant, and still means, and why I wanted to do it in the first place, was it's the most ultimate freedom that you can have. Doesn't matter what you're flying. I think being in an airplane, especially by yourself, is the most freeing thing, and that's what I was seeking. That's what I enjoy about flying. I think it's a miracle every time it happens.

Pilot Golf appreciated the mental freedom that can be derived from aviation. The task of flying a plane is so consuming that it forces a pilot's attention away from other matters. She stated, "The FAA says you shouldn't fly when you have things on your mind and worries. That's the best time for me to do it, because I'm totally free of all those problems, all those concerns."

**Role models.** Of the 12 women interviewed, all but one were aware of at least one famous female pilot before starting flight training. Seven of the 11 participants identified well-known pilots as role models. Amelia Earhart was the most commonly cited pilot. Most participants appreciated her contributions to aviation. Pilot Echo recalled, “I loved looking up to Amelia Earhart. I’m a big fan of that era, with the leather bomber hats and goggles, and stuff like that.” Pilot Echo also mentioned being inspired by the Women Airforce Service Pilots from World War II, as did other participants.

Pilot Alfa spoke of Bessie Coleman, the first African-American and the first person of Native American descent to earn a pilot certificate. Pilot Alfa explained, “Being a minority, I had an interest to find people that had my background and that may have looked like me. Bessie Coleman came from a background that’s not usual.”

Fictional female pilots in popular culture were not as prevalent and appeared to be associated with the participant’s generation. Two women mentioned Penny from the 1950s television show *Sky King*. After much thought, one woman reminded herself of Airplane Jane from the cartoon *TaleSpin*. Neither character was considered a role model, but the participants noted that this was due to Penny still being an adolescent and Jane being an animated hippopotamus.

Pilots who were personally known to the participants were often referenced during the discussion of role models. Of the 12 participants, 10 knew a pilot prior to starting flight training. Of the 10 participants, six identified the pilot as a role model. Of the 10 participants, eight reported they were at least somewhat encouraged by the pilot to commence with their own flight training. All 10 participants said the pilot they were

personally acquainted with was a male, and one participant stated she also knew a female pilot.

For several of the participants, the male pilots they were personally acquainted with were influential in their journey of becoming a professional aviator. Pilot Echo, whose father was also a military pilot, referred to him as her “biggest role model.” Pilot Foxtrot had a family friend who was an airline captain. He advised her on her decision to pursue aviation, and he continued to be a mentor as she also achieved the position of airline captain.

The pervasiveness of male pilots makes it more unlikely to encounter a female pilot who can serve as a role model. Nonetheless, male pilots were reported as being very effective in this capacity. Pilot Echo summarized the rapport:

I didn't see many women pilots, but I did have a male pilot who was a very big part of my life, and that inspired me. So it doesn't necessarily have to be females encouraging other females to fly. I think that getting the men to encourage women to fly, as well, if they are men who can be a positive, influential role in young women's lives, then they should definitely encourage that kind of thing.

***Event.*** The decision to become a professional pilot was initiated by a singular event for the majority of the participants. While all of the women spoke of events that occurred during their flying careers, seven pilots cited an occurrence that began their pursuit of aviation. For two pilots, the event was an educational opportunity to study the private pilot curriculum. The other five pilots recalled either riding as a passenger in an airliner or taking the controls of a small airplane. In both cases, the participants described an immediate affinity for aviation.

Pilot Alfa recalled her first trip on a plane, traveling from Chile to Disney World as a young child:

When I was 4-years old, that was when I first saw an airplane. From that moment, I wanted to know everything about airplanes. I think that at that young age, just seeing the airplane and having the pilot bring me up to the cockpit and put his hat on me, that was one of the moments that stayed with me and allowed me to pursue my career in aviation. It was just that moment that did it for me.

Pilot Kilo had a similar experience at the age of 12, although she was met with resistance by the female flight attendant:

The flight attendants came by and my sister had to go with me to the cockpit. The flight attendant said, “oh, they’ll give you stewardess wings,” and my sister took them, and I went, “I don’t want stewardess wings.” She said, “why not?” and I said, “because I want pilot wings. I’m going to be an airline pilot.” And she said, “oh, little girls can’t be pilots.” And I said, “but I bet big girls can.” She thought this was so funny that she took me up to meet the captain, and he gave me captain wings. And I came back, “see I have pilot wings.”

The participants who were introduced to aviation by actually flying a small plane also had positive experiences that profoundly affected their career choice. Pilot Delta shared:

We took off at the local airport, and I remember seeing the Twin Towers, the only time I saw them. And that was it. That was the bug. A lot of pilots talk about getting bitten by the flying bug, so that was my flying bug. And from that point on, I kept studying planes and keeping up with it.

Pilot Juliett encountered aviation through the Civil Air Patrol, at the suggestion of her brother. Her first flight instructor convinced her of her potential as a pilot. She stated:

The senior member of the Civil Air Patrol would take me flying, and he would give me stick time. In other words, he'd let me fly the airplane, and tell me what was going on. He said to me one day, "You're a natural." And I believed what he said. He said I'm a natural, so if I'm a natural, that means I could be a pilot. That did it. That did it. And of course it told me what happens when you encourage people, not maybe being a pilot, but encourage them about anything, that that sticks.

**Support.** For two thirds of the participants, family played a supportive role in the decision and process of becoming a professional pilot. The participants spoke of parental approval as being one of the factors that facilitated their journey. In some cases, the women acknowledged they already knew that their parents would endorse any career path they chose, which allowed them to select a less traditional career.

Pilot Foxtrot remembered, "I could have said anything—astronaut, President of the United States, and they'd be like, 'Yeah, do it.' So that's kind of how it went." Pilot Lima had a similar experience. She recalled, "Whatever we wanted to do was fine with them." Pilot Lima jokingly added, "Provided it was legal." Pilot Delta agreed with this sentiment and continued, "If I want something done, I do it. And it's because my parents are always there to say I can do it."

Some parents took a very active role in their daughters becoming aviators. Pilot Echo stated regarding her mother, "We were middle class, and she went through the trouble and moved our family to a good school district so that I could pursue being a

pilot; so I could pursue what I wanted to do.” Regarding her father, who was an Air Force pilot, Pilot Echo said, “He was very proud and encouraging, once it was clear what I wanted to do on my own. He was very happy about that.”

Pilot Hotel’s father already flew for the airlines and was familiar with the training required to become a pilot. When he became aware of his daughter’s goal, she recollected her father, “definitely encouraged it and would tell me about all the women he flies with.” Pilot Foxtrot did not have any pilots in her family. When she told her parents that she wanted to be a pilot, they responded, “Alright, if that’s what you want to do, we’ll figure it out.” She described that they “definitely had no idea how to do it.”

In the case of Pilot Kilo, her parents were supportive of her goals, but they did not take the same initiative as the parents of Pilots Echo, Hotel, and Foxtrot. She explained:

My mother and father were very supportive because all of my life I kept telling them, “I’m going to be an airline pilot.” They always said, “oh, okay, that’s good.” They didn’t facilitate it, or they didn’t say anything, but they never said, “oh, you can do that.” And they never told me that I cannot do something.

The participants who did not have the support of their families spoke of the backing they received from their friends and peers. Pilot Charlie, who worked as an aerospace engineer for an aircraft manufacturer while waiting for the opportunity to fly with the Air Force, described her work environment as being one where “everyone’s supportive and thinks what you want to do is neat.” She also credits her colleagues with helping her apply to the Air Force at the right time. Pilot Charlie stated:

I knew people who were in the Guard there in town, and they were the ones that said, ‘Hey you should apply now. I heard the Air Force is super looking for pilots, and I know you wanted to do that. Well, why don’t you just come in?’

Pilot Charlie spoke of the camaraderie offered by her local chapter of The Ninety-Nines. Pilot Delta, who came from a supportive family, appreciated the importance groups, like The Ninety-Nines, can provide to someone like Pilot Charlie. Pilot Delta remarked, “I am in The Ninety-Nines, and I’m trying to get as many mentoring positions as possible because not every kid has that network or that support. So, I just love being that support for people.”

This point is illustrated by the background of Pilot India, who did not have a group of peers who could offer her assistance when her family discouraged her from becoming an aviator. Of the 12 participants, Pilot India was the most vocal about this point. She explained:

When I was child, I had wanted to join the Civil Air Patrol, and my mother had said, “No, if you want to learn to fly, actually, I know you, you just want to learn to fly, and it’s for rich people. Get it out of your head. If you want to fly, be a flight stewardess.”

Pilot India also reflected, “Civil Air Patrol would’ve been a really wonderful opportunity, and she didn’t realize that it wouldn’t cost money, but it was also too cumbersome for my family for me to be able to do an activity like that.” When Pilot India finally began her flight training decades later, she still did not receive the level of reinforcement she would have hoped for from her husband. She said, “My husband tried to be supportive. He had absolutely no interest in aviation.”

**Major findings.** The three phases of data coding that yielded the four themes and 10 subthemes provided an understanding of the participants' lived experiences. This insight created a composite of the phenomenon of a female's decision to become a professional pilot. While every participant had a unique story, the commonalities in what they conveyed served to inform the research questions.

**Research question 1.** Research question 1 asked, *What factors influence women to become pilots?* Interviews with 12 female pilots yielded three scenarios that prompted these women to pursue a career in aviation. These three prompts can be described as the influence of a role model, lived event, and personal epiphany. Table 4.3 shows the distribution of these factors.

Table 4.3

*Initiating Causes of Flight Training*

Prompt	Total Participants ( $N = 12$ )	% of Participants Who Experienced a Prompt
Role Model	3	25
Lived Event	7	58
Personal Epiphany	2	17

**Role model.** Three women attributed their decision to become a professional pilot to the affect a role model had on their lives. Two participants were inspired by their fathers, who were either airline or military pilots. Pilot Echo summarized her feelings of her father's career:

He just was a pilot, with a love of flight and love of the Air Force and contentment with what he had done. And being proud to serve and by talking

about the camaraderie and everything that he accomplished, that's what inspired me to want to be a pilot.

Pilot Charlie was the only participant who credited her aviation career to role models she had never met. Her interest in aviation was sparked by watching space shuttle launches on television. As a child, she reasoned to herself, "It's amazing that there are people and that is their career. That was where I started learning about the space program, so that made me think, 'I want to do that.'" In Pilot Charlie's endeavor to become an astronaut, she studied the skill sets of the current crews of the space shuttle program. In addition to being engineers, Pilot Charlie learned, "I knew that they were all pilots too." Becoming a pilot was a qualification she wanted to achieve so she would be more competitive for an opportunity on the space shuttle.

*Lived event.* A lived event was a prompt to become a pilot for seven of the 12 participants. The experience of flying as a passenger on an airline caused three of the participants to decide they wanted to pursue aviation. Pilot India said, "I took my first airline flight when I was 12, and I just knew I had to be up there." Pilot Alfa had a similar reaction to her first trip on an airline. "There was nothing that I was interested in. Just airplanes from that age on."

Two participants credited their aviation career to the first time they took the controls of an airplane, although the first flight was mentioned by other participants in terms of reinforcing their decision. Pilot Delta recalled that first experience in a small plane with a family friend:

My mom was in the back of the 172, and he just turned around and started talking to her. And she's like, "who's flying the plane?" He said, "your daughter." "What

do you mean, my daughter's flying the—she 8! She can't fly!" He's like, "look, she's flying the plane." I mean it was the Cessna, so they can fly themselves. But, yeah, it was really cool.

Pilot Juliatt also had fond memories of the first time she flew a plane. She described her choice to become a pilot as having "clicked that day." Pilot Juliatt mentioned the positive feedback given to her by the instructor accompanying her on that flight as being integral to her decision as well. Pilot Lima, although she had already been exposed to flying through a ground school course, was in agreement about the profound effects of the first flight. She commented, "I took a lesson, and the first time up, I was hooked."

Pilot Lima was one of two participants who came to aviation by means of a course she took independently from her flight training. While making plans to continue her education, she looked through a catalog of night classes at a local college for ideas that might interest her. Pilot Lima recalled, "I found there was an aviation course, so rationalizing that aviation was here to stay, I took that course."

Pilot Golf was the other participant who was initially introduced to the flying profession from a class. She shared:

I got a mailer from the community college, and it was just general interest things, like pottery and cake baking, that they send out. They're evening courses, so general interest. One of them was about Private Pilot or something. I thought it was just general interest about what's this exposure to an airplane. I walked into the class the first day and found out, oh no, it was Private Pilot ground school. The full-blown FAA ground school, and it was a semester long 2 nights a week,

3 hours each night. The next day a friend pilot said, “How was it?” And I said, “Oh no, this is not what I thought. This is to learn to fly.” And her answer was to me, “Wait a minute, haven’t you always wanted to learn to fly?” And I said, “Yeah, I have.”

In addition to taking ground-school classes, Pilots Lima and Golf had other commonalities in their narratives. They both decided to take a flight lesson at the conclusion of their course. Lima and Golf also had friends or family members supporting their decision to progress through ground and flight training.

*Personal epiphany.* The third prompt that was associated with the decision to become a professional pilot was personal epiphany. Two participants reported this scenario as their motivating factor. Both women had already been exposed to aviation previously, but the idea to become a professional pilot occurred separately. The circumstances behind this decision were very different for each pilot.

Pilot Foxtrot had been on commercial planes as a passenger and had a friend of the family who was an airline pilot. Neither of these phenomena were directly attributable to her decision to go into aviation. Pilot Foxtrot described the moment she had her realization:

I say it was a God thing, because it just popped into my head one morning, where I was, like, I always enjoyed flying commercially when we would go on vacations. I thought it was the coolest thing ever. One morning, it just occurred to me that I could, potentially, do that.

Pilot Bravo told a unique story. Her husband, a former pilot, was diagnosed with a terminal illness at a young age. A friend of theirs owned a small plane and offered to take

them for a flight. After they landed, Pilot Bravo's husband asked her, "Would you get your pilot's license, so I can spend what time I have left on this earth in an airplane?" Pilot Bravo reluctantly agreed and earned her Private Pilot certificate. For an extra measure of safety and with the help of friends, she continued working toward additional pilot ratings while her husband's illness progressed.

His death left her devastated and feeling lost. About a year later, Pilot Bravo received an offer from an acquaintance to teach aviation to high school children. This conversation sparked a change inside Pilot Bravo, which she recounted:

I literally saw this big black cloud lift, and I said, "This is my husband telling me what I need to do. This is; this is it. This is what I have to do." I said, "You have no idea what you just did," and from that point, I started right there. I got my flight instructor. I started teaching the kids. I started my organization. I started working with all of that, and that's what really got me into working with people, teaching and inspiring others, that I knew that this was Mario's time, which was a gift that he left for me to share with others.

**Research question 2.** Research question 2 asked, *What strategies can be used to improve the recruitment of female pilots?* The findings for this research question are based on both suggestions provided by the participants and background information that was shared during the interview.

**Outreach initiatives.** When the candidates discussed how to increase the number of female pilots, their most common response was associated with the importance of outreach events and role modeling. Pilots Alfa, Bravo, and Kilo were already active in these activities. Alfa volunteered with several groups that hold summer camps for

elementary, middle, and high school age students. These programs are designed to introduce children to potential careers in aviation, including the opportunity to become a pilot. Pilot Alfa was also a frequent speaker at events like Girls in Aviation Day, an annual event that is sponsored by Women in Aviation, International. Girls between the ages of 8 and 17 years are introduced to professional opportunities in aviation.

Pilot Bravo founded her own organization, with the mission of reaching disadvantaged youth, particularly girls, and providing them with aviation experiences and education. Pilot Kilo began a chapter of The Ninety-Nines where none had previously existed. Both of these organizations can reach females who may not have had any other access to aviation and female pilots.

Pilot Delta, much like Pilot Bravo, stated that she would like to have her own plane so that she could start participating in events that raise awareness about career possibilities in aviation. She stated:

The only thing I really aspire to do is to eventually have my own plane so I can participate at the local airport. There's a Community Day where people volunteer to take people up in the planes and introduce them to flying. So I really want to get involved in that.

Pilot Foxtrot gave an example of a program being offered by the Girl Scouts and its relationship with gender-based expectations:

There's a group here that was talking about Girl Scouts, and how they've made a patch for Girl Scouts for aviation. I think that is one of the things, or an example of things, that we should be doing. I don't think it occurs. You think about an airline pilot as a kid, and you think of a male. You think of a male, an older male.

That's why, when people see me in the airport, they think I'm a flight attendant. They can't believe I'm a young girl that is an airline pilot. So, I think that there should be more things like that, or more programs like that, where it can occur to young girls that this is a possibility. I think it just doesn't occur to them. I think that when they're growing up, they don't think . . . . That's not one of the top things you think of as an option. They think of a nurse, or a teacher, or something that females are more prevalent in. They don't think, "Oh. What if I flew planes?"

Pilot Hotel previously participated in Women Can Fly events, which offered free plane rides to elementary, middle school, and high school students. She has also visited STEM schools in her area and made presentations on aviation. Pilot Hotel mentioned a program her high school offered, in which students are asked about their interests, and they are then connected with someone knowledgeable in that field. Pilot Hotel already knew, at that time, that she had an interest in aviation. Her high school sent her to a local airport for 1 week to meet with a flight instructor, during which time they spoke about the flight training process.

Pilots Echo and Golf brought up the importance of introducing girls to aviation at an early age because the opportunity to see or interact with women pilots is still rare.

Pilot Golf offered a personal anecdote:

I was in the elevator going down to hop in the van and go out to continue flying. Apparently, there was a pee-wee soccer tournament, and I don't know if it was all girls or co-ed, but there was a little girl that got on the elevator with me. She was in her soccer uniform. I don't know how we got the conversation going, but she said something about me being the stewardess. She used that word, instead of

flight attendant. I wasn't going to correct her and all. The more I thought about it, fortunately, it was a long enough elevator ride. I said, "No, I can't do this. I have to let her know that I'm not the flight attendant. I'm the one flying that airplane," because she needs to know she can do that. When I told her she was like, "You can fly airplanes?" and I said,

"Yes, I can and you can, too. You can do anything you want to do." I think that's part of it, is let young people know they can do anything. Let them know it's okay to have that family, if they want to have the family, and have a career, whatever the career is.

Pilot India, who started her flying career at a later age, liked to talk to children and adults about the possibilities of a career in aviation. She has said to women with grown children, "Wow, you can have a whole new part of your life here." Pilot Lima agreed with this strategy. She advocated, "Tell females that they should always be adventurous and try new things, whether it be flying or something else because you might find out that you really like it." Pilot Lima was a frequent guest at aviation events, particularly those aimed at younger girls. In addition, she was an advocate for the Women Airforce Service Pilots, educating the public about their contribution to the war effort and campaigning for military recognition by the United States government.

Pilot Kilo also enjoyed speaking to women who had not yet considered aviation as a profession. She shared, "I just have this passion about flying, and everybody should feel that way, and if they want to fly, I would do everything I could to help them. It's not just a feeling, it's everything, you know?"

## Summary of Results

This study was a phenomenological qualitative analysis of professional women pilots. The research was grounded in Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory. Semi-structured interviews were conducted with 12 professional female aviators. The research questions that guided these interviews were:

1. What factors influence women to become pilots?
2. What strategies can be used to improve the recruitment of female pilots?

The data resulting from these interviews was coded, resulting in four themes and 10 subthemes. The four themes were motivation to fly, role models, events, and support. These themes, together with the subthemes, were discussed with supporting examples of quotes provided by the participants. The major findings of this study emerged from the themes. These results helped the researcher to explore the reasons and motivating factors behind the participants' decisions to become pilots. Knowing what caused these women to enter this career may contribute to a better understanding of how to recruit more female pilots, which was detailed in the second major finding. In both cases, comments and observations from the participants were provided to substantiate the results.

The participants offered three overall motivating factors that inspired them to become a professional pilot: (a) a lived event, (b) the influence of a role model, and (c) a personal epiphany. The most common answer of what caused the participant to pursue aviation as a profession was the impact of a lived event. This factor was cited for seven of the 12 participants. These women either flew on an airplane as a passenger, took the

controls of a small airplane, or attended an FAA class. Six of the seven participants who reported a lived event also spoke of the support they received from friends and family. The significance of a personal aviation experience can be reinforced by the suggestion of attracting more female pilots through outreach programs and events.

Three participants became pilots due to the influence of a person or role model. Two of these women had fathers who were professional pilots, and one participant was inspired by the astronauts she watched on television. The remaining two participants decided to pursue aviation because of a personal epiphany that convinced them that it was the correct career path for them.

Consistent with the literature, the influence of role models was a relevant dynamic for most of the participants. Role models did not have to be personally known, and the role models were both male and female. Support from family or peers aided their decisions to become a professional pilot. For those pilots who deferred flight training until later in life, an event was cited as a motivating factor in facilitating their decision.

In response to the strategies that can be used to recruit other female pilots, 11 of the 12 participants spoke of the importance of outreach initiatives. Commonly referenced programs included the Girl Scout's Aviation Day and their Aviation Badge, Girls in Aviation Day, and Women Can Fly. Many of the participants had either created their own outreach program or used their own resources and opportunities to connect with potential female pilots on an individual level.

Chapter 5 discusses the implications of these findings, as well as the limitations and suggestions for further research. In addition, the implications will be linked back to the literature review.

## **Chapter 5: Discussion**

### **Introduction**

The purpose of this qualitative phenomenological study was to identify reasons why females became professional pilots. Building upon this information, the secondary purpose of this study was to explore strategies for increasing the number of future female pilots. This research utilized semi-structured interviews with 12 professional, women pilots, and the research explored the participants' histories and circumstances surrounding their decisions. This study was guided by two research questions:

1. What factors influence women to become pilots?
2. What strategies can be used to improve the recruitment of female pilots?

The interview questions allowed the participants with the opportunity to provide various demographic information about themselves, a narrative regarding their journey to enter flight training, and suggestions for how the next generation of female pilots can be recruited. Having an understanding of how these women chose their career can be pragmatic in helping other females with this same decision. This study was framed and evaluated through the lens of Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory. These theories offer explanations of how children select or eliminate career possibilities.

Chapter 5 addresses the implications of the research findings, the limitations of the research, and the recommendations for future research. The findings and implications discussed in this chapter provide a better understanding of how women, who were

already professional pilots, decided to enter this vocation. This information is applicable not only to females who are considering a career as a pilot, but it is also for girls who may not realize that aviation is an option available to them.

Previous studies suggest that females perform at least as competently as males in the cockpit. An analysis of the National Transportation Safety Board database revealed that there was no significant difference in the number of accidents attributable to human error for male and female pilots. Male pilots were responsible for more fatal accidents than females, and the difference in those rates was shown to be statistically significant (Bazargan & Guzhva, 2011). Furthermore, research suggests that few significant differences exist between the ability of males and females to complete flight training (Kantor et al., 1979; Walton & Politano, 2016).

These studies suggest that women are capable of being safe and successful aviators. Despite their aptitude in this field, females still represent a small minority of professional pilots. According to the FAA (2017) database of pilots, women represent barely more than 5% of the professional pilot population in the United States. This number has been fundamentally constant for several decades, while women have thrived in other careers (Strand, 2014). During these decades, the pool of retiring military pilots has diminished, causing airlines and other businesses in the aviation industry to find eligible personnel from civilian sources (Anderson, 2001). This change in hiring practices has created an opportunity for women to enter the pilot workforce, but they have not capitalized upon these openings.

The dearth of female pilots may be, in part, rooted in the process of selecting a vocation. Two career theorists expanded upon the influence of gender and self-identity

throughout this process. Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory help elucidate the phenomenon of aviation remaining a male dominated profession. The process of selecting a career begins at a very young age, during childhood, and these decisions are compounded as an individual matures. Both Eagly (1987) and Gottfredson (2002) maintained that career choice is affected by what is modeled by family and friends and also what is demonstrated in popular culture (Gottfredson, 2002; Koenig & Eagly, 2014). The proportionally small population of professional female pilots results in an absence of visible role models for potential women aviators and creates the misconception that flying is a career only suitable for males.

Boeing's 2018 *Pilot Outlook* shows that with the current growth and demand, 790,000 new pilots must be recruited and trained during the next 20 years. North America will require 206,000 of these pilots. This booming demand for aviators, happening at a time when FAA data (2017) show a stagnant number of current qualified pilots, which has resulted in a pilot shortage. Females could play a critical role in alleviating the shortage, but they have yet to enter the pipeline of future aviators in sufficient numbers.

The academic research on this topic has not yet resulted in a significant growth in the number women joining the aviation field. If the number of female pilots is going to increase, both for their own self-actualization and to fulfill staffing demands, the factors that draw women to aviation must be identified and considered for recruitment purposes. Awareness of the dynamics and journey experienced by females who became professional pilots may advance this endeavor.

## **Implications of Findings**

The findings of this study are consistent with the theory and recommendations discussed in the literature review. Explanations provided by Eagly (1987) and Gottfredson (2002) regarding why individuals pursue or eliminate career options are reflected in the data. Likewise, the significance of role models and support from others is evident in this research. These findings have implications that can be applied by the aviation industry for recruitment and hiring practices of future women pilots. The implications can also inform females who are choosing whether to pursue aviation. Furthermore, these implications will contribute to the limited body of knowledge regarding the female pilot population within the academic community.

Little research exists regarding the reasons why women become pilots. Most literature discusses barriers to entry, obstacles encountered while in flight training, and gender-related experiences in the professional flight environment (Ashcraft, 2005; Davey & Davidson, 2000; Hynes & Puckett, 2011; Mitchell et al., 2006). This research builds upon Germain and Hamilton's 2012 study of female pilots and Hamilton's ensuing research in 2014. Hamilton (2014) surveyed female pilots with a more diverse set of FAA certificates, including many females who were undergoing their primary training. While Hamilton (2014) contacted a more varied group of pilots regarding a broader range of topics, this current study focused specifically on professional pilots and career choice. The process of selecting a vocation is associated with Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory. This research is framed by those theories and applies them to the aviation field.

The implications of the major findings are presented below. They are categorized according to their corresponding research question. Interviews with 12 participants yielded common themes regarding the backgrounds of the women who chose to become professional pilots. The data are organized into four major findings, which are used to address the research questions.

**Research question 1.** The first research question asked what factors influenced the women to become pilots. This question required an examination of the backgrounds of the female pilots who participated in this study and how they arrived at their decision to enter aviation. Two findings are associated with this research question.

Detailed demographic information provided by the participants created a more meaningful understanding of the participants who decided to become professional pilots. Much of this demographic data were collected as a recommendation for further research by Hamilton (2014). The participants shared their socioeconomic status as a child and whether they had ever been married or had children.

***Finding 1: The mental model of who can become a pilot must be expanded.***

None of the participants identified their childhood socioeconomic status as being higher than upper-middle class. Most described their family as middle class, and three participants designated their families as lower or working class. The cost of flight training is a common concern for people considering taking lessons. Pilot India's mother prevented her from commencing flight training for this reason.

Indeed, the price of the necessary certifications is a considerable financial undertaking, but it does not automatically exclude those people who do not have the immediate resources to cover the expense. Military flight training resolved the problem

of cost for two of these three participants. Scholarships, grants, and loans are available to assist student pilots who cannot pay for flight training on their own. Socioeconomic status is not necessarily a predictor of who can become a pilot.

Similarly, aspirations of having a family does not preclude a female from becoming a pilot. Of the 12 participants, five reported being married, and two reported being widowed. Five of the participants had at least one child. The roles of motherhood and professional pilot are not mutually exclusive. One participant spoke of the flexible maternity leave program offered by her airline. Her husband, also a pilot, was entitled to paternity leave. Careful work scheduling can ensure that at least one parent is always home and available to care for children.

The participants reported initially becoming interested in an aviation career at the average age of 18.2 years. According to social role theory, people at this stage of development have already observed enough women in the roles of wife and mother to know that it is a cultural norm (Eagly & Wood, 2012). At the time when females are considering a career in aviation, they may have already incorporated the potential roles of wife and mother as part of their self-concept. These ideas do not have to be discarded in place of a piloting career. Balancing the demands of aviation with family life may be a feasible compromise for females planning to marry or have children.

Family was also central to the decision of becoming a professional pilot regarding the level of support they provide. The participants who acknowledged receiving approval from their parents, when they told them of their aviation plans, tended to begin flight training much sooner than those participants who did not receive at least verbal support from their parents. The participants who did not share their goal with their family, or

whose parents were not in agreement with their goal, did not initially begin flight training. They abandoned aviation for some period of time and then returned later in their adulthood, usually as a career change.

***Finding 2: The members of the aviation industry can effect change.*** Although the aviation industry is still predominantly male, a welcoming and encouraging environment for potential women pilots can be created. Every female pilot who participated in this study spoke positively about her male flight instructors. Some participants considered their instructors to be role models, while others reminisced about how encouragement from these men facilitated their training. The influence of these relationships cannot be underestimated. Hamilton (2014) found that two of the top-10 reasons why women discontinue flight training is due to poor communication between male flight instructors and female students and the perceived apathy of flight schools regarding the differences between male and female life experiences.

As discussed in the literature review, the most effective role models are those who are personally known to an individual, are relevant, and whose achievements are also attainable by the individual (Lockwood & Kunda, 1997). The male flight instructors discussed by the participants matched this criteria, however, they did not possess the additional benefits that could be offered by a female flight instructor. Gibson (2004) and Stout et al. (2011) suggested that same-sex role models present a better matched behavior and improved preservation of self-concept. As demonstrated by the 12 participants, male flight instructors can be effective with female students despite the additional cognitive step that is required in translating behavior from a person of another gender.

Several of the participants mentioned the support they received from other males they encountered in the aviation industry. Pilot Juliett spoke of the car rides to the airport that she accepted from her contact in the Civil Air Patrol. Pilot Hotel was assisted by the general aviation pilot she met through the Dream Week program. Pilots Alfa and Kilo were both encouraged by the male pilots they visited in the cockpit of an airliner they were flying on as passengers. All of these examples happened in the course of the typical working day for the established pilots, and they had a profound impact on these women who had yet to begin their flight training. The success of one-on-one outreach was observed in the stories of many of the participants. While individual contact with prospective pilots may be a time-consuming initiative, its demonstrated power makes it an important tool to engage future aviators.

**Research question 2.** The second research question asked what strategies can be used to improve the recruitment of female pilots. This question can be answered by analyzing the commonalities among the participants and determining the effective access points that provide potential female pilots with reliable career information. Two findings are associated with this research question.

***Finding 3: New and revised recruitment strategies are needed.*** All but one of the participants reported having a college degree. It is worth noting that this participant is from an era when approximately 6% of American adults over age 25 had attained a bachelor's degree or higher (National Center for Education Statistics, 2016). This participant stated that her life's biggest regret was not attending college. Six of the participants reported having graduate degrees. This consistent importance placed on formal education by the participants indicates that colleges and universities are

worthwhile settings to recruit potential pilots. For students who are enrolled in courses of study other than aviation, they do not necessarily need to change their major or transfer to an aeronautical college. Most of the participants did not study aviation at the undergraduate level. The flight training and education required to become a professional pilot can be completed at a flight school, independent of higher education institutions.

The participants were asked about their extracurricular activities during high school and college. Nine pilots stated that they played sports while in school. The most commonly cited sports were tennis and softball, each being listed three times. Marching band was also mentioned by three participants. Although studies have been conducted on correlations between extracurricular activities and successful flight training, research has yet to suggest a definitive relationship (Jaquez, 2013). However, with tennis, softball, and marching band each being cited by 25% of the participants, these activities at the high school and collegiate level could be a possible source of future female pilots.

***Finding 4: Educators and others can influence career selection through their dissemination of information.*** Many of the participants, who knew from an early age that they wanted to become pilots, stated that they did not know the process or requirements for achieving their goal. The guidance counselors and career services offices at their high schools did not have any information available on how to become a pilot. The participants reported that they often received bad or outdated information, such as pilots must be trained by the military, or pilots must have 20/20 uncorrected vision. Wrong information shared by a supposed expert could dissuade an interested person from pursuing the career any further. High school students are in Gottfredson's (2002) fourth

stage of circumscription, a time when they are eliminating careers that they do not perceive as compatible (Gottfredson, 2002).

High school is one of the most essential places for students to receive correct information about any career they wish to pursue. Access to helpful resources could be one of the prompts discussed by Eagly (1987) and Gottfredson (2002) that causes someone to reconsider a career that had been previously discarded. High school students are at an age when this reassessment is possible because an individual's sense of self is still being formed, and behaviors are being defined (Eagly & Wood, 2012; Gottfredson, 2002). A high school student who is seeking a career as a professional pilot may decide to attend an aeronautical college, a choice they may not have made if they were relying on inaccurate information.

The future employment numbers cited in Boeing's 2018 *Pilot Outlook* suggest that the vast opportunities in the field are too substantial to continue being overlooked by secondary schools. Participants who decided to become professional pilots before reaching college all found sources of information outside of their formal school setting. Often, they needed their parents' help in locating individuals who could answer their questions. One participant attended a high school that created a network of relevant experts to nurture students' interests.

The Dream Week program, described by Pilot Hotel, is an effective example of utilizing outside experts. Each student shared one of their interests, and the high school matched the student with an expert in that field. Students spent 1 week learning more about their area of interest and how to pursue a career in that field. This type of program was one of the suggestions offered by Anderson and Pucel (2003) to recruit more pilots.

Their study suggested that information is more influential when it is received from an expert, rather than an intermediary. The role of outside experts, as reported by the participants, supports this theory.

**Unanticipated results.** The participants shared anecdotes of supportive and discouraging encounters that occurred when they were still considering a career in aviation. When the participants referred to unsupportive comments that were made regarding their career aspirations, in all cases, these remarks were made by other women. The most blatant example is the flight attendant who told Pilot Kilo that she could not fly, which was immediately dispelled by the captain giving Kilo a pair of pilot wings.

The matter of females undermining women pilots exists with some prevalence. Both female pilots and non-pilots question the abilities of women in the cockpit. A survey performed by Sunshine, an online British travel agency, found that 51% of all respondents said they were less likely to trust a female pilot. Within these respondents, 61% of the women surveyed admitted to having less faith in a female pilot's abilities (Anderson, 2013). At the same time, a study of perceptions among pilots showed that some female pilots held negative perceptions of female pilots, in general, including with regard to safety orientation. The researchers theorized that in a male-dominated profession, such as aviation, women pilots may underestimate their own abilities (Mitchell et al., 2006).

Another unanticipated result was the reported consistency of experiences by all age groups. The participants covered a 71-year-age range, with the oldest pilot having commenced her flight training in the early 1940s. That participant stated that she was supported by her family when she told them that she wanted to become a pilot. Similarly,

she had a good experience with her flight instructors, especially her first instructor, whom she considered to be the best instructor she ever had. These reports of encouragement from family and other pilots are comparable to the ones made by the youngest participants.

In the 1940s, women were more of a rarity in aviation than they are in the 21<sup>st</sup> century. Pilot Lima, a member of the Women Airforce Service Pilots during World War II, spoke of her family supporting her decision to enter aviation. Her desire to fly, sustained by her parent's response to her goal, outweighed popular opinion and even the military's resistance to female pilots for Pilot Lima. If the impact of support provided by family, friends, and instructors transcends the multiple generations represented by the participants in this study, it may be one of the most critical factors in a female's decision to become a pilot. Hamilton (2014) cited lack of support from family and friends as one of the top 10 barriers in completion of flight training for females.

### **Limitations**

There are three major limitations connected with this study. The first is the demographics of the participants. The researcher identified the participants through a purposeful sampling. Part of the selection criteria was to find pilots of different ages who had worked in various types of flying so that a more generalizable set of findings could be attained. Other factors, such as ethnicity and religion, were not prioritized and, therefore, they were not addressed in the research.

The second limitation is the sample size of the participants. There is a limited amount of research regarding women pilots. Future studies with more participants would improve understanding of this topic. Also, this study was conducted in one location, and

the participants were associated with one organization. Additional and different results might be obtained from studies of other professional female pilots.

Third, the researcher is a member of the population she studied and works with students pursuing an aviation education and career. Her background enriched her understanding of entering this occupation and helped gain access to her participants. A strong background in aviation was also beneficial during the interviewing and coding stages. At the same time, the researcher may have been subject to positionality, although this was somewhat mitigated by the use of peer debriefers. Research conducted by someone other than a professional female pilot may yield other findings.

### **Recommendations**

After careful examination of the results and implications, there are three sets of recommendations for this study. These recommendations pertain to mentorship, increased outreach, and suggestions for further research.

**Mentorship is essential for recruitment.** As discussed in the literature review, mentors serve an important function for individuals who are in the beginning stages of their education and career. The visibility of mentors has been shown to improve the diversity of a field that was previously dominated by one demographic. For females who are interested in becoming pilots but either lack the support of their family or do not know how to become a pilot, mentors could provide a life-changing service.

Ideally, women pilots should serve as mentors for females interested in aviation. Due to the low number of women pilots, it is unlikely that nascent female aviators will be able to locate a female mentor. This was experienced by most of this study's participants. Also experienced by most of the participants was the impact a male pilot had on their

decision to enter aviation. Male pilots may have to assist women in mentoring the next generation of aviators—at least until the number of female pilots becomes more substantial.

One way in which future pilots can be identified and introduced to mentors is through outreach initiatives. Several female-oriented aviation groups, such as The Ninety-Nines, Women in Aviation, the International Society for Women Airline Pilots, and the International Aviation Women's Association, already feature these services. One obstacle to accessing these mentors is that interested females would already have to be cognizant that such organizations exist. Collaboration with a non-aviation group, such as the Girl Scouts, could help increase awareness of these organizations.

Social media can provide another access point to mentors, and some have been quite effective in doing so. The membership of Female Aviators Sticking Together (F.A.S.T., 2018) has grown to almost 10,000 licensed female pilots within the 3 years of its inception, with 1,000 women joining in its first 30 days. The progression of this group demonstrates that the use of newer modes of communication, such as social media, can reach large audiences in a short amount of time. F.A.S.T. is a private group with prospective members needing approval by the administrators, but a public group intended for younger audiences could be formed.

Mentorship by experts could fill a deficiency that exists in sharing accurate information with future female pilots. Some participants in this study knew from a very early age that they wanted to become pilots, and others entered the field as a career change. In both cases, the participants had to research the requirements and process of becoming a pilot. Several participants received incorrect information. Trusted sources,

such as career and guidance counselors at secondary schools, were often the source of misinformation. If guidance and career counselors do not have the expertise to give meaningful advice to potential aviators, they should have outside resources, such as female pilot mentors, readily available for the students to access.

For the females who knew at a young age that they wanted to pursue aviation, often their parents shared in learning about how to enter this career. Considering the highly influential role parents demonstrated in the lives of the participants, families should also be familiarized with the process of becoming a professional pilot. The advice they provide their child will help the child to be better informed. The parents of the participants who had to seek outside experts for guidance learned, alongside their daughters, about the process of becoming a pilot.

Educating younger girls about their potential as future pilots allows them to explore the career before actually entering the workforce, as was true for all the participants who were younger than age 40. This is beneficial to the airlines that are currently required by law to retire pilots upon reaching age 65. Hiring younger pilots provides a longer career for those aviators wishing to stay employed by the airlines. From the employers' perspective, longevity produces more pilots with relevant experience. For employees, extended time at one company typically increases seniority, which positively affects salary, scheduling, domicile location, and choice of airplane to fly.

**Innovative outreach models will benefit more females.** Several outreach programs already exist that focus on introducing girls to aviation. Many of the participants mentioned their involvement in these programs as a way to inspire future female pilots. The Girl Scouts have partnered with various organizations to create local

programs for participants to earn their aviation badge. The Ninety-Nines offer introductory flights to prospective pilots through their Let's Fly Now! program. Women in Aviation, International founded Girls in Aviation Day, an annual event held worldwide that allows girls between the ages of 8 and 17 to explore aviation and aerospace.

One of the benefits of having organizations offer these programs is that they can mobilize individual efforts and publicize the event for greater participation numbers. Although these programs are relatively new, they are reaching a large number of potential aviators. For example, the fourth annual Girls in Aviation Day, held in 2018, had 15,000 attendees engaging in 99 individual events throughout 15 countries (Women in Aviation, 2018). While not all attendees will become pilots, the large number of girls participating in the events indicate that awareness is being raised about the opportunities available to women who are interested in this career. The development of more programs like Girls in Aviation Day can further this awareness. These organizations can also be a source of accurate information for the girls who need more information on the process of becoming a pilot.

Leaders in the aviation industry can contribute to these initiatives, and many are already doing so. In 2018, Virgin Australia announced a new goal for their Pilot Cadetship Program, targeting a 50% female enrollment in their incoming class. By November 2018, Virgin Australia reported a 56% female population in their cadet program. This was a 200% increase over their previous program. Recruitment took place over a 13-week period, with applicants going through a merit-based selection process based on interviews, abilities testing, personality profiling, and reference checks (Virgin Australia, 2018). Following Virgin Australia's successful recruitment efforts, other

airlines should create similar programs, particularly with the new pilot cadet programs being offered by airlines in the United States.

Industry leaders can help improve visibility of women aviators through their presence in the media. For the past several years, Boeing (2018) has featured a female first officer on the cover of their pilot outlook reports. During the Winter 2018 Olympics, United Airlines launched a publicity campaign featuring the athletes, as well as United employees, as superheroes. Standing front and center in their advertisements was a female pilot (Gianatasio, 2018). She was equally visible in a series of commercials that ran on network television. This initiative by United allowed for even casual consumers of mainstream media to observe that females can be professional pilots. The advertisements may have resonated with females who had yet to see an example of a woman aviator. More advertising campaigns such as these would reinforce this message.

Outside of aviation, contributors to popular culture can also increase the prominence of female pilots. Gibbon (2014) cited the effect *Top Gun* had on the staggering proliferation of applications to the United States Navy. When asked about female pilot characters on television and the movies, the only example provided by the participants was Airplane Jane, a cartoon hippopotamus. While probably appropriate for small children, this character has little cognitive relevance for other populations. A positive female pilot character in a television show or a movie marketed toward older children and adults could cause viewers to consider new professional possibilities.

Likewise, books are another source of inspiration for career ideas. In 1980, Dr. Seuss authored a book entitled, *Maybe You Should Fly a Jet! Maybe You Should Be a Vet!* (LeSieg, 1980). The cover of the book featured a female pilot at the controls of an

airplane. Consistent with Eagly (1987) and Gottfredson (2002), Dr. Seuss demonstrated the importance of exposing young children to career possibilities at a very early age. The publication of additional books such as these could suggest to children that many vocations, with just one example being aviation, are available to them. This would prevent the unnecessary elimination of career options and begin the discussion within families at a much earlier age of how to pursue professional goals.

**Suggestions for further research.** More research, similar to this study, would improve understanding of the phenomena regarding females becoming pilots. It is evident that gaps in the literature still exist, and the lack of research is reflected by the inability to explain why women have not joined aviation as they have done so in other careers. Interviews with additional women aviators would increase comprehension of how their goals were pursued and attained.

The lack of female pilots is an ongoing and increasing problem, the consequences of which are being manifested in a pilot shortage. This is affecting not just the aviation industry, but anyone seeking to travel by plane or having goods and services provided by aircraft. When the circumstances behind the lack of female pilots are discovered, the aviation industry will be better prepared to locate their next generation of talent. In addition, females will be aware of another professional option, thereby increasing their likelihood to achieve self-actualization.

The presence of humans working in the higher levels of the atmosphere is a relatively new occurrence. The physical effects of this type of work are still not completely understood, especially with labor conducted in the flight levels not being subject to the protections offered by the United States Occupational Safety and Health

Administration. According to the Centers for Disease Control and Prevention (CDC, 2017), all people onboard aircraft are subject to increased levels of cosmic ionizing radiation due to the loss of protection offered by the atmosphere. Ionizing radiation has been shown by the World Health Organization Agency for Research on Cancer to cause cancer in humans (CDC, 2017).

The relationship between cosmic ionizing radiation and various forms of cancers, reproductive issues, and birth defects has yet to be defined. Within the United States, no official dose limits of cosmic radiation has been established for flight crews (CDC, 2017). Recent studies, such as the one conducted by McNeely et al. (2018), suggest higher incidents of cancer among flight crews when compared to the general population. Further studies regarding the long-term health of flight crews must be funded and expanded upon. The findings of this research may have profound implications for anyone who spends significant amounts of time in the upper troposphere.

## **Conclusion**

Females are a part of aviation history, dating back to hot air balloons in Europe during the 18<sup>th</sup> century. Women began flying airplanes within 5 years of the airplane's inception. World War I helped define a large-scale purpose for airplanes, and upon restoration of peace, pilots were recruited from former military aviators (Anderson, 2001). Future wars provided veteran pilots at a rate that mostly satisfied the demands of civilian aviation until the latter part of the 20<sup>th</sup> century. This hiring practice created a demographic expectation of a pilot and that resonates today.

Although popular culture still represents the typical pilot as a masculine character, research suggests that both males and females are capable of the job. Furthermore, the

growth of the industry demands that women join the ranks of career aviators. For the comparatively few females who are now professional pilots, a better understanding needs to be established regarding how they were able to select this career in spite of a mismatch existing between who they were and a perceived assumption of who becomes a pilot.

This qualitative phenomenological study utilized semi-structured interviews with 12 professional female pilots to explore their lived experiences. The participants were from a diverse age range and aviation backgrounds. Each participant identified the reasons why she entered aviation as a career and the circumstances surrounding that decision. The participants provided demographic and contextual information that supplemented their narratives. This data was analyzed and coded by the researcher, with the objective of identifying the essence of why these women chose to become pilots.

Four themes and 10 subthemes emerged from the data. These themes were frequently mentioned by the participants as the circumstances behind their decision to pursue a piloting career. The themes included motivation to fly, role models, events, and support. The participants discussed their love of aviation, the personal and public persona who influenced their career decision, and the emotional backing received from family or friends. This support, or lack thereof, was associated with the timing of the participants beginning their flight training.

The factors that influenced the participants to become pilots fell into three categories. For seven of the 12 participants, an experience of either riding in a plane, piloting a plane themselves, or taking an aviation class caused them to decide to become a pilot. Three participants cited the influence of role models who primarily inspired them to begin flight training. Two of the participants commenced their role as a professional

pilot due to a personal epiphany they experienced. The epiphany resulted from years of flying on planes or being related to someone who wanted them to become a pilot.

The participants had numerous suggestions on how to engage future female pilots. Many of the participants were involved in formal outreach programs, such as the Girls in Aviation Day. Most of the participants engaged in one-on-one dialogues with girls who are intrigued by the profession. All the participants agreed that these types of outreach initiatives are essential to growing the population of female pilots.

This research was framed by Gottfredson's (2002) theory of circumscription, compromise, and self-creation and Eagly's (1987) social role theory. Both theories examine the process by which individuals select, or exclude, their career choices. Eagly (1987) and Gottfredson (2002, 2005) underscored the importance of providing children with accurate information at the earliest age possible so that potential career choices would not be dismissed without due cause. The suggestions made by this study's participants could prevent such a misunderstanding from occurring. Many of the participants reported receiving incorrect information during their research on how to become a professional pilot. Their contributions, along with the contributions of the organizations of which they are a member, may help decrease the sharing of misinformation.

Identifying future pilots at a younger age is one major implication of this study. Accomplishing this requires spreading awareness to the general public that aviation is open to many diverse demographics. The traditional stereotype of the professional pilot must be relinquished. Mentoring of future aviators by current female pilots is critical, especially for those girls who do not have a support network. Furthermore, there is an

onus on the aviation industry to ascertain their future pilots. They already have the power and resources to change the narrative that aviation is a male-dominated profession.

In addition to curtailing the pilot shortage, girls should be introduced to aviation because not doing so prevents them from discovering their true potential. Janine Shepherd (2012), a motivational speaker and professional pilot who came to aviation through recovery from a devastating injury, said in a TEDx talk, “life is about opportunities – creating them and embracing them.” If girls are to create and embrace their lives, it is incumbent on others to help them realize their limitless range of opportunities.

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## **Appendix A**

### Data Collection Instrument: Semi-Structured Interview Questions

1. Tell me about yourself.
  - a. What is your age?
  - b. What is your marital status?
  - c. Do you have any children?
  - d. What is your highest level of formal education?
  - e. Where did you grow up?
  - f. What was your socio-economic status as a child?
  - g. What professional pilot jobs have you held?
2. What interested you in this study?
  - a. What made you want to participate in this study?
3. How old were you when you first became interested in pursuing a career as a pilot?
4. Prior to the start of your flight training, were you aware of any famous female pilots?
  - a. If so, which ones?
  - b. Did you consider these pilots as role models?

5. Prior to the start of your flight training, were you aware of any real or fictional female pilots in popular culture?
  - a. If so, which ones?
  - b. Did you consider these pilots as role models?
6. Prior to the start of your flight training, did you know anyone who was a pilot?
  - a. If so, were they male or female?
  - b. How were you related to this pilot (friend, family member, etc.)?
  - c. Did this person encourage you to become a pilot?
  - d. Did you consider this person as a role model?
7. Prior to the start of your flight training, did anyone nurture your interest in aviation?
  - a. If so, who?
  - b. Did this person have any affiliation with aviation?
8. Prior to becoming a professional pilot, did you have any other careers?
9. Why did you decide to become a professional pilot?
10. Does flying fulfill a personal dream?
11. Does flying fulfill your need for a challenge?
12. Does flying fulfill a love of freedom?
13. Did becoming a pilot present an opportunity to conquer a fear?
14. Do you consider yourself to be a risk taker?
  - a. If so, what previous activities cause you to define yourself this way?
15. Did you play sports in either high school or college?

16. Is there any additional information you would like to share that might be useful to this study?

17. Do you have any questions for me?

## Appendix B

### Sample Letter of Introduction to Potential Participants

Dear Fellow Pilot,

I am a doctoral candidate at St. John Fisher College, enrolled in the Ed.D. Program in Executive Leadership. I am conducting a study on the factors that cause females to become professional pilots. The purpose of the study is to gain a better understanding of the influences that play a role in the decision to become a pilot. This research may be useful in identifying ways to increase the number of female pilots.

If you are currently employed as a professional pilot in any capacity, or if you have ever worked as a pilot during any point in your career, I believe you can provide valuable insight through your participation in this study. This research is being conducted through semi-structured questions that will take place via individual interviews lasting approximately 60-90 minutes.

If you agree to participate in this study, your identity and all associated identifying details will be kept strictly confidential. Reports and publications that result from the data collected from this study will not include any information that identifies you as a participant.

There is minimal risk associated with your participation in this study. You may discontinue your participation for any reason at any point during this study. You may also refuse to answer any questions in this research study.

Your participation is greatly appreciated. If you are willing to contribute to this research, please respond within two weeks. Feel free to share this invitation with other female pilots.

Sincerely,  
Debra Henneberry  
Doctoral Candidate and Researcher  
St. John Fisher College  
(\_\_\_\_) \_\_\_\_-\_\_\_\_  
\_\_\_\_@sjfc.edu

## Appendix C

### St. John Fisher College INFORMED CONSENT FORM

**Title of study:** The Sky's the Limit: Factors That Affect Females' Decisions to Become Professional Pilots

**Name of researcher:** Debra Henneberry

**Faculty supervisor:** Dr. Josephine Moffett

**Phone:** (\_\_\_\_) \_\_\_\_-\_\_\_\_

**Purpose of study:** The purpose of this study is to gain a better understanding of why females become professional pilots and which factors are the most significant in this decision making process. This information may be used in increasing the number of female pilots.

**Place of study:** Greater New York City area

**Length of participation:** 60-90 minutes

**Method(s) of data collection:** The researcher will digitally record the interview and have it transcribed for analysis. The researcher may take notes during the meeting to support the recording.

**Risks and benefits:** There is minimal risk associated with participating in this study. You may discontinue your participation for any reason at any point during this study. You may refuse to answer any question in this research study.

**Method for protecting confidentiality/privacy of subjects:** No individual person or identifying details will be used in the research findings or presentation. Your identity will be kept confidential by being assigned a pseudonym in any data that is reported from this study.

*Your information may be shared with appropriate governmental authorities ONLY if you or someone else is in danger, or if we are required to do so by law.*

**Method for protecting confidentiality/privacy of data collected:** Your identity will be kept confidential through the use of a pseudonym instead of your name in all written documents. All electronic notes and recordings will be in password protected files. Hard

copies will be stored in a secured location until they are destroyed three years after completion of the study.

**Your rights:** As a research participant, you have the right to:

1. Have the purpose of the study, and the expected risks and benefits fully explained to you before you choose to participate.
2. Withdraw from participation at any time without penalty.
3. Refuse to answer a particular question without penalty.
4. Be informed of the results of the study.

**I have read the above, received a copy of this form, and I agree to participate in the above-named study.**

_____	_____	_____
Print name (Participant)	Signature	Date
_____	_____	_____
Print name (Investigator)	Signature	Date

If you have any further questions regarding this study, please contact the researcher(s) listed above. If you experience emotional or physical discomfort due to participation in this study, please contact your personal health care provider or an appropriate crisis service provider. A local resource is Phelps Hospital Counseling Services, reachable at (\_\_\_\_) \_\_\_\_-\_\_\_\_.

The Institutional Review Board of St. John Fisher College has reviewed this project. For any concerns regarding this study/or if you feel that your rights as a participant (or the rights of another participant) have been violated or caused you undue distress (physical or emotional distress), please contact Jill Rathbun by phone during normal business hours at (\_\_\_\_) \_\_\_\_-\_\_\_\_ or \_\_\_\_@sjfc.edu. She will contact a supervisory IRB official to assist you.

Audio recordings addendum:

All digital audio recordings and transcriptions of interviews will be maintained using a private, locked, and password-protected file and password-protected computer stored securely in the private home of the principal researcher. Electronic files will include assigned identity codes and pseudonyms; they will not include actual names or any information that could personally identify or connect participants to this study. Other materials, including notes or paper files related to data collection and analysis, will be stored securely in unmarked boxes, locked inside a cabinet in the private home of the principal researcher. Only the researcher will have access to electronic or paper records. The digitally recorded audio data will be kept by this researcher for a period of five years following publication of the dissertation. Signed informed consent documents will be kept for five years after publication. All paper records will be cross-cut shredded and

professionally delivered for incineration. Electronic records will be cleared, purged, and destroyed from the hard drive and all devices such that restoring data is not possible.

## Appendix D

### Approval Letter from NYNJ Section Governor of The Ninety-Nines Organization



April 15, 2018

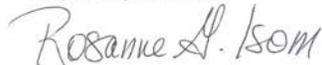
Dear St. John Fisher IRB,

As governor of the New York-New Jersey Section of The Ninety-Nines, I am writing in support of Debra Henneberry, an Ed.D. candidate at St. John Fisher College, to conduct her study on female professional pilots.

I give permission for Debra to contact members of the New York-New Jersey Ninety-Nines as potential research participants. We are happy to contribute to this research as it is consistent with the mission of our organization.

Please do not hesitate to call me if you have any questions.

Respectfully Submitted,



Rosanne G. Isom  
NYNJ Section Governor of the Ninety Nines  
Council of Governors Spokesperson  
New Jersey Chapter Member