COLLECTIF

WHY ARE THERE SO FEW WOMEN PILOTS?: A COMPARATIVE CASE STUDY OF WOMEN PILOTS IN UNITED STATES AND INDIAN AVIATION

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In 2017, *The New York Times* published a letter Amelia Earhart had written them shortly after becoming the first woman to fly across the Atlantic Ocean alone. Earhart's 1932 letter requested that the *Times* refer to her as Amelia Earhart instead of by her married name of Mrs. Putnam.[1] Now seen as a reasonable and easily granted request, her persistence introduced questions of identity in the changing public perception of women with impressive accolades. For decades, women pilots have made significant contributions to the aviation industry in the United States and globally — but with limited recognition. Traditionally, the relationship between women and transportation has been inherently political, seen through Saudi Arabia's policy change on women obtaining drivers licenses or NYU's discovery of the "pink tax" where women pay increasingly more than men on private ride-sharing apps to avoid harassment on public transportation.[2][3] Considering these events, issues of mobility and access are now shifting away from the gender-specific and exclusionary policies of the past.[4] The private sector of aviation has seen the most growth when it comes to the involvement of women pilots, compared to corporate transport and military aviation.[5] Overall, the increasing demand for air travel is forecasted to lead to the granting of 790,000 new pilot licenses over the next 30 years.[6]

Today, women make up only 7% of all pilots in the United States; up from 3% in1960.[7] Slowly, though, the number of women participating in aviation as students and as private and commercial flyers continues to climb, as do the strong international predictors of growth, specifically in the South Asian country of India. In 2018, India had the highest percentage of commercial women pilots in the world (13.9%) at the airline IndiGo; in comparison Jet Blue and Southwest airlines have both hovered around 4% for the number of women pilots on their staff.[8] These positive developments can be attributed to more than just a shift in culture. The average age of a pilot in the United States and Asia is approaching 50. As many reach the mandated retirement age of 65, the window for younger and more diverse recruits is expanding. Today, there are also more alternative and professional career options including corporate and business piloting that have flexible hours and have pilots operate jets for transport.[9] In addition, policies that prevented women from participating in combat missions in the Indian and United States Air Forces have been amended or eliminated in recent years.[10]

Despite increasing opportunities for female aviators, policy cannot be the only solution to solving the global pilot shortage. The aviation industry has been affected by the psychological concept of *stalled collective action*, where pilot schools and airlines are not filling the need for labor fast enough to meet the current demand.[11] Inviting more women into aviation spaces and relating piloting to its broader connections with STEM careers would not only diversify the field, but help to ease the labor shortage for pilot schools and airlines. For women, there are a variety of factors that influence the discovery, initial pursuit and maintenance of a piloting career. The purpose of this report is to contextualize why there are so few women pilots and propose solutions to increase the current number. This investigation interrogates four variables that may explain why women are outnumbered by men in the pursuit of pilot licenses and careers. Those factors include: (1) workforce safety; (2) the impact of gender role stereotypes; (3) access to Science, Technology, Engineering and Math (STEM) training; and (4) professional support. This paper will demonstrate that the existing arena for women in aviation is slowly improving, though the underrepresentation of women of color remains an issue. Greater accessibility to training, scholarships and role models can all serve as a potential remedy to the low number of women pilots in general and within the aviation industry.

Methodology

A comparative methodology was used to examine if the United States is a strong supporter of women pilots, while considering areas of growth through an international lens. India was chosen as the secondary case study to illustrate how both countries operate in the same industry, though from differing sociocultural perspectives. The four variables of the study were chosen to holistically address categories highly applicable to workplace success, specifically for women pilots.

While there was ample research on the importance of women's integration and retention in other professional settings, the small body of academic work on female pilots, specifically, proved outdated and warranted further investigation. The present research was approached through a gender lens to assess what realistic goals can be set to increase the number of women pilots in aviation internationally. This study aims to generate scholarly research and awareness to motivate young girls and women to consider piloting as a career path or as an activity that joins them to the wider general aviation community. In this paper, extra focus was given to the extensive efforts in both countries to work specifically on addressing gender-role stereotypes and professional support for women, particularly for ones pursuing pilot careers.

Discussion

The factors that describe the interaction between women and global aviation include workforce safety, the impact of gender role stereotypes, access to Science, Technology, Engineering and Math (STEM) training, and professional support. Collectively, these variables represent the varying degrees to which each helps or hinders the discovery, pursuit or development of women as pilots.

WORKFORCE SAFETY

The environment in which women pilots feel safe and describe the workplace are supported by data trends, policy change and guaranteed benefits provided by military, commercial and private entities. A comparison between India and the United States reveals the parameters for a realistic assessment of goals to increase the number of women pilots nationally.

Like Earhart, many other female aviators have found freedom in the skies and claimed recognition for women pilots. This includes the Women Airforce Service Pilots (WASPs), a civilian unit of the United States Army Air Forces that formed in 1942 to fly military aircrafts while men fought as combat soldiers overseas.[12] World War II was an era of increased opportunity for women in the workplace, but within two years after the war, there was a cultural transition to an age of preservation for female safety. Post-war, many non-traditional jobs (e.g., factory work, WASPs flight training) once praised as patriotic, were discontinued for women in the name of patriarchy. Almost forty years later, the WASPs were recognized with military status in 1977, and later granted the Congressional Gold Medal for their service.[13] For women in the military, gender-based caution was penned into law in 1948 as the official Combat-Exclusion Policy of the Women's Armed Services Integration Act. The act, voided in 2013 by former Secretary of Defense Leon Panetta, supported women as members of the Armed Forces but limited their capacity to administrative roles — ruling out active duty and combat responsibilities afforded to men.[14] Similarly, in the Indian Air Force, India's government cited the threat of sexual violence in enemy territory as its rationale for excluding women as fighter pilots and other combat participants.[15] Today, despite the repeal of India's Combat Exclusion Policy, there are still concerns with the prevention of violence against women overseas.

Within the context of safety, the idea that conditions inside the plane have become in many ways gendered spaces, where the planes are inherently designed to accommodate male bodies, is presented in recent research. In Penny Hamilton's "Teaching Women to Fly" research project, data suggest that even the physical interior of a standard plane accommodates men rather than women. Of the 157 female participants, 37.6% reported barriers in the physical environment, including outdated training or simulation equipment and the small interior of the cockpit that affected their pilot training.[16]

Air Force pilot Heather "Lucky" Penny suggested that in the short term, the aviation industry would benefit if the goal was to expand the percentage of women pilots to 30%. As the Director of the US Air Force Air Superiority at Lockheed Martin Aeronautics Company and Senior Resident Fellow at the Air Force Association, her approach to expanding representation specializes in business strategy and defense policy. When 30% of any organization is comprised of women, "the collective IQ of an organization increases substantially…and they get better."[17] In this case, rather than aiming for gender parity at 50% right away, the Air Force and commercial employers should aspire to securing at least 3 out of every 10 pilots to be women, in order to improve productivity and success. Increasing the goal incrementally allows for the existing community of women pilots to pursue mentorship, attract more students to the field and continue advancing into senior leadership positions.

With more than 50 female fighter pilots in the U.S. Air Force today, conversations around their professional and physical welfare aim for increased equity and inclusion. In a case brought against the Department of Defense, the American Civil Liberties Union (ACLU) argued that a concern for female safety should not equate to professional marginalization. In 2013 testimony, the ACLU argued: "Men do not have a monopoly on patriotism, physical ability, desire for adventure or willingness to risk their lives. Until both the responsibilities and the rights of citizenship are shared on a gender-neutral basis, women will continue to be considered less than full-fledged citizens."[18] In India, where a history of deeply recognized patriarchy has existed, the country has witnessed the addition of its first three women into the Indian Air Force, in 2017. By now, most Indian policies that excluded women from fully participating in the aviation industry have been withdrawn. However, to truly excel, India's current and future female pilots must also be guaranteed the same protection, benefits and support as their male counterparts.

One reason why India maintains the highest percentage, globally, of commercial women pilots is because of recently instituted policies by large airline employers — policies that stand in contrast to those in the United States.[19] Within the last decade, commercial Indian airlines like IndiGo and SpiceJet have instituted strategies to improve productivity and the well-being of pilots by reducing workplace stress with union mandated equal pay, on-site daycare services and commuting accommodations of "pick-up and drop-off services, accompanied by an armed guard," in areas that have been determined unsafe.[20]

This is a leading example of the effectiveness of recruitment techniques that attract women from all walks of life. The negotiation between respect and the genuine pursuit of an exciting career is no longer a primary battle for the growing number of female cadets and students in India's flight schools.

GENDER ROLE STEREOTYPES

Gender role stereotypes influence the careers and experiences of women pilots in a variety of ways. First, stereotypes that reveal *implicit biases,* or unconscious perceptions of character, impact policy and cultural traditions that work against efforts to recruit more women to the field.[21]

Historically, non-discrimination policies based on sex have been helpful, certainly, but have not extinguished other deeply-ingrained issues like gender role stereotyping in the United States and India. Gender roles are a series of characteristics performed or impressed upon an individual based on society, culture and time.[22] The goal of these assumed roles is often to maintain some patriarchal structure of power that does nothing to mend its relationship with women who resist. Chahat Dalal, a seasoned pilot in India, provides an example of a gender role stereotype: "People assume that women are bad drivers, so they must be bad flyers as well. For instance, if a female pilot has a harsh landing, she will often face snide comments about it. But if a man has a harsh landing, it's assumed that the weather is bad."[23] Given the underlying judgment of women, the stereotype perpetuates a legacy of mistrust and lack of confidence in women's abilities. *Microaggressions* like sarcastic comments, often mask larger, more systemic issues like the reality of India's labor force being only 29% female.[24] The lack of land ownership and the routine exclusion of women from financial institutions there contextualize

the power that aviation has to reverse these barriers.[25] While 47% of the United States workforce is female, women who do not fit into normalized categories are either stigmatized, sexualized or scrutinized.[26] The different degrees of patriarchy in Indian and American society represent varying obstacles that contribute to lingering societal resistance to women pilots. Regardless of geography, gender stereotypes that rely on a fixed ideal have become personal barriers that affect the woman, the family and the society at large.[27] Today, elements of culture and tradition remain paramount in the discussion of what women can do.

While some believe that life as a pilot introduces a prospect of danger or risk — elements assumed to be inherently masculine — data suggest that female pilots score higher on personality characteristics proven to strengthen their performance as pilots, when compared to men.[28] Though there is limited research on the risk taking behaviors of the female pilot community, it is possible that their behaviors might diverge from the more common risk taking behaviors of the larger female population, based on their interest and pursuit of aviation. While male and female pilots share an initial fascination with planes and a determination to succeed, women pilots in the U.S. Air Force were reported to score higher than men in the areas of extraversion, agreeableness and conscientiousness.[29] Being able to outwardly express confidence and adapt with flexibility are habits that women pilots tend to demonstrate better than their male counterparts. Out of the three characteristics measured, "agreeableness" has traditionally been connected to femininity and inherent care for others; however, there is a larger case to be made that what is truly being measured is women's persuasive management potential and skill.[30] "Conscientiousness," or self-awareness, was named as the most important trait that Air Force pilots should have due to the excessive demands for accountability, responsibility and consistency.[31]

Risk and masculinity are becoming increasingly uncoupled as the gender gap closes on self-reported and observed risk-taking behaviors.[32] In the example of post-war dismissal of WASP veterans, so-termed *benevolent sex discrimination* was used against them because of the assumed physical and emotional strength disparity between the two genders. This form of sexism is most often carried out by men who are trying to appear helpful but are still entrenched in the ideas of misogyny. The fact that there are so few women pilots in the world today may be related to the disproportionate amount of men to women in positions of power globally. Still, trailblazing women constantly disprove of what women are *supposed* to do. As a result, women have created an occupational identity for themselves that runs parallel to the confines of traditional gender roles.

Pilots make up only 0.002% of the entire world population; any and all sex discrimination, stereotyping and sexism negatively harms women and does nothing to benefit the aviation industry.[33] Identified as *societal implicit bias*, the three aspects of professional critique that women endure fall under the categories of ability, experience and authority.[34] An example of sex-based implicit bias was a 2011 incident in which a man refused to fly on an Indian airline where a woman was the senior pilot. According to the news report, he said: "I don't want to die! She can't take care of the house, how will she take care of a plane?" His comments are an example of inherent and personal bias against a woman in a position outside of his perception of accepted gender norms.[35]

Hostile sexism like that, where intentional and chaotic conflict occurs, can be severely damaging to women because of blatant disrespect and the maintenance of a superiority dynamic between men and women. It's important to correct inaccurate and harmful comments that prop up gender role stereotypes or implicit bias. In the United States, for instance, data confirm that there is no significant difference between the accident rates of male and female airline pilots.[36] Neither men nor women are the safer pilot group, and the average age of a female airline pilots is 38, seven years younger than the national average for men. Other indicators of skill include exposure to different types of planes and hours logged. In Penny Hamilton's "Teaching Women to Fly" study, 61 percent of female private pilots with military, instrument or advanced rating and glider training had completed 100 to more than 500 hours of flight experience.[37] All of these factors work to validate the capability of female pilots everywhere.

Even though the incident above sparked a discussion about value and gender roles in India, it is difficult to change stereotypes because of ever-changing views on authority. Today, social media and news media possess the power to dismantle negative stereotypes. Compare that to 40 years ago, when most people looked only to their parents to model what a man and woman should act like. The attack on women's authority in the aviation space is a direct function of traditional gender role expectations. Because female pilots have been identified as an untapped market for global airlines, international military services and private employers, commercial leadership scholars point to a fundamental political dilemma as the result: a resistance to women in authoritative positions to maintain a masculine pilot identity.[38] As long as gender remains a key feature of individual identity, naming an activity inherently masculine or feminine does little to explain what being a woman in the industry really means.

The 1997 study, *Female United States Air Force Pilot Personality: The New Right Stuff,* that distinguishes the personalities of male and female pilots, reinforces gender stereotypes by determining an ideal standard for women to reach as it relates to their sex. In this research, female Air Force pilots proved statistically different from both the male pilots and the female non-pilots. However, both groups of pilots were more alike than both sets of women.[39] Some argue that the women pilots, over time, adapted their personalities to align with that of the masculine ideal. However, a more convincing argument considers the parameters of the job.[40] When considering the need for attention to detail and an increased desire to succeed in the face of gender stereotypes, it makes sense that women are redefining what being a pilot looks like. The study concluded that the female pilots were more "similar" to male pilots than to women in general.[41] This result could be attributed to the obvious fact that pilots, regardless of gender, probably have more in common with each other than with those who don't understand the appeal and challenge of flight.

Analysts suggest that a woman's confidence and performance in highly selective and demanding tasks improved in response to specific, positive feedback on things they can control — such as effort, strategies and behaviors, all of which are influenced by the environment in which she is taught.[42] Irrespective of factors that make men and women similar or different, the power of discipline and their passion for flying is what connects them, regardless of the results of any personality test.

STEM TRAINING

Women's access to STEM opportunities through education, internships and workshops can contribute to the success of pilot training and completion of licensure. In particular, where there is no access or pursuit of physics, "the building block" to all other STEM disciplines starting in high school, students are less likely to get degrees in those fields. And, thus, less likely to be pilots.[43]

Science, technology, engineering and math are all relevant fields to the discipline of aviation. While neither the United States nor India has a formal requirement for pilots to obtain an advanced academic degree in any specific major, a variety of technical skills are beneficial to the success of a piloting career early on. Knowledge gained in most science-based curricula can relate to aviation proficiency, including aptitude in weather patterns, cockpit technology, physics and fuel calculations.[44] Sally Ride, NASA's first woman astronaut pointed to "lingering stereotypes" that socialize girls to disengage from STEM more than boys do starting in middle school.[45] One cause of the disparity in the number of female and male pilots today can be attributed to the lack of exposure, or the early academic withdrawal of girls in specialized subjects like engineering, mathematics and physics.

Even for women who do enter STEM occupations, without external investment or a positive long-term experience in their jobs, women are more likely to leave the industry entirely due to experiences of isolation from hostile work environments or minimal to no feedback from supervisors.[46] Almost one-third of women in the United States and 20% of women in India tended to leave their science, engineering or technology jobs within the first year.[47] Despite this trend, data suggests that women pilots are the anomaly, where over 52% continue their careers past six years.[48] In 2017, senators Susan Collins

(R-ME) and Tammy Duckworth (D-IL) introduced S.2244, the Promoting Women in Aviation Workforce Act. This bipartisan resolution would create a Women in Aviation Advisory Board for the Federal Aviation Administration and guarantee science-based workshops that focus on education, training and recruitment of women as licensed pilots across the United States.[49] Education and exposure are the bridge that will join a new generation of pilots with an industry that is projected to grow by 14% by 2020.[50] The bill also encourages industry stakeholders, including employers and leaders in the field, to expand opportunities, such as pilot training for youth, flight simulation and STEM education. These strategies, combined with accessibility for students, will help women from a young age learn about, and prepare for, a career in aviation. With evidence that girls are motivated by projects they find personally relevant and deeply meaningful, the continuation of this will help increase the number of young girls and women interested in aviation.[51]

PROFESSIONAL SUPPORT

Mentorship and professional development organizations are the cornerstone of women's involvement and inclusion into non-traditional career choices. Affinity groups, women-led workshops and outreach programs have provided extensive research on the ways to improve retention rates and value the experience of women pilots.

There are many reasons why some women choose to pursue life as a pilot, some of which include the fulfillment of a personal dream, the sense of freedom or the desire to conquer fear.[52] The universal aspiration to succeed at any craft, including one as dynamic as aviation, starts with an interest and is achieved with an environment of support. With increasing focus on the empowerment of young girls in male-dominated fields around the world, positive relationships with role models and mentors in their field of choice greatly influence the trajectory of the girl's future.[53] In celebration of International Women's Day, in 2017, India became the first country to have an all-women flight crew on its four longest routes from India to the United States, using 20 pilots and 75 cabin crew members in total.[54] Not far behind, in May of 2018 Alaskan Airlines in the United States confirmed the world's first flight operated solely by African-American women pilots and crew. Similar celebrations of diversity took place in countries like France, Ethiopia and Saudi Arabia.[55] This series of "unmanned" flight crews are an international example of representation that serves to engage the public and bring awareness to the growing presence of female pilots.[56]

While the United States reports to have a greater percentage of women in its Air Force (20%) than India's, Air Force (8.5%), this could be due to the difference in size between both forces. In 2017, there were 12,297 pilots in the US Air Force, in comparison to India's 585 active duty fighter pilots.[57] Beyond the numbers, both countries still have work to do on the topic of gender role stereotypes.[58] Brené Brown, a leadership scholar with extensive research in the arena of courage and vulnerability, introduced these elements to encourage women leaders to go against the status quo. In conversation with Colonel DeDe Halfhill, the director of innovation, analyses and leadership development for the U.S. Airforce Global Strike Command, they found that nowhere in the most recent Air Force training manual was there reference to a sense of belonging, team-building or common humanity, in comparison to the first version published in 1948.[59]

More broadly, as the pilot community grows, ensuring that mentors and instructors have the tools to offer authentic guidance is paramount to keeping learners interested. Halfhill noted that terms like tactical, operational and strategic leadership as they relate to pilots are important but "provide little guidance to young leaders on how to deal with the complexities of people."[60] Globally, the primary champions of community-based outreach are national and local affinity groups that work to increase the number of women pilots, and provide resources to curious students. In 1967, the Indian Women's Pilot Association, India's first organized group of female pilots, was established with the sole purpose of increasing the number of women pilots in the country.[61] India has also seen a rise of female pilots go hand-in-hand with the rise of the country's middle class, which further demonstrates aviation to be of economic and social value. In contrast to the United States, India's government-run airlines have a mandated equal pay requirement for

male and female employees.[62] In a direct effort to amend the costs for students, India's Government organized an initiative that subsidizes the cost of flight school for underserved populations. In 2016, the Special Component Sub-Plan (SCSP) waived the tuition of ten students pursuing their private pilot licenses in the state of Karnataka.[63] Today, Indian flight schools maintain a steady 25-30% of female students in classes every year, supporting the upward trend in comparison to the 12.9% of female students in American flight schools. [64]

While the United States and India differ in their strategies to recruit new female private and commercial pilots, they have a shared history when it comes to aviation advocacy in the early 20th century. In 1929, 99 female pilots established The Ninety-Nines International Organization of Women Pilots® in the United States to share their passion for flying with the world. By 1967, the women helped to create the Indian Women Pilots Association and a 99s India chapter to create a network of high-achieving women in aviation. Today, through a variety of scholarships, grants and leadership programs, they aim to "accelerate the advancement of women in all pilot professions."[65] On a local level, Mount Saint Mary's University, a women's university in Los Angeles, hosts an annual "Expanding Your Horizons" workshop that introduces girls in grades five-eight to careers in STEM — including an aviation component.[66] The presence of these types of women-led advocacy and education efforts help to reverse the effects of the historical absence of women in senior leadership and mentorship positions.[67] In the days of passengers challenging the competence of pilots based on gender, now more than ever, women-led organizations that provide tools to address public disapproval and counter discrimination are in global demand.

Conclusion

As a result of many years of advocacy, policy change and civic engagement, most women enjoy greater freedom and agency than those of their mothers and grandmothers. Despite this seemingly more equitable world, the concept of true equity is still challenged concerning what occupations women should pursue. Workforce safety, access to STEM education, gender role stereotypes and professional support are all variables that may help or hinder their journey as pilots. Addressing questions of ability, endurance and skill, as they relate to women pilots, produces consequences that can affect personal well-being and workplace stress. Still, the most transformative of actions have come through mentorship and collaborative projects aimed to uplift the aviation community.

Globally, the abolition of laws that prohibited women pilots from combat service and licensure restored the privilege of choice to 50% of the population. India's success as the world leader in hiring women pilots to the workforce can be attributed to the accessibility of information and programs for women. Instituting recruitment techniques — including a pledge to employee safety, government subsidies for flight schools and union-mandated equal pay — are all strategies that could improve the experience of women pilots around the world.

Despite bias and structural barriers to obtaining licensure for women pilots, social support and access to mentors are the two principal predictors of opportunity and growth. More, and earlier, exposure to piloting — as a stimulating career or as an activity — opens the doors for more women leaders in aviation. Because leadership is all about building a strong and far-reaching community, the invitation for more women to become pilots can only be made more attractive by improving the environment for those women who already serve as pilots and role models.[68]

In Earhart's words, "*Flying may not be all plain sailing, but the fun of it is worth the price.*"[69] The enthusiasm passed down to younger generations from pioneering female flyers proves that for as long as there is passion, women will continue to surpass boundaries and fly with confidence.

CATEGORIES	ALL PILOTS	WOMEN PILOTS	% OF WOMEN
Pilots	609,306	42,694	7.01%
Students	149,121	19,219	12.89%
Recreational	153	14	9.15%
Sport	6,097	229	3.76%
Private	162,455	9,971	6.14%
Commercial	98.161	6,267	6.38%
Airline Transport	159,825	6,994	4.38%
Rotorcraft	15,355	N/A	N/A
Glider	18,139	N/A	N/A
Flight Instructors	106,692	7,105	6.66%
Remote Pilots	69,1666	3,462	5.01%

Source: Women in Aviation International via FAA Aeronautical Center December 2017

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