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'I'm a Pilot First, Female Second': Why Flight Deck Gender Imbalance Persists and the Case for Allyship

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Abstract

Why is there greater gender parity for long-haul truck drivers, astronauts, and paleontologists than for women airline captains? This study uses a mixed-methods approach to examine the underlying causes of the gender imbalance in the United States aviation industry, in which only 3.6% of airline captains are women. Two polls and one survey gather data from professional pilots (N=1093) on their experience with stereotyping, gender bias, and allyship. Direct comments were analyzed to shed light on the results of the survey. Results suggest that contrary to prevailing perceptions, the persistent gender imbalance in the flight deck can largely be attributed to an ingrained and self-perpetuating negative culture cycle unique to the flight deck and a lack of allyship which affects the recruitment and retention of women pilots. Findings from self-identified male pilots (N=575) revealed that the majority of most potential allies are not participating in resolving the gender imbalance because they do not see it as their responsibility. The authors develop a model depicting this cycle and propose a novel system-level (s-frame) solution to fundamentally change the culture.

Keywords: allyship, gender bias, culture, s-frame, aviation

Introduction

We live in a world where women have higher representation in government (UN Women, 2023), more education, and greater freedoms than ever before (Kattan & Khan, 2023). In the United States (US), women now make up more than half the college-educated workforce (Fry, 2022), and globally, girls have higher levels of learning than boys across most measures (Kattan & Khan, 2023).

However, this progress is not represented in the aviation industry, where stereotypes, biases, and structural barriers have kept the percentage of female professional pilots among the

lowest of any profession— just 4.7% as of 2022 (Federal Aviation Administration Women in Aviation Advisory Board [FAA WIAAB], 2022). Women have higher representation as locomotive engineers (United States Bureau of Labor Statistics [US BLS], 2022), astronauts (Mark et al, 2014), paleontologists (Plotnick, 2022), firefighters, and industrial truck and tractor operations (US BLS, 2022) than professional pilots (FAA WIAAB, 2022). The United States Bureau of Labor Statistics (2022) publishes gender data on 391 different types of occupations; all but 19 have a higher percentage of women than U.S. airline Captains (3.6%) (FAA WIAAB, 2022). Somehow, as a society, we have made rockets, trucks, and dinosaurs more gender neutral than airplanes.

The underrepresentation of women in aviation is not for a lack of interest, however. Women comprise nearly 20% of airplane dispatchers and Air Traffic Controllers, 79% of flight attendants (FAA WIAAB, 2022) and 14% of student pilots (Women in Aviation International [WAI], 2022).

To investigate the gender imbalance, in 2021 a Congressionally mandated task force, the Women in Aviation Advisory Board (WIAAB), was formed of industry experts and leaders to provide the Federal Aviation Administration (FAA) with an analysis of the gender imbalance and recommendations on ways to encourage female students and aviators to pursue professional aviation careers (FAA WIAAB, 2022). The report identifies *culture* as the predominant barrier for women in aviation: “The biggest barrier that discourages women from entering and staying in aviation careers is culture – and it is the hardest to change. Women don’t feel like they belong” (FAA WIAAB, 2022, p. 3).

Furthering this claim, a 2021 literature review by Gorlin and Bridges revealed that “an aviation culture resisting female inclusion underpinned most challenges and barriers faced by

female pilots” (p. 1). Adopting a sociological definition, this research defines culture as *the ideas, beliefs, and assumptions that organize a group’s behavior* (Markus & Hamedani, 2019).

The negative industry culture seeps into the microculture of the flight deck. Women experience gender harassment and bias in the microculture and report feeling that they must hide their femininity (Yanikoğlu & Küçükönel, 2020) and avoid emotion (Mitchell et al., 2005). They are often exposed to stereotype threat (Siy & Cheryan, 2016), making them feel as though they must work twice as hard for half the credit (Zirulnik & Orbe, 2019).

Data points to discrimination and bias as contributing factors to the negative flight deck culture. A survey of 450 aviation professionals by the International Aviation Women’s Association (IAWA) and Oliver Wyman revealed that 59% of women had considered leaving the aviation industry due to implicit bias and/or discriminatory behavior, and that those who stay in the industry often endure harassment due to their gender (Oliver Wyman & IAWA, 2021; Yanikoğlu, Kılıç, & Küçükönel, 2020; Zirulnik & Orbe, 2019). Gender harassment is present in explicitly hostile comments such as “another empty kitchen” (Mitchel et al., 2005) and in benevolent sexist comments (Glick & Fiske, 1997), such as “Well done, you landed just like a man” (Yanikoğlu et al., 2020, p. 4).

Adding to the negative culture is the prevalence of treating women as “tokens” or “diversity hires.” The FAA WIAAB report defines tokenism as “the practice of making a perfunctory or symbolic effort to do a particular thing, especially by recruiting a small number of people from underrepresented groups to give the appearance of sexual or racial equality” (p. 53). The report concludes that the lack of inclusivity is rooted in “false perceptions of equality, a credibility gap, gender stereotypes, bias, harassment, and tokenism” (p. 46). While there are

many ways to measure the presence of tokenism in the workplace, one possible method is to use a proxy, such as comments about tokenism experienced by female pilots as negative.

Research by D. Geeraerts differentiates between prototypes and stereotypes as follows: “Prototypes are primarily psychological notions with an individual status. Stereotypes, on the other hand, are social entities; they indicate what the adult citizen is supposed to know about the referents of the categories he uses” (Geeraerts, 2008). The researchers adopt this distinction in exploring and describing the gender imbalance in the flight deck. In the United States, the prototype of a woman involves orientation toward others (e.g., collaborative, kind, considerate) while that of a man involves self-orientation and independence (e.g., strong, type-A, self-made) (Cheryan & Markus, 2020). Masculine defaults exist when organizations, institutions, and/or industries value and reward behaviors that conform to the masculine prototype, such as aggressive leadership strategies, self-nomination for promotion, and organizational styles that expect assertive interjection to be heard (Cheryan & Markus, 2020). Another form of masculine default is the belief in a meritocracy as it disproportionately benefits men by masking privilege and perpetuating the status quo (Lombard et al., 2021).

Stereotypically feminine characteristics, such as being nurturing, agreeable, modest, patient, and interdependent (Cheryan & Markus, 2020) exist in direct opposition to the pilot prototype. Women pilots may find that they must attempt to meet the demands of feminine stereotypes but also embrace the pilot prototype. This double bind comes with a cognitive cost as women attempt to satisfy these divergent social goals (Lombard et al., 2021). The feminine stereotypes cast on women aviators along with the persistence of a pilot prototype with masculine defaults create a culture of exclusion.

The hegemonic power of the pilot prototype is experienced by women pilots in various ways. Women experience gender harassment and bias in the microculture and report feeling that they must hide their femininity (Yanikoğlu et al., 2020) and avoid emotion (Mitchell et al., 2005). They are often exposed to stereotype threat (Siy & Cheryan, 2016) making them feel as though they must work “twice as hard for half the credit” (Zirulnik & Orbe, 2019). When women do speak up against gender harassment, they may experience negative consequences or be outright rejected, as one woman experienced when she spoke up about the sexist language used during a simulator training session at a major airline: “if you want to play in a man’s world you will have to get used to man’s talk” (Davey & Davidson, 2000, p. 198).

Women aviators have reported hearing explicit sexism and gender harassment in the workplace, such as “a woman in the cockpit is one less in the kitchen” (Vermeulen & Mitchell, 2007) or “if women were meant to fly, the sky would be pink” (Mitchell et al., 2005). Research shows that women pilots are at greater risk for negative perceptions based solely on their gender identity (Walton & Politano, 2014). Women aviators may experience forms of *benevolent sexism*, in which attitudes that seem positive in tone actually suggest inferiority to men based on supposed fragility, need for protection, or lack of competence (Glick & Fiske, 1997). Benevolent sexism may be harder to spot than explicit sexism, but both forms contribute to the negative culture.

Without a thorough understanding of the causes and manifestations of the gender imbalance in the flight deck, it is impossible to formulate and administer policies and interventions. This research uses multiple survey instruments to investigate the role of culture—particularly bias and allyship—as it relates to the gender imbalance in the flight deck. The study uses a survey and two polls to investigate the presence of gender bias and allyship within the

flight deck microculture. It uses comment analysis to further understand the experiences of pilots with regard to the existence of gender disparities, drawing support from social psychology and intergroup emotion theory. The researchers propose a model that ties together these findings and allows a novel understanding of the negative culture cycle. Finally, the researchers offer specific, actionable recommendations for modifying flight deck culture. This research contributes data and insights for practitioners, researchers, and policymakers in the aviation industry to develop and implement policies, practices, and interventions that address the issue of gender imbalance in the flight deck.

Research Methodology

The methodology of this research uses both theoretical and practical paradigms. It draws on intergroup emotion theory (Mackie et al., 2008), which posits that intergroup behavior is driven by social emotions which are, themselves, generated by a sense of belonging to one group over another. It is a natural proclivity of humans to think of one's own group as superior to other groups (Tajfel, 1974). The negative sentiment toward out-group members helps to strengthen a sense of belonging for in-group members; therefore, bias toward out-group members may be less about direct hostility and more due to preferential treatment toward in-group members (Brewer, 1999).

Our research is grounded in the notion that the gender roles and defaults have little to do with biological sex; rather, they are socially constructed and maintained through power structures benefiting the dominant group (men, specifically White men) and subjugating the subordinate group (women) to *other* status.

The proposed solutions are grounded in the theoretical model of behavioral policy that categorizes problem framing via *s-frames* and *i-frames* (Chater & Loewenstein, 2022). This

theory states that most modern-day problems are analyzed by policymakers through the *individual* or i-frame, focusing on the ability of individuals to enact change. This is largely true of recent efforts within the aviation industry, with individual role models and organizations attempting to elicit allyship and create mentorship programs. This is an i-frame intervention to the problem of the underrepresentation of women in aviation. In contrast, *system* or s-frame interventions focus on institutional and social norms within the aviation industry. Recent efforts within the industry have focused more heavily on i-frame interventions, consequently neglecting the s-frame benefit of encouraging us to better understand the origins and perpetuation of the problem.

The purpose of this study is threefold: (1) to investigate the impact of gender bias in aviation, (2) to explore the perceived impact of bias on the recruitment and retention of women pilots; and (3) to measure the level of allyship and engagement expressed by men pilots to assist in resolving the gender imbalance of the flight deck. Thus, this study explores the following questions:

RQ1: Are women pilots targets of negative sentiments suggesting that they don't belong in the aviation industry due to their gender?

RQ2: Do women pilots report that gender bias has negatively impacted the recruitment and retention of other women pilots?

RQ3: How do men pilots perceive the gender imbalance and their role in resolving it?

This study used survey and poll instruments (see Appendix A) to explore the presence of gender bias, how it is perceived by the *out-group* members (women), and the level of allyship offered by *in-group* members (men). The polls offered multiple-choice selections or an individualized write-in option. This method of 'self-report' is well suited to investigate

psychometric variables that may be conceptualized differently by individuals (Elasz & Gaddy, 1998), such as bias, stereotypes, and allyship. The questions in the polls are used as proxies to measure the outcomes being explored in the three research questions.

Data was collected between April 2020 and July 2021. In total, 993 pilots responded to the two polls, and 100 pilots responded to the survey. Participation in the polls and the survey was voluntary, and the purpose of the research was stated at the beginning of the poll or survey. All research was approved by the University of Washington Institutional Review Board.

The polls and survey were distributed through two aviation-specific special interest groups (SIGs) existing on a social media platform. These SIGs are referred to in this study as Group A and Group B. The membership criteria of the groups were established by the founders of the SIGs, and there was no independent verification that the members conformed to these criteria.

Group A was organized by and for women pilots. Membership in this group required the pilot to self-identify as a woman and hold at least a private pilot license. In 2021, at the end of the data collection period, more than 12,900 pilots were members of this group.

Group B was organized by and for professional jet pilots. Membership in the group required answering a series of questions confirming that the pilot is a professional pilot flying a jet aircraft, as opposed to a student or recreational pilot. In 2021, at the end of the data collection period, more than 14,000 pilots were members of this group.

Two polls and one survey were used for this study. The first poll sought to measure the prevalence and impact of sexist comments directed toward women pilots. The poll was administered to Group A— a group of self-identifying women pilots, belonging to a SIG for women pilots. The poll was created with tools available on the social media platform. Group

members were able to view and comment on the poll, and their responses were visible to other group members.

The poll asked if the respondent had ever been called a “token” or a “diversity hire” or if anyone had expressed to them the assumption that they were hired or promoted due to their gender during their aviation career. For respondents that indicated that they had experienced sexist comments, the poll then asked how the comment had affected them. A total of 418 women pilots responded to this poll.

A second poll was created in Group B, which was composed of professional jet pilots of both genders. This poll, like the first, was created and administered on the social media platform that hosted the group. Group members’ comments on the poll were visible to group members. The poll provided statistics on women in aviation in the US and asked group members who self-identified as men to report their own level of participation in resolving the gender imbalance. The poll offered four options with a fifth option to write an individualized response. In total, 573 pilots responded to this poll.

Along with the quantitative data from the polls themselves, the researchers utilized the voluntary comments written on the poll posting as another method of analysis of the culture and sentiment of professional pilots.

The study also used a survey designed on Survey Monkey. The survey link was made accessible to Group A via the social media platform. One survey question asked about the perceived barriers in recruitment while a separate question was focused on perceived barriers to retention. Participants had the option to skip questions, and all questions included an *Other* or *Not applicable* option. All questions were optional. The two questions analyzed within this study had 100% participation. A total of one hundred women pilots responded to the survey.

While comments were not mandatory, Group B left 407 comments in total on the poll. Comments were coded for sentiment (negative, neutral, or positive) and analyzed for frequency. Though sentiment coding has limited power on its own (Cohen et al., 2011), it is used in this study to uncover any patterns that relate to the culture that may contribute to the persistence of the gender imbalance. Verbatim comments are included in this research only when relevant to explicitly convey sentiment without diluting or obfuscating through academic language.

The researchers classified comments into two groups: those that directly relate to the poll's question (hereafter referred to as *primary comments*) (N=66), and those that respond to another respondent's comment (hereafter referred to as *secondary comments*) (N=341).

Qualitative axial coding was used to categorize comment sentiments into three categories: positive, neutral, and negative. Prior to coding, the researchers defined these terms as the following:

Positive: Acknowledging that there is a gender imbalance problem and/or stating support for solving this problem

Neutral: Neither positive nor negative; commentary

Negative: Gaslighting, i.e., making victims feel “crazy” for their beliefs (Sweet, 2019), belittling, or denying the existence of a gender imbalance problem.

Results

RQ1: Are women pilots targets of negative sentiments suggesting that they don't belong in the aviation industry due to their gender?

To explore RQ1, the researchers analyzed the responses to the first poll in Group A. Four hundred eighteen (418) women pilots responded to the question “Have you ever been called a ‘token’ or a ‘diversity hire’ at work?” If yes, respondents were asked if receiving the comment

had upset them. As explained in the research methodology, the poll questions were designed to test for the presence of negative sentiment toward women pilots. Sixty-five percent (65% = 271/418) of women pilots had received the token/diversity hire comment and of those that responded to the next question, ninety-five percent (95% = 257/271) said that the comment had bothered them. The comments of respondents offer further evidence of the presence of negative sentiment targeting women pilots (Table 1).

RQ2: Do women pilots report that gender bias has negatively impacted the recruitment and retention of other women pilots?

To analyze RQ2, the researchers examined survey questions asked of Group A. This survey asked women pilots to voluntarily share their experiences regarding recruitment barriers. Fifty-four percent of respondents believed that a lack of representation was the biggest barrier; twenty-five percent believed that the negative culture (bias and discrimination) was the biggest barrier; and twenty-one percent indicated that it was something else by selecting “Other.”

The survey also revealed that fifty-two percent of respondents believed that better schedule predictability would be most helpful in improving retention; twenty-seven percent felt that ending bias and discrimination would be the most helpful; fifteen percent selected “Other,” and six percent felt that higher pay would retain more women.

RQ3: How do men pilots perceive the gender imbalance and their role in resolving it?

To analyze RQ3, the researchers examined the second poll, asked of Group B. This poll received 573 responses from professional pilots self-identifying as men and 66 direct comments to the post (as opposed to nested replies to others’ comments).

The study revealed that sixty-four percent (64%, n=368) of respondents do not feel that gender imbalance is their responsibility; therefore, they are not actively doing anything to resolve

the imbalance. Seventeen percent (17%, n=96) identified as allies by selecting the option indicating that they are actively doing something to resolve the gender imbalance issue. Twelve percent (12%, n=69) indicated that they wanted to help but didn't know how to assist. Seven percent (7%, n=40) said they tried to be an ally but didn't feel comfortable in the process.

A Qualitative Interpretation of Results through Comment Analysis

Researchers did not prompt poll respondents to leave a comment, yet the social media platform afforded them the opportunity to do so. These comments help elucidate the findings by revealing themes that were present in numerous interviews, adding qualitative depth to the quantitative analysis of poll responses. The comments shed light on the role of prejudice, discrimination, and allyship in gender imbalance in aviation. Only comments directly responding to the post were analyzed, as nested comments (i.e., comments that respond to others' comments) were seldom relevant to the poll's content.

As defined in the Methods section, negative comments included comments aimed at gaslighting or problem-denial, such as: "Do you think it may just be possible that some vocations are just gonna have more of one gender than the other...and maybe, just maybe that's ok, and is not a crisis that needs interventions, programs, quotas, and allies to 'fix?'" While these types of comments are differentiated from explicitly hostile comments, such as "I'm sure the Wright Brothers are rolling in their graves. Go to flight school, pay your dues just like anyone else," both are categorized as negative comments.

Of the primary comments voluntarily offered in the poll, 53% (n=35) were negative. See Table 1 for a complete breakdown. The negative comments support the FAA WIAAB's main finding that there is a negative culture toward women aviators. Themes prevalent in the comments are discussed below.

Table 1*Sentiment and Frequency of Primary Comments Related to Flight Deck Gender Imbalance*

Total	Positive	Negative	Neutral
N=66	N=11	N=35	N=20
100%	16.7%	53.0%	30.3%

Hostility towards women is an obvious form of sexism, persisting through directly discriminatory acts or words. In the voluntary comments left on the Group A poll, woman/gender nonbinary pilots and FOs recounted instances of men finding excuses to comment on their physical appearances. In some cases, there were implications that they were too attractive for their current profession, or that they were not attractive enough for others. Women pilots recounted comments such as “You’re too pretty to fly planes, you should do porn instead,” indicative of the belief that physical appearance should be a factor in their professional choices.

Some women aviators felt that their femininity presented an excuse for men to talk about their bodies, receiving comments such as “Did you break a hip? No? Then why are you swinging that ass like that?” Finally, a few women recounted instances where male pilots insinuated that they had used sexual favors to get their credentials, hearing comments such as “When I first saw you, I assumed you’d just gotten by because you were cute.” Through these comments, hostile sexism manifests on the flight deck.

However, this is not the only form of sexism the researchers identified, as there was another that can be equally if not more dangerous: benevolent sexism. Such sexism persists as a kinder, more subtle, nudge to maintain male dominance. Benevolent sexism can be difficult to identify, since individuals harboring and perpetuating benevolent sexism may believe their

gender assumptions and related actions are altruistic. Benevolent sexism can appear through complimentary gender differentiation (Glick & Fiske, 1997), such as “I always loved working with female pilots. They were generally more energetic, sharp, and harder workers.” While a comment like this may seem positive, the gender differentiation assigns traits to women that are consistent with, and thus promote, traditional gender roles where women are consistently in a position of less status and power (Glick & Fiske, 1997).

Women pilots experience these nudges towards traditional *homemaker* roles through benevolent sexist reminders that they are the gender most often responsible for caregiving roles, such as the following poll comment: “I do believe this career can make it EXTREMELY difficult to be a mother, and that pushes some women away from or leads to the exit of some from this profession. Not because they can't perform the job well, but the sacrifices required are too great for their individual desires and risk/reward proposition.” While these forms of benevolent sexism may appear approving or supportive, they work against egalitarian inclusivity. Both hostile and benevolent forms of sexism serve to validate and preserve patriarchy (men’s structural control) and maintain the defaults, stereotypes, and prototypes that contribute to the negative culture felt by non-prototypical pilots (Glick & Fiske, 1997). *Problem Denial* was also a theme in many comments. Multiple respondents choosing to leave a comment from the Group B poll denied that there is a gender problem in aviation, for example, “Just like in any career, this is an equal opportunity for anyone who wants it.” Some commenters argue against programs that favor women and make claims that men are the marginalized gender; for example, “I’m confused, I was under the impression that woman [sic] have an advantage in aviation?” or another poll respondent wrote, “I hate to tell you this but between affirmative action programs and hiring quotas. Women have always had the advantage in aviation.”

A variation of this problem denial is a phenomenon known as *gaslighting*. Comment analysis revealed gaslighting as a recurring phenomenon. Gaslighting is a form of psychological abuse steeped in social inequality (Sweet, 2019) which attempts to maintain the status quo of power imbalance by making those with less power feel unreasonable for suggesting that an imbalance exists. Comments including gaslighting varied in their severity but held the underlying theme of problem denial, as seen in the below examples:

Comment 1: “Have you thought just for once that a majority of women don't want to be pilots? Hmmm... what a thought.”

Comment 2: “All careers are self-selective. No institution or group is keeping women out. Men and women are different creatures and in fact like different things. Women can pursue aviation just as men can and their trajectory in any career is based upon desire, drive and motivation. Look at careers where there are more women than men. Nobody is keeping men out. It just happens that men and women gravitate to different things. Time to accept that as a fact and stop demanding that everything have 50/50 numbers.”

Comment 3: “Do women need allies? Is there something blocking you from getting a career in any STEM field?”

Comment 4: “The fact that this is even a topic surprises me. We will hire the person not the gender as it's more important to be safe then [sic] politically correct.”

Comment 5: “Last I checked, I got my ratings and survived the checkrides by meeting the criteria for a pass. I'd prefer having mentors and people who believe in my abilities - than an 'ally' cause of lady bits. Sincerely- a woman.”

The last comment, made by a female pilot, exemplifies *conformity for social capital*. In this case, women pilots may adopt what they perceive to be desirable traits associated with the

prototype pilot or attempt to assimilate to the culture established by the collective norm (Zirulnik & Orbe, 2019). Conformity for social capital is also observed through a comment left by a woman pilot who claimed that men pilots are “usually ‘out-guyed’ by me because I am and will always be a tomboy and it ends up being a good situation. I just don’t go around trying to prove myself because I’m a chick. I’m a pilot first, female second.” The comment shows assimilation to align with the hypermasculine pilot prototype.

A third theme present was a variety of *definitions and perceptions of allyship*. One pilot suggested that his allyship consisted of “not being creepstastic – which was a common complaint among female students across all the flight schools I worked at.” This pilot stated that “I was one of two male instructors at a school I worked at that female students specifically requested because I don’t give a [expletive] what’s between your legs, I care if you meet the standard.” This comment reveals a belief that simply not participating in harassment is akin to helping remedy it.

Seventeen percent of male pilots reported that they were “actively doing something” to help end discrimination. Comments suggest that in some cases, their involvement was simply to hire women pilots; for example, one pilot wrote he was “fully supportive of women in aviation,” volunteering that he had “hired and worked with several in the corporate arena over the years.” Another pilot noted that he had “hired a female pilot who became a Captain this would be about 1985 era.” The datedness of these comments and paucity of examples suggests that some men pilots feel that a one-time act of support is sufficient to characterize themselves as lifelong allies of women pilots. One woman pilot eloquently expressed that her concept of allyship went beyond simply hiring women:

“I think for me personally (not speaking for every female pilot here) – being an ally is stepping up and taking ACTION when you see wrongdoing. So if you see a female pilot being harassed – it’s stepping in. When you see your friends making jokes that are sexist and inappropriate, it’s speaking up. I was discriminated against multiple times at an old workplace – people knew about it and did nothing. They stayed silent. And who wins when it’s one voice against a company? Being an ally isn’t just saying “I have female pilot friends” or “yeah women should be pilots!” – it’s also recognizing that we experience a different side of this industry and stepping up when you see someone not being treated fairly. When you see something – say something.”

Discussion

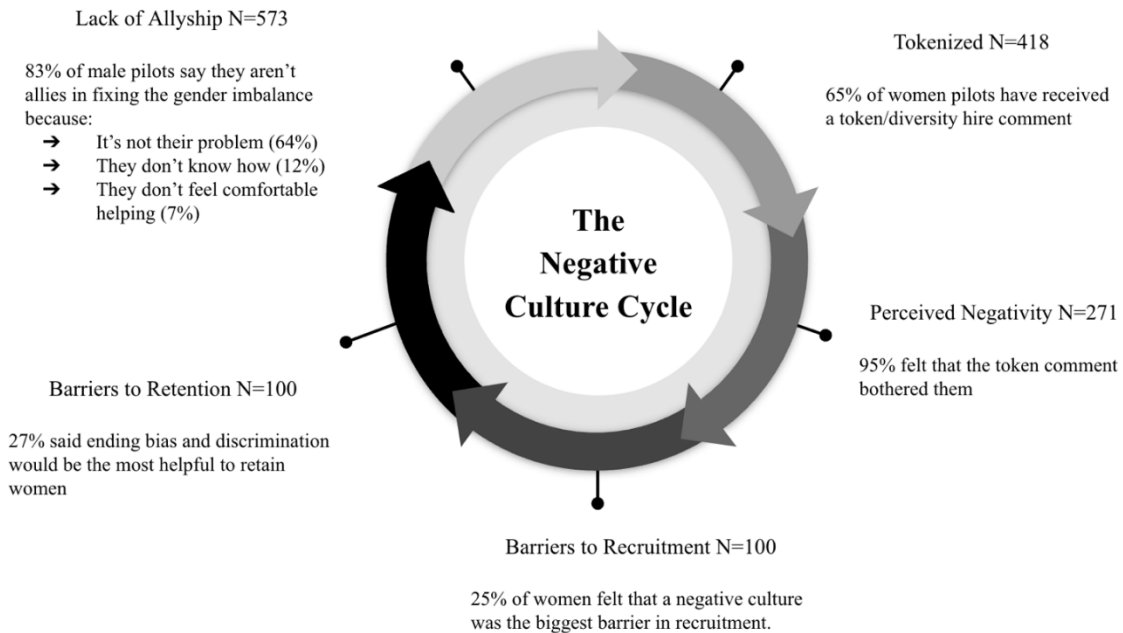
The researchers found ample evidence of women pilots experiencing gender harassment and exclusionary behaviorism in the workspace, both from their own anecdotes and from men’s direct comments. The finding that 65% of women pilots had been called *tokens* or *diversity hires* adds to existing evidence that women pilots experience sexism, high visibility, scrutiny, less favorable advancement, and harassment resulting in them leaving the airline industry. While there is no causal relationship between negative culture and gender imbalance in the flight deck, research suggests that microaggressions in the form of tokenizing diversity negatively impact the culture in the workplace and contribute to the perception of the industry, contributing to the low recruitment and poor retention rates of women in aviation (Oliver Wyman & IAWA, 2021). This is supported by the finding that 24% of women pilots believed that the negative culture was the biggest barrier to recruiting more women in the aviation industry, a finding also substantiated by the FAA WIAAB Report (2022).

The lack of allyship in conjunction with the frequency of negative comments illuminates why a negative culture persists. Allyship offers a powerful voice for the underrepresented group. Men benefit from their in-group status in various ways, including favoritism (Brewer, 1999), stereotype lift (a boost in performance by negatively stereotyping out-group members) (Walton & Cohen, 2003), and the alleviation of the cognitive cost associated with stigmatization (Salvatore & Shelton, 2007). These advantages are available to men pilots because of their identity (Radke et al., 2020) as opposed to earned through a meritocracy. An ally is aware of these advantages and uses them to create a more egalitarian environment. For men to become an ally, they must first acknowledge these advantages and then leverage their power to create a more inclusive environment.

Findings revealed that perpetuation of a discriminatory workplace for non-prototype pilots contributes to a reduction in psychological safety, which reduces the efficacy of safety models and systems utilized within the industry (Perkins et al., 2022). The hegemony of this culture explains why most men pilots do not feel compelled to ameliorate the inequities; thus, leaving the burden of problem-solving the gender imbalance on the marginalized group. Women who enter the aviation industry are often tokenized, which is one way a negative culture is created. A negative culture is a barrier to retaining these women as well as a barrier to recruiting future women aviators. Many men pilots do not see this negative culture cycle as their problem to resolve. Figure 1 depicts this concept.

Figure 1

A Model of the Negative Culture Cycle that Perpetuates Gender Bias in Aviation



Implications for Policy and Practice

To guide the industry in adopting approaches along both i- and s-frames (Chater & Loewenstein, 2022), the researchers propose an s-frame intervention with success metrics focused on *culture shift* within the aviation industry. Currently, companies and flight organizations rely on unconscious bias training as a lever to change the culture. Nearly all Fortune 500 companies offer some sort of diversity or unconscious bias training (Dobbin & Kalev, 2018). However, research shows these trainings to be largely ineffective (Lai et al., 2014), and that even when effective, changes were short-lasting (Forscher et al., 2017; Lai et al., 2016; Onyeador et al., 2009). Bias training can make participants defensive and less inclined to change behaviors (Howell et al., 2013; Knowles et al., 2014). Additionally, framing bias as ‘implicit’

rather than ‘explicit’ can serve to mitigate culpability, unintentionally undermining the desired effect of the training (Onyeador et al., 2009).

Current safety systems and safety models focusing on crew dynamics (e.g., Crew Resource Management and Threat and Error Management) would benefit from a training curriculum that includes the psychology of prejudice and out-group behaviorism (Brewer, 1999), the exclusionary consequences of defaults (Cheryan & Markus, 2020), and the influence of power on the production of overconfidence and decision-making (Fast et al., 2011), while also providing tools to develop and enhance interpersonal skills and crew psychological safety. This could be accomplished with an s-frame solution that includes enhanced interpersonal skills education as part of training, recruitment, and hiring, competency-based training with observable behaviors as metrics, and systemic mentorship and allyship at all career stages.

Some research supports exposing in-group members to the stigmatized out-group as a method for curbing unconscious bias (Pearson et al., 2009). This approach can be effective for changing sentiment toward female pilots, as shown in Walton and Politano’s (2014) study indicating that male pilots with the strongest opposition to female pilots tended to be those that did not frequently occupy a gender-diverse flight deck. When male pilots shared the flight deck with female pilots, 75% of the time they viewed women pilots as “nearly equal status” (Walton & Politano, 2014). However, given the low representation of career female aviators, using exposure as a method to curb gender bias is likely an ineffective plan—other interventions are needed.

Specifically, the researchers propose including enhanced interpersonal skills concepts such as growth mindset, bias literacy, psychological safety, and interpersonal communication in all training that a pilot receives throughout their entire career. It is critical that these concepts are

taught from the beginning, during pilots' first exposure to CRM as part of a commercial license. There is precedent for a content shift, as was seen with the integration of Threat and Error Management into the Crew Resource Management model (see FAA, 2004). More recently, we have seen an FAA-mandated curriculum update on leadership and mentoring (see FAA, 2020), further augmenting our argument that safety training content should receive iterations based on safety data (such as the data revealed in this study) and industry trends (such as the dismal recruitment rate of women aviators throughout the past 50 years) (FAA WIAAB, 2022). These interpersonal skills concepts would develop throughout pilot training, until they have received their airline transport pilot license. The recruitment and hiring process for airlines must also undergo s-frame transformation. Many flight organizations require pilot candidates to undergo simulator evaluations and/or mental aptitude tests in the recruitment phase. We suggest that an emotional intelligence testing could be included as a subset of the overall application process.

In addition to introducing s-frame solutions in pilot licensing, hiring, and recruiting, professional pilots should be required to demonstrate their ability to create psychological safety through interpersonal communication as part of annual training. In addition, our findings suggest that mentorship and allyship should be a part of all employers' workforce development strategies. The role of mentoring, both informal and formal, has been shown to have a positive effect on women pilots' career progression (Cline, 2018) and should be present at a system-level in all stages of a female pilot's career. Likewise, men pilots should receive actionable training on how to be effective allies.

These concepts must be taught, reinforced, and tested continually throughout a pilot's career. Interpersonal competencies must be a basic requirement, just as are stick-and-rudder

skills, since our research findings show that both are crucially important to having a safe flight deck. Our proposed multi-stage s-frame intervention creates a viable pathway to disrupt and resolve the negative culture cycle.

Equally important to the training curriculum syllabus is the andragogical approach used to operationalize these theoretical concepts into observable behavior in the flight deck.

Behavioral science research must be utilized to develop content and pedagogy that is approachable to *all* pilots (i.e., circumventing the *them vs. us* unintended consequence of some bias training) by using a method of communication, language, and system framework that is inherently inclusive for pilots.

Limitations and Future Research

Findings of this study offer compelling insights into why the gender gap persists in aviation; however, there are some limitations. One limitation was that the poll and survey were not accessible to all pilots. It was only available to members of the special interest groups referred to in this study as Group A and Group B. The resulting selection bias weakens the data. Since participation in the survey and polls was optional, it could be that only those members who felt strongly about the questions chose to respond. This, too, can impact the applicability of the findings to the general population of pilots. However, given that each membership consisted of more than 10,000 pilots, the researchers believe that the population with access to the survey and polls adequately represents the greater population of pilots (Cohen et al., 2011).

Another limitation was the platform of the polls. The social media platform hosting the polls did not allow for anonymity in comments. It also showed the aggregate responses to the poll questions. Without anonymity, ‘groupthink’ could have influenced participants’ responses.

To counterbalance this limitation, all polls were voluntary with options to add individual answers and/or additional comments.

While this research began with a research question centering around women in aviation and captures the voices of pilots, both specifically in Group A and across survey respondents, there are very few instances of people self-identifying as non-binary (only two pilots in our data speak about identifying beyond the gender binary), leading us to wonder if such voices are missing by virtue of not feeling empowered enough to speak out. For future iterations of this work, more efforts must be made to bring such voices into the conversation.

Also possibly missing in this dataset are the voices of women who do not feel empowered enough to speak up, even in a group of women in aviation. There could be a few contributing factors to them not feeling such empowerment: prior research on questions of sexual discrimination in aviation also shows that reports of such acts are bounded by the perpetrator and victim (Bates, 2016), and that women can be reluctant to speak out (Ferla & Graham, 2019), even anonymously, for fear of retaliation. Future research that seeks to further understand the culture problem in aviation must make active efforts to count and seek out such suppressed and missing voices.

This research explores the defaults, prototypes, and stereotypes that contribute to a negative culture for women in aviation. The negative culture is examined through the lens of gender, specifically female aviators. However, it is worth noting that the negative culture experienced by female aviators may resonate with other marginalized and underrepresented groups. Intersectionality (Crenshaw, 1989) likely intensifies the feelings of a negative culture as other groups in aviation manage both sexism and racism. For example, it would be particularly

relevant to know if and how the younger and older generations of pilots differ in their beliefs, perceptions, and experiences related to demographic bias and gender harassment.

Conclusion

The early decades of the 21st century have been characterized by widespread awareness of inequality and the movement to correct it. This push toward equality has been manifested in occupational settings through company pledges, slogans, and campaigns for diversity, equity, and inclusion. While some organizations only espouse rhetoric for these principles, others find strategies to dismantle the status quo and rebuild with egalitarian structures. Despite decades of fighting for equality, women remain statistically underrepresented in the aviation industry.

To resolve the gender imbalance, the industry has been reliant on i-frame interventions that operate under the premise that individual (i.e., mentorship volunteerism) and organizational (e.g., International Aviation Women's Association, The Ninety-Nines, Women in Aviation, etc.) efforts will resolve the gender imbalance. Although the merits of such approaches are clear, current statistics have shown they are not enough on their own. S-frame solutions should include required enhanced interpersonal skills education, competency-based training with observable behaviors as metrics for success, and the setting of measurable goals on the intervention outcomes.

This study provides evidence of the prevalence and impact of modern-day gender-based bias in the professional aviation industry in the US. Results support our argument that prejudice in the industry is rooted in socially constructed biases manifested through masculine defaults, prototypes, and stereotypes: 53% of comments expressed negative sentiment regarding the presence of bias, commonly containing gaslighting (Sweet, 2019). Our results provide evidence that the systemic bias in aviation negatively impacts those considering a career in aviation and

those already in the industry. Sixty-five percent of women pilots have been called a token or diversity hire. Furthermore, it fills a research gap on the role of allyship in aviation. Most men pilots (83%) do not participate in allyship mainly because they do not feel that the gender imbalance is pertinent to them (64%), which elucidates why a negative culture in aviation exists.

The presence of such a culture cannot be ignored, nor can industry executives and policymakers turn a blind eye to the ways in which it is being perpetuated. There is an imminent need for a culture shift, and traditional unconscious bias training is not working (Dobbin & Kalev, 2018). Current approaches to end bias, such as *copy-and-paste* unconscious bias training can be divisive and generate an *us vs. them* narrative; more thoughtful and personalized approaches are needed. The culture shift must be part of a wider program of change, such as integrating it from the first stages of pilot training to solidifying it with annual recurrent training. We can dismantle the negative culture for non-prototype pilots by integrating a more inclusive culture as a necessary shift for the overall health of the industry and for the next generation of aviation professionals.

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Appendix

The following provides an overview of how some of the data was collected for this research. It is not an exhaustive list. The following paragraph was posted on a female-pilot social media webpage. This webpage required all members to identify as “female” and hold a private pilot’s license.

Posting: Ladies, I’m speaking about diversity and inclusivity and need your help to capture some data on why women leave the industry. Would you please complete this three-question survey that will help me gather data? Thank you so much in advance!

The posting included a link to a survey hosted by SurveyMonkey. The three questions can be seen below.

SurveyMonkey Title: Why women leave a career in aviation:

1. If you have seen a woman leave the aviation industry (started flying but decided to change careers or become a stay-at-home parent), was it because of:

- Family decisions (i.e., wanted to have kids)
- Decided she was not interested in aviation
- I’ve never seen a women leave the aviation industry once started
- Didn’t like the negative culture (discrimination, bias, etc.)
- Other (please specify) _____

2. Have you ever held yourself back from an upgrade and/or passed on a promotion/opportunity because you thought it would lower your quality-of-life and affect your work/life balance? (for example, you wanted to hold a better schedule, so you bypassed upgrade).

- Yes
- No
- Option to leave a comment _____

3. What do you think the number one reason is that more women don't become pilots?

- Lack of representation (didn't know it was a choice)
- Negative culture (good ol' boys club)
- Other (please specify) _____

Another posting for data collection was posted to the same social media webpage but was an embedded poll, as opposed to a link to a survey. Below is the posting paragraph recruiting volunteers along with the poll options. Participants had the option to write-in a response or choose one option from the provided list.

Posting: *Ladies, I'm writing another article about piloting and parenting. If you have children or are the caregiver of elderly parents, could you please take a moment to answer these questions? Please and thank you. I promise to keep names anonymous in my publications. This data will be very helpful.*

Title of poll: Are the airlines more family-friendly?

Options:

- Have you left business aviation for the airlines due to family reasons?
- If you were in business aviation, did you pause your piloting career to have children?
- Didn't apply to airlines because of family obligations.
- Airlines are more family friendly if you make them (pass on upgrade, for example).
- [Decided] not to have children.