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PERCEPTIONS OF GENDER-RELATED PILOT BEHAVIOR

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An online version of the 34-question Aviation Gender Attitude Questionnaire (AGAQ) was administered to 113 Federal Aviation Administration-certificated pilots. A statistically significant difference (p < 0.05) in perceptions of female pilots was found between male and female pilots, with male pilots viewing female pilots’ flying proficiency, flight confidence and standards more negatively than did female pilots. These perceptions were not moderated by age, experience, or opportunities to fly with female pilots. Our findings replicated previous findings in South Africa, Australia, Norway, and South America. The paper concludes with a discussion of the implications for female pilots, and training implications for both genders.

Women have flown aircraft since the 18th century, when Jeanne Labrosse first soloed in a balloon. Five years after the Wright brothers’ first flight at Kill Devil Hills, North Carolina, Therese Peltier soloed an aircraft in the Military Square in Turin, Italy. Two years later, Baroness Raymonde de Laroche became the first licensed female pilot. But these female aviation pioneers were the exception, rather than the rule; the aviation industry has historically discouraged women from becoming pilots. Changes in societal attitudes towards women as a whole, combined with the passing of anti-discrimination and equal opportunity legislation, have removed many of the legal barriers that women faced in pursuing flying, but not the hostility and suspicion from their male peers that can lead to isolation, sexism, and harassment (Davey & Davidson, 2000).

The purpose of this study was to examine perceptions of gender-related pilot behavior in the United States (US) pilot population. Such an assessment is important for several reasons, with safety of flight being the most important one; if the crewmembers of an aircraft distrust each others’ abilities and judgment, they will not be able to function adequately as a team. Additionally, at a time when declining standards in professionalism and the quality of the pilot pool are at the forefront of the debate on pilot certification and hiring standards, the aviation community cannot afford to shun future members due to preconceptions and prejudices. Finally, an assessment of pilot attitudes can be helpful in either addressing the problem of negative perceptions if they exist, or in dispelling the myth if they do not.

Previous studies have examined gender differences in both pilot behavior and perceptions of pilot behavior. Fischer and Orasanu (1999) found gender differences in the way that female and male pilots communicated with their air crews. Baker, Lamb, Grabowski, Rebok, and Li (2001) examined accidents in general aviation, and found that male pilots were more likely to crash due to inattention or flawed decision-making, while female pilots were more likely to crash because they mishandle the aircraft. It should be noted, however, that McFadden (1996) found no difference in the accident rates of male and female airline pilots. Turney (1995) examined perceptions of gender-based differences in air crews, and found that male pilots were perceived as more task-oriented and confident, while female pilots were seen as better communicators and negotiators. Turney and Bishop (2004) found gender-based differences in concepts such as command, leadership, effective communication, and decision-making in air crews. Vermeulen (2009) examined how flight instructors and commercial pilots in the Republic of South Africa differed in their perceptions of female pilots, finding that the two groups differed significantly in their assessment of female pilots’ flying proficiency but not in their safety orientation.

Our purpose was to examine gender-based perceptions of pilot behavior, rather than actual differences in behavior, using the 34-question Aviation Gender Attitude Questionnaire (AGAQ). The AGAQ, designed by Wilson (2004), gauges attitudes, stereotypes and prejudices towards female aviators. Although the original questionnaire contained 72 questions, the questionnaire has since been refined to 34 questions covering four dimensions: 1) flying proficiency, 2) safety orientation, 3) flight confidence, and 4) flight standards.
The AGAQ has been shown to have acceptable factorial validity, internal consistency and unidimensionality, and appears to be a valid and culturally unbiased tool that could be used to ascertain gender-related perceptions in aviation across different Western, English speaking cultures (Kristovics, Mitchell, Schaap & Vermeulen, 2009; Vermeulen & Mitchell, 2007).

Hypotheses

We proposed that pilot perceptions of gender-related behavior would vary as a function of a number of variables, including: pilots’ gender, age, flight experience, and opportunity to fly with the opposite gender. Specifically, we hypothesized that:

H1: Perceptions of female pilots’ behavior will vary depending on gender (same sex vs. opposite sex).
H2: Male pilots’ perceptions of female pilots’ behavior will vary with the male pilots’ age.
H3: Male pilots’ perceptions of female pilots’ behavior will vary with the male pilots’ experience as measured by total flight hours.
H4: Male pilots’ perceptions of female pilots’ behavior will vary depending on the amount of opportunities male pilots have had to fly with female pilots.

Method

Our method was a survey, hosted online using the Survey Monkey software and its web hosting option. The Survey Monkey software automatically collected and catalogued the data, which was then be interpreted using SPSS statistical analysis software. Traffic to the website was generated by contacting various pilot and aviation organizations via e-mail and telephone calls, through a viral campaign on the Facebook social networking site, and through notices on various online pilot and aviation-related forums.

Sample

For the purposes of this study, we defined the pilot population as “anyone who holds a valid Federal Aviation Administration (FAA) pilot certificate.” The total population consists of more than 612,000 pilots. We obtained a total of 113 complete responses to our survey. Of our respondents, 89 were male (79%) and 24 (21%) were female. The age of our sample ranged from 18 to 64, with an average age of 27. The majority of our sample (61%) had a commercial pilot or higher rating. The average flight experience in years was eight, and the average number of flight hours was 2,723.

Instrument

We used the 34-question Aviation Gender Attitude Questionnaire (AGAQ), which covers four dimensions: 1) flying proficiency, 2) safety orientation, 3) flight confidence, and 4) flight standards. The AGAQ has been shown to have acceptable factorial validity, and internal consistency (Vermeulen & Mitchell, 2007). The AGAQ uses a 5-point Likert scale, with lower scores indicating more positive attitudes.

Analysis

Where appropriate, the answers to the AGAQ were reverse-coded, and the individual question scores were then aggregated according to the four factors identified by Vermeulen and Mitchell (2007). Reliability analysis was carried out by calculating Cronbach’s alpha (α = .94).

Hypothesis One

Our first hypothesis stated that perceptions of female pilots’ behavior would vary by gender. T-tests were performed to test the hypothesis. The mean scores and results of the t-tests are shown in Table 1. There was no difference in perceptions of safety orientation, however; for the remaining three dimensions, there were significant differences in perceptions based on gender.
Table 1.

**Perceptions of Female Pilots by Gender**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td></td>
</tr>
<tr>
<td>Flying proficiency</td>
<td>43.37</td>
<td>26.96</td>
<td>6.5</td>
</tr>
<tr>
<td>Safety Orientation</td>
<td>19.97</td>
<td>18.46</td>
<td>1.14</td>
</tr>
<tr>
<td>Flight Confidence</td>
<td>22.63</td>
<td>16.75</td>
<td>4.52</td>
</tr>
<tr>
<td>Erosion of Standards</td>
<td>11.63</td>
<td>8.21</td>
<td>4.58</td>
</tr>
</tbody>
</table>

**Note.** 1 n= 89   2 n = 24

**Hypothesis Two**

Our second hypothesis stated that male pilots’ perceptions of female pilots’ behavior would vary with the male pilots’ age. We divided our sample of male pilots into two groups; those between 18 and 30, and those between 31 and 64. T-tests were performed to test the hypothesis that mean scores would vary by group. The scores and results of the t-tests are shown in Table 2. There were no significant differences perceptions based on age.

Table 2.

**Male Pilot Perceptions of Female Pilots by Age**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-30</td>
<td>31-64</td>
<td></td>
</tr>
<tr>
<td>Flying proficiency</td>
<td>44.56</td>
<td>39.52</td>
<td>1.74</td>
</tr>
<tr>
<td>Safety Orientation</td>
<td>19.85</td>
<td>20.33</td>
<td>.34</td>
</tr>
<tr>
<td>Flight Confidence</td>
<td>23.07</td>
<td>21.19</td>
<td>1.32</td>
</tr>
<tr>
<td>Erosion of Standards</td>
<td>11.68</td>
<td>11.48</td>
<td>.23</td>
</tr>
</tbody>
</table>

**Note.** 1 n= 68, 2 n = 21

**Hypothesis Three**

Our third hypothesis focused on the effects of experience, as measured by flight hours, on male pilots’ perceptions of female pilots’ behavior. We divided our sample of male pilots into two groups; those with 350 hours or less, and those with 351 hours and more. T-tests were performed to test the hypothesis that mean scores would vary by group. The scores and results of the t-tests are shown in Table 3. There were no significant differences perceptions based on experience.

**Hypothesis Four**

Our fourth hypothesis stated that perceptions of female pilots’ would vary depending on the amount of opportunities male pilots had to fly with the opposite gender. Male pilots were grouped into those who had fewer (or no) opportunities to fly with the opposite gender (50% of the time and below) and those who had more opportunities to fly the opposite gender (50% and above). T-tests were performed to test the hypotheses.

The mean scores and results of the t-tests are shown in Table 4. There were no significant differences in perceptions based on the opportunities male pilots had to fly with the opposite gender. Although not statistically significant, opportunities to fly with the opposite gender actually resulted in less favorable perceptions of female pilots.
Table 3.

**Male Pilot Perceptions of Female Pilots by Number of Flight Hours**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350 hours or less¹</td>
<td>351 hours or more²</td>
<td></td>
</tr>
<tr>
<td>Flying proficiency</td>
<td>43.85</td>
<td>42.59</td>
<td>.49</td>
</tr>
<tr>
<td>Safety Orientation</td>
<td>19.36</td>
<td>20.94</td>
<td>1.3</td>
</tr>
<tr>
<td>Flight Confidence</td>
<td>23.25</td>
<td>21.62</td>
<td>1.3</td>
</tr>
<tr>
<td>Erosion of Standards</td>
<td>11.58</td>
<td>11.71</td>
<td>.16</td>
</tr>
</tbody>
</table>

*Note.* ¹ n = 55, ² n = 34

Table 4.

**Male Pilot Perceptions of Female Pilots by Opportunities to Fly with the Opposite Gender**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Few opportunities¹</td>
<td>More opportunities²</td>
<td></td>
</tr>
<tr>
<td>Flying proficiency</td>
<td>42.80</td>
<td>46.20</td>
<td>1.03</td>
</tr>
<tr>
<td>Safety Orientation</td>
<td>19.86</td>
<td>20.47</td>
<td>.38</td>
</tr>
<tr>
<td>Flight Confidence</td>
<td>22.53</td>
<td>23.13</td>
<td>.37</td>
</tr>
<tr>
<td>Erosion of Standards</td>
<td>11.46</td>
<td>12.47</td>
<td>1.03</td>
</tr>
</tbody>
</table>

*Note.* ¹ n = 74, ² n = 15

**Discussion**

Our findings corroborate those found in previous research, indicating that there are indeed differences in perceptions of female pilots based on gender, with male pilots viewing female pilots in a more negative light than do female pilots (Kristovics, Martinussen, Mitchell, Vermeulen, & Wilson, 2009; Vermeulen, 2009; Wilson, 2004). None of our other hypotheses were confirmed: neither age, experience, nor opportunities to fly with female pilots had an impact on the negative perceptions regarding female pilots. Even after 100 years of female participation in aviation, a certain level of distrust exists regarding female pilots. Although these findings are somewhat disheartening, they do point out areas in which further work needs to be done. Changes in societal attitudes towards women as a whole, combined with the passing of anti-discrimination and equal opportunity legislation, have not removed the hostility and suspicion that female pilots face from their male peers. This finding is important for several reasons, with safety of flight being the most important one; if the crewmembers of an aircraft distrust each others’ abilities and judgment, they will not be able to function adequately as a team.

The main limitation of our study was the small and somewhat skewed nature of our sample, which was heavily weighted toward younger and less experienced pilots. Because of this, there are doubts as to how accurately our sample represents the pilot population of the United States as a whole.
Future research should focus integrating the results of this study with those of previous studies using the AGAQ in order to obtain a more complete view of pilot perceptions of gender-related pilot behavior. A complete and accurate picture of how various subsets of the pilot population view gender-related pilot behavior will allow for the roots of such attitudes to be identified and addressed.

References


