



## Gender and Performance in Naval Aviation Training

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## Abstract

Women have played an important role in naval aviation since their entry into naval aviation training as pilots in 1973 and as naval flight officers in 1979. Heightened by the Congressional debates over women in combat, questions are being raised regarding equitable selection, fair treatment in training, and equality of opportunity. This paper presents a brief historical perspective of the rationale and research related to women in military aviation, examines selection and training data of 13,755 men and 421 women who entered naval aviation training from 1984 to 1991, and addresses the issues of equitable selection and fairness in naval aviation training. Analyses of the data include descriptive statistics and  $t$  tests to compare male/female performance on selection tests and pre-flight training grades, a test of equal proportions and a chi-square test to assess differences in attrition, correlation and regression analyses to determine the significance of relationships between selection test measures and performance in pre-flight training. Analysis of gender differences indicated that women had significantly better scores than men on the aviation selection tests which are predictive of pre-flight academic training performance ( $p < .01$ ). Their performance grades during the pre-flight academic training, however, were significantly lower than that of men ( $p < .01$ ). Attrition rates and types of attrition did not differ. Implications of the findings and future directions for research are suggested.

Women have played an important role in naval aviation since their entry into naval aviation training as pilots in 1973 and as naval flight officers in 1979. Their entry was due to the lifting of the number restrictions imposed by the Women's Armed Services Act of 1948, the manpower gap created by the all volunteer force, and the impact of the women's liberation movement. Heightened by the current congressional debate regarding the role of women in combat, questions are being asked regarding equitable selection, fair treatment in training, and equality in opportunities. This paper presents a brief historical perspective of research related to women in military aviation, examines recent selection and training data, and addresses issues of equitable selection and fairness in naval aviation training.

By law, women pilots and naval flight officers are precluded from permanent assignment to squadrons with combat missions. Currently, women comprise two percent of the naval aviation officer population. The limitations on squadron assignments and the lack of integrated fleet weapons and tactical experience promote differences in the career development and satisfaction of men and women. Major problem areas with regard to the assimilation of women are their acceptance, their utilization, and the quality with which they are treated (1990 Navy Women's Study Group, 1991). The Navy's task is to determine what can be done to facilitate the assimilation of women.

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Early research focused on finding solutions to problems encountered in the introduction of the first women into naval aviation training. Willingness of men to accept the new role of women in one of the most traditional of all service groups was the impetus of a survey of attitudes by Baisden (1974). Peer attitudes were generally accepting; however, senior officers felt women were out of place in a combat-oriented organization. Concern about individual differences resulted in a pilot personality profile that transcended sex distinctions (Novello & Youssef, 1974). The question of grounding related to menstrual cycle and to oral contraceptives prompted the respective studies of Baisden and Gibson (1975) and Altekruze and Sanders (1976). Studies addressing difficulties in physical training and survival training led to new aerobic conditioning requirements and survival techniques that compensated for female deficiencies in upper-body strength and endurance (Surburg & Williamson, 1974). Requirements to ascertain the strength capabilities needed to control aircraft under abnormal conditions led to the definition of aircraft control forces and female strength characteristics and measuring techniques for screening pilots (McDaniel, 1978). Women's sizes caused reevaluation of standards, aircraft restrictions, and aircraft designs relative to anthropometric measures (Ketchan-Wiedl & Bitner, 1976).

As the number of women in aviation training increased, research shifted to performance evaluation. Kantor, Nobel, Leisey, and McFarlane (1979) and Baker (1989) found comparable performance of Air Force men and women on selection measures, training measures and completion rates. Morvant (1981), however, found the flying performance of Air Force women significantly inferior to that of men and raised the issue of male bias and objectivity of flight grades. Carretta (1990) found the graduation rate from Air Force training was significantly higher for men and attributed the difference to women's lower selection scores. His findings were consistent with those of Siem and Sawin (1990) evaluating Air Force women and with Brown and Dohme (1980) evaluating Army students in aviation training.

The objectives of this study are to determine whether there are gender differences in 1) selection test scores of students entering naval aviation training, 2) attritions rates and types of attrition, and 3) grades in pre-flight training.

### Method

Selection and training data for 13,755 men and 421 women who entered naval aviation training to become aviators or naval flight officers between October 1984 and December 1991 were examined. These numbers represent the total population (excluding Marines) of students. Selection data included scores on the Navy's Aviation Selection Test Battery, paper-and-pencil tests consisting of the Academic Qualifications Test (AQT) and the Flight Aptitude Rating (FAR). Training data included academic grades, peer ratings, instructor evaluations, final grades during pre-flight training, and attrition statistics.

Analyses of the data included descriptive statistics and *t* tests for comparison of performance on selection tests and training grades, a test of equal proportions and a chi-square test for assessing differences in attrition, correlations and regressions to determine significance of relationships between selection test measures and performance in pre-flight training, and regression analysis to examine test bias.

## Results and Conclusion

Gender differences in selection test scores of aviation students were highly significant. Women achieved higher scores on the AQT ( $t(14172) = -5.83, p < .001$ ), but men achieved higher scores on the FAR ( $t(14159) = 19.01, p < .001$ ). These findings are consistent with those reported by Blower, Dolgin and Schull (1991) with a sample of applicants for naval aviation training.

The correlations of AQT and final grade in pre-flight training for women ( $r = .30, p < .001$ ) and for men ( $r = .36, p < .001$ ) were highly significant and support the historical trend reported by Baisden and Holcombe (1991).

Because women had higher AQT scores, a higher completion rate in pre-flight training was expected. A test for equal proportions indicated the 17% attrition rate for men was not significantly different from the 18.4% attrition rate for women ( $z = .61$ ). Differences in types of attrition were not significant ( $X^2(3, N = 2040) = .863, n.s.$ ).

The relationship between gender and performance in training was addressed by examining test scores with gender as predictor variables. A regression analysis of the complete/attrite variable on AQT score and gender was performed. An SPSS stepwise procedure using default coefficient significance test produced the equation: Complete =  $.660 + .033(\text{AQT})$ . Gender entered the equation but was removed indicating lack of predictive significance. When final grade was used as the dependent variable, gender remained in the equation. Final =  $43.40 + 1.37(\text{AQT}) - 2.95(\text{sex})$ .

Results of  $t$  tests comparing the means of pre-flight training grades indicated the grades of men were significantly higher than those of women ( $p < .001$ ). Kirkland (1978) reported that females are more reactive to criticism during the learning process. This reactivity, college majors, disposition toward peer support, and systematic differences in both acceptance and equality of treatment may explain some of the performance differences and, therefore, warrant further study.

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