Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-AM-74-7		

4. Title and Subtitle	5. Report Date
JOB-RELATED ATTITUDES OF NON-JOURNEYMAN FAA AIR TRAFFIC CONTROLLERS AND FORMER CONTROLLERS: A SEX COMPARISON	August 1974
	6. Performing Organization Code
	8. Performing Organization Report No.
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9. Performing Organization Name and Address FAA Civil Aeromedical Institute P. O. Box 25082 Oklahoma City, Oklahoma 73125	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.
	13. Type of Report and Period Covered OAM Report
12. Sponsoring Agency Name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D. C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

This research was conducted under Tasks AM-B-73-PSY-43 and AM-C-74-PSY-43.

16. Abstract

Recent ATC attrition rates showed no sex differences in the proportion of trainees completing FAA Academy training; however, the percentage of women who subsequently left ATC work was twice that of men. In the present comparison, questionnaires concerning aspects of job-related attitudes were given to 56 male and 56 female former trainees (attritions) who were matched on several variables, and also to a sample of controllers (63 women and 63 matched men) who entered training at the same time as the attritions, but who were still in ATC work (retentions).

The return rate for the questionnaires was 87%. Over 93% of the subjects said ATC work was challenging, useful, and respected. More women (88%) than men (66%) indicated entry-level pay was better than that for most jobs they could get. More women (24%) than men (5%) felt that co-workers discriminated against them; however, as many female retentions as attritions agreed to this item. Regarding facility management and supervisors, over one-fourth of female attritions and only 9% of retentions agreed to discrimination. Among males, 18% and 12% respectively of male attritions and just 3% of male retentions agreed management and supervisors discriminated against them. Attritions of both sexes were more negative toward facility training than retentions. Over half the attritions and less than a third of the retentions thought training was too hurried and not adequate. Among women, more attritions (38%) than retentions (18%) felt shift work was not desirable. About one-third of male attritions but less than one-sixth of male retentions viewed the work as routine and not pleasant.

17. Key Words	18. Distribution Statement
Air Traffic Control Work Employee Attrition Sex Differences	Availability is unlimited. Document may be released to the National Technical Information Service, Springfield, Virginia 22151, for sale to the public.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified		$3.00

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JOB-RELATED ATTITUDES OF NON-JOURNEYMAN FAA AIR TRAFFIC CONTROLLERS AND FORMER CONTROLLERS: A SEX COMPARISON

I. Introduction.

Recent studies of attrition in the Federal Aviation Administration's air traffic control (ATC) occupation have indicated that:

(1) The annual attrition rate of all FAA controllers has been approximately 5% in recent years (Farrell, 1972) but has averaged about 12% for trainees (i.e., for controllers who have not yet reached journeyman status, a process requiring about three years).

(2) Most of that trainee attrition resulted from failure to pass the FAA Academy initial training courses or the subsequent training requirements at the facility to which the trainees were assigned (Mathews, Collins, and Cobb, 1974).

(3) Although ATC is a predominantly (97%) male occupation, there have been no significant sex differences in recent Academy attrition rates (Cobb, Mathews, and Lay, 1972).

(4) Over twice the proportion of women as men recently left ATC work after completing the two months of Academy training, but before reaching journeyman status (Cobb, Mathews, and Lay, 1972).

(5) The major reason for that sex difference in post-Academy attrition rates was associated with family responsibilities of women, i.e., marriage, relocation, child care, and the like (Mathews, Collins, and Cobb, 1974).

Sex differences in job tenure have been noted in studies of other occupations (e.g., Lunden, 1968) and motivational and attitudinal differences have been reported between males and females in different work settings. For example, when asked to rate various job characteristics in terms of importance or preference, females generally rate good co-workers (Jurgensen, 1947; Hardin, Reif, and Heneman, 1951; Centers and Bugental, 1966; Hilgert, 1971), supervision (Blum and Russ, 1942; Jurgensen, 1947; Hardin, Reif, and Heneman, 1951; Burke, 1966), and work hours (Jurgensen, 1947; Nealey and Goodale, 1967) higher than do males; male workers indicate higher preference for good promotional opportunities (Jurgensen, 1947; Hardin, Reif, and Heneman, 1951; Burke, 1966), pay (Blum and Russ, 1942; Hardin, Reif, and Heneman, 1951; Nealey and Goodale, 1967), and job security (Jurgensen, 1947; Hardin, Reif, and Heneman, 1951; Burke, 1966). However, both men and women usually value interesting and challenging work more than the above-mentioned factors (Hardin, Reif, and Heneman, 1951; Burke, 1966; Centers and Bugental, 1966; Herzberg, 1968).

None of the above reports assessed sex differences as factors in leaving or staying on the jobs under investigation. The present study was undertaken to assess possible sex differences and attrition-retention differences (1) in a variety of job-related attitudes about air traffic control; (2) in aspects of ATC work which are viewed by trainees as most favorable and least favorable; and (3) in perceptions by trainees of how certain groups (e.g., minorities, women, older trainees) are treated and accepted, and what is expected of them by instructors, supervisors, and co-workers.

II. Method.

Subjects

All 119 females who entered initial ATC training at the FAA Academy from December 1968 to November 1970 were included in the study. The subjects were classified into three groups depending on whether they were still in ATC work as of December 1972, had completed Academy training but left ATC work, or had failed to pass Academy training and conse-

We gratefully acknowledge assistance by Phyllis Reed in formulating some items in the questionnaire and by Steve Greer, Peter Nelson, and Barbara Rizzuti for assistance in data analysis.

quently left the field. Each female was matched with a male of the same attrition-retention status. In addition, each male was chosen to match a female counterpart as closely as possible with respect to age, type of training option (En Route, Terminal, or Flight Service), size and geographical location of facility of assignment, possession of previous certified ATC experience (usually from military service), date of entry into ATC Academy training, duration of employment, job level, and salary.

Procedure

Biographical data concerning the subjects and their work setting were obtained from several sources with overlapping data providing reliability checks. First, each subject completed a "personal background and data sheet" upon entry into Academy training, providing birthdate, education, previous work experience, date of employment, type of training option, and facility to which initially assigned. Personnel records maintained at FAA Headquarters were used to determine whether a subject was still in ATC work, to verify type and facility of assignment, and to obtain dates of separation of those Air Traffic Control Specialists (ATCSs) no longer with the FAA.

Attritions were contacted by telephone and interviewed concerning their reasons for leaving ATC work; these findings are presented elsewhere (Mathews, Collins, and Cobb, 1974). They were then asked if they might be sent a questionnaire (Appendix A) about some aspects of their ATC experience. Retentions were sent a copy of the questionnaire with an explanatory letter asking for their help and cooperation.

The Questionnaire

A. *Section A.* Section A of the questionnaire concerned seven factors in the work environment (work itself, supervision, co-workers, pay, promotions, management, and working conditions) which have often been reported as related to job satisfaction and motivation (Hoppock, 1935; Herzberg, 1968; Smith, 1969), and three additional sources of attitudinal differences which might exist in ATC work, viz, assignments (geographical and type of control work), facility training, and shift work. Each of the 10 factors included from 4–16 agree-disagree items; the total number of items was 107. Approximately the same numbers of positively and negatively worded items were devised to minimize set response tendencies.

B. *Section B.* Section B consisted of two free-response, or open-ended, questions for elicitation of what each subject regarded as the best and worst features of being an FAA air traffic controller. The responses were sorted into 16 categories, corresponding to those specified by Herzberg (1966). Six of the factors, designated by Herzberg as "motivators," and primarily associated with job satisfaction are: *work itself*, *achievement*, *responsibility*, *recognition*, *advancement opportunity*, and *possibility of growth.* The remaining 10 factors, concerning hygiene (i.e., work situations) and usually associated with job dissatisfaction, are: *company policy and administration*, *working conditions*, *technical supervision*, *interpersonal relations with peers*, *factors in personal life*, *salary*, *interpersonal relations with superiors*, *job security*, *status*, and *interpersonal relations with subordinates.*

C. *Section C.* Section C measured, on a five-point scale, how well informed the subjects felt they were about the job upon accepting appointment to ATC work and also how they viewed ATC training. The data were obtained for purposes of comparing present groups with groups which began FAA-ATC training during more recent time periods under different training conditions and will be presented in a future report.

D. *Section D.* Each subject was asked to suggest two changes for the ATC system. The suggestions were sorted into several empirically derived categories (e.g., training suggestions) on the basis of frequencies.

E. *Section E.* Responses involving perceived attitudes of management, supervisors, and journeyman controllers toward trainees based on sex, age, minority membership, and trainee status in general were elicited in Section E of the questionnaire. The first two sets of questions in this section asked how much, in terms of job duties, *was expected* of each of four trainee groups (females, minority members, older trainees, and all new ATCSs), by supervisors or crew chiefs, and by journeyman controllers. The five choices ranged from "much more than should be" (coded 5) to "much less than should be" (coded 1). In the third part of Section E, the subjects were asked about their conception of the journeyman controllers' acceptance-rejection of each of the

four trainee groups; the five response alternatives ranged from "completely accept" to "completely reject." The final part questioned *treatment* of each of the four trainee groups by journeymen, providing five choices from "very good" to "very bad." For analysis purposes, responses to items of the third and fourth parts were assigned codes of 1 to 5, with the lowest code, in each instance, pertaining to the most negative view and the highest code to the most positive view.

F. *Section F.* Section F, provided for attritions only, consisted of a list of possible reasons for leaving ATC work with space allocated beside most items for giving more detailed information or examples. These data are reported elsewhere (Mathews, Collins, and Cobb, 1974).

Return Rate

Completed or partly completed questionnaires were returned by 40 of 56 female attritions and 52 of the 56 male attritions, and by 55 of 63 female retentions and 59 of 63 male retentions. The relatively high percentage of questionnaires returned was achieved, at least partially, through use of air mail letters and follow-up telephone reminders. This high return rate attests to the absence of any appreciable self-selection bias.

Demographic Characteristics of Samples

As a result of the matching technique, the sex groups (retentions and attritions) were quite comparable in background characteristics. The mean ages in years and standard deviations (SD) for men and women were 28.9 (SD: 5.7) and 29.3 (SD: 7.1), respectively. Two or more years of college education were possessed by 33% of the men and 28% of the women. Pre-FAA ATC certificates (usually in military control) were held by 28% of the men and 24% of the women. For the attritions, the length of FAA-ATC tenure in months was 12.3 (SD: 10.3) for males and 12.0 (SD: 9.9) for females.

III. Results.

Section A of the Questionnaire

A. *General Findings.* To assess the degree of "favorableness toward" or "satisfaction with" each aspect of work, the percentage of subjects agreeing to positively worded items and disagreeing to negatively worded items was calculated. Based on these calculations, the percentage of subjects who expressed favorable attitudes ranged from 30 to 99% for individual items; the average for all 107 items was 70% (Table 1).

Eleven items received positive answers by more than 90% of the subjects. Subjects agreed that ATC work was useful, respected, challenging, and gave them a sense of accomplishment. Co-workers were seen as responsible, intelligent, not excessively friendly, and not excessively protective. Similarly, neither facility management nor supervisors were seen as excessively protective. Finally, subjects did not perceive promotions as being too fast.

Only eight items were answered negatively by more than half the subjects. The most unfavorable response involved working conditions, which 70% of respondents indicated needed improvement, while almost as many subjects (69%) agreed that there were not good opportunities to transfer in ATC assignments. Facility management provided two sources of dissatisfaction as a majority of subjects agreed that it was both regimented and too bureaucratic, while promotional opportunities were considered to be limited and not fair to all options. Most subjects felt that entry-level ATCSs were not "highly paid" and 53% did not perceive co-workers as having interests the same as theirs. This latter finding may reflect, at least partly, the background characteristics of the present sample. Recent female trainees have had more college education and less pre-FAA ATC experience than the vast majority of male trainees in general (Cobb, Mathews, and Lay, 1972) and the matching procedures for the present samples would emphasize these factors.

B. *Sex Comparisons.* Women expressed significantly more favorable attitudes ($p<.05$ or better) than men on three of the 107 items and had significantly less favorable attitudes on 10 items. With respect to the former, more women than men (88% vs. 66%) agreed that ATC pay was better than the pay for most jobs they could get; fewer women than men indicated that the pay was less than they deserved (7% vs. 19%) and that the work provided "no chance for personal growth" (17% vs. 30%).

Of the 10 items answered significantly less favorably by women than by men, four concerned co-workers, who were more frequently seen as too friendly (11% vs. 3%), vulgar (27% vs.

Table 1

Percentages of male and female retentions and attritions agreeing to items in section A of the questionnaire. Chi square tests for significant differences between males and females (M-F), male retentions and attritions (M R-A), and female retentions and attritions (F R-A) were conducted; the levels of only those comparisons which reached statistical significance are presented.

	Per cent agreeing to each item					Chi Square Comparisons (Significance levels only)				Per cent agreeing to each item					Chi Square Comparisons (Significance levels only)		
	Male Ret.	Male Attr.	Fem. Ret.	Fem. Attr.	All Sg*	M R-A	F R-A	M-F		Male Ret.	Male Attr.	Fem. Ret.	Fem. Attr.	All Sg*	M R-A	F R-A	M-F
FACILITY MANAGEMENT									SUPERVISION								
Concerned	74	61	74	71	70				Helpful	83	63	78	72	74	.02		
Cold	26	35	15	29	26				Hard to please	19	39	24	36	29	.02		
Informed	85	69	69	58	71			.05	Praise good work	62	57	59	59	59			
Regimented	64	77	60	54	64				Tactful	69	61	72	51	64			
Impartial	62	55	54	53	56				Annoying	12	24	19	39	22		.05	
Good planning	57	47	52	53	52				Stubborn	29	41	33	46	37			
Sufficiently capable	88	73	82	68	79				Intelligent	79	86	82	74	81			
Too bureaucratic	50	67	41	54	53				Too little supervision	19	26	19	13	19			
Gave too few benefits	26	18	19	18	20				Quick tempered	10	28	15	26	19	.05		
Provided good training	66	49	59	49	57				Told me where I stood	66	63	63	54	62			
Inflexible	24	53	37	42	38	.01			Knew job well	76	75	70	77	74			
Sympathetic	53	53	59	45	53				Unsympathetic	31	39	21	41	33			
Discriminated against me	3	18	9	29	14	.05	.01		Discriminated against me	2	12	9	26	11		.02	.05
Tried to protect me too much	5	0	4	8	4				Tried to protect me too much	7	0	6	10	5			
Treated me as different	7	14	26	40	20			.001	Treated me the same as others	83	75	69	46	70		.02	.01
Set different standards for me	10	20	13	26	16				Set different standards for me	14	20	19	21	18			
CO-WORKERS									WORK ITSELF								
Discriminated against me	3	6	24	23	13			.001	Good job security	78	73	83	61	75		.02	
Loyal	79	80	70	69	75				Fascinating	85	78	85	87	84			
Boring	7	10	9	21	11				Routine	14	31	32	24	25	.05		
Talk too much	22	14	26	15	20				Respected	98	94	96	97	97			
Responsible	91	94	96	92	94				Useful	97	100	98	100	99			
Easy to meet	84	78	91	87	85				Frustrating	35	37	39	37	37			
Vulgar	14	10	30	23	19			.01	Pleasant	83	67	93	76	80	.05		
Pleasant	91	88	92	90	90				Challenging	93	96	91	97	94			
Easy to make enemies	22	24	32	31	27				Bad for health	24	43	32	32	32	.05		
Intelligent	93	92	91	85	91				Sense of accomplishment	91	88	93	95	92			
No privacy	26	26	37	31	30				Boring	9	14	13	8	11			
Interests same as mine	41	63	38	46	47	.05			Fatiguing	66	51	49	58	56			
Too friendly	5	0	9	13	6			.05	Harder than I expected	40	39	32	34	36			
Tried to protect me too much	2	0	4	8	3				Easier than I expected	29	24	24	13	23			
Treated me as equal	83	75	62	67	72				Responsibility too great	7	18	6	8	10			
Set different standards for me	14	14	22	15	16			.02	No chance for personal growth	28	33	19	14	24			.02
ENTRY-LEVEL PAY									ASSIGNMENTS								
Too low	24	16	13	15	18				Facility I wanted	71	67	66	61	67			
Highly paid	36	39	41	59	43				Based on ability	53	53	47	43	50			
Less than I deserved	26	10	7	5	13	.05		.02	Option I wanted	78	63	76	70	72			
Better than most jobs I can get	67	65	94	80	77			.001	Good opportunity to transfer	35	24	35	29	31			
FACILITY TRAINING									PROMOTIONS								
Good	64	57	57	47	57				Poor opportunity for advancement	21	18	20	11	18		.01	
Much too hard	5	18	6	14	10	.05			Opportunity somewhat limited	62	56	59	27	53			
Harassed me more than most	7	22	20	25	18	.05			Promotion on ability	45	62	57	53	54			
Set different standards for me	16	14	19	25	18				Fair for all ATC options	29	53	33	58	42	.02	.02	
Timely	62	53	46	43	54				Infrequent	36	22	46	22	33		.02	
Adequate	74	51	69	44	61	.02	.05		Too fast	5	10	6	8	7			
Too hurried	26	53	30	61	40	.01	.01		Reflect greater responsibility	76	74	80	78	77			
Should come after Academy trng.	68	84	81	69	76												
WORKING CONDITIONS									SHIFT WORK								
Location good	79	88	82	71	81				Unhealthy	36	20	26	27	28			
Comfortable	85	90	80	92	86				Rotations too frequent	29	26	26	43	30			
Surroundings unpleasant	19	16	17	5	15				Shift length o.k.	79	90	89	89	87			
Hours advantageous	66	67	59	50	61				Night work pleasant	69	78	83	68	75			
Marginal	29	29	42	37	34				Desirable	60	69	82	62	69		.05	
Insecure	9	22	13	29	17		.05		Busy shift best	81	76	89	87	83			
Equipment up-to-date	41	67	32	65	50	.01	.01		Upset family life	41	30	34	47	38			
Adequate work space	79	82	76	76	78				Difficult to manage outside resp.	26	10	28	32	24	.05		.05
Needed improvements	72	67	74	65	70				Family adjusted o.k.	81	80	80	69	78			
Isolated	14	10	28	27	19			.01	Fatiguing	48	39	52	51	48			

* Maximum sample size = 202. The range for each subgroup N is: MR, 57 - 58; FR, 52 - 54; MA, 49 - 51; FA, 35 - 39.

12%), discriminating against them (24% vs. 5%) and not treating them as equals (36% vs. 21%). Relative to men, the women also answered significantly more often that ATC supervisory personnel discriminated against them (16% vs. 6%), that management (32% vs. 10%) and supervisors (40% vs. 21%) treated them differently, and that management was not informed (36% vs. 28%). Finally, more women than men (28% vs. 12%) responded that they were isolated in their working conditions and that shift work made it difficult to manage outside responsibilities (30% vs. 18%).

No significant sex differences were detected for any of the items dealing with ATC assignments, facility training, or promotions.

C. *Attrition-Retention Comparisons.* Twenty-five of the 107 items yielded significant differences ($p<.05$ or better) between attrition-retention groups; attritions were more negative than retentions on 18 of them. Of the 25 differentiating items, five yielded significant attrition-retention differences for both sexes, 12 other items showed differences between male retentions and attritions, and eight items yielded differences between female retentions and attritions.

For both sexes, more attritions than retentions agreed that training was too hurried (females 61% vs. 30%; males 53% vs. 26%) and not adequate (females 56% vs. 31%; males 49% vs. 26%), that facility management discriminated against them (females 29% vs. 9%; males 18% vs. 3%), that promotions were fair to all options (females 58% vs. 33%; males 53% vs. 29%), and that ATC equipment was up-to-date (females 65% vs. 32%; males 67% vs. 41%).

Among women only, more attritions than retentions reported that working conditions were insecure (29% vs. 13%), and that supervisory personnel were annoying (39% vs. 19%), did not treat them the same as others (54% vs. 31%), and discriminated against them (26% vs. 9%). Female retentions more often than female attritions agreed that shift work was desirable (82% vs. 62%), that ATC work provided good job security (83% vs. 61%), but that promotions were infrequent (46% vs. 22%), and opportunities were somewhat limited (59% vs. 27%).

Of the 12 items which differentiated only among the men, attritions more often than retentions agreed that training was much too hard (18% vs. 5%), that they were "harassed more than most" during facility training (22% vs. 7%), that supervisors were hard to please (39% vs. 19%) and quick-tempered (28% vs. 10%), that facility management was inflexible (53% vs. 24%) but that co-workers had interests the same as theirs (63% vs. 41%). Also, male attritions exceeded retentions in agreeing that ATC work was routine (31% vs. 14%) and bad for their health (40% vs. 24%), and that shift work made the management of outside responsibilities difficult (26% vs. 10%). On the other hand, male retentions more frequently than attritions reported that supervisory personnel were helpful (83% vs. 63%), that ATC work was pleasant (83% vs. 67%), but that entry-level pay was less than they deserved (26% vs. 10%).

D. *Discrimination.* Differences in percentages of agreement for each experimental group on three similarly worded items which involved perceived discrimination by facility management, by supervisors, or by co-workers were examined and tested for statistical significance at the .05 level. Among male attritions, 18% agreed to "discriminated against me" concerning facility management, 12% for supervision, and 6% for co-workers; the difference in responses between perceived discrimination by management and co-workers was statistically significant. However, no more than 3% of the male retentions agreed to any of these discrimination items. Thus, while few male retentions perceived discrimination, male attritions perceived more discrimination in general and significantly more from management than from co-workers.

On the other hand, female attritions reported uniformly more perceptions of discrimination than did males: 29%, 26%, and 25% with respect to management, supervisors, and co-workers, respectively (differences between management, supervision, and co-workers were not significant), while the female retentions agreed significantly more often to discrimination by co-workers (24%) than they did with respect to facility management or supervision (each 9%). Thus, while approximately one-fourth of female attritions and about one-fourth of female retentions perceived discrimination from co-workers, the retentions perceived much less discrimination from management than did the attritions.

(Results of other analyses conducted on the response data for items of Section A are presented and discussed in Appendix C.)

Section B of the Questionnaire

As may be recalled, the subjects were asked, in Section B of the questionnaire, to state the "best feature of being an ATC" and the "worst feature of being an ATC." Using Herzberg's (1966) categories, work itself (28%), salary (22%), achievement (21%), and job security (9%) accounted for 80% of the features cited as best about ATC work. Company policies and administration (38%), working conditions (including shift work) (22%), and responsibility (10%) accounted for 70% of the worst features. No other categories comprised as much as 7% of the responses and no differences in best or worst features between sex groups or between retention-attrition groups were significant at the .05 level. Two of the three most frequently cited "best" features (work itself and achievement) are the same ones Herzberg reported and classified as top motivator factors, and two of the three most frequently cited "worst" features (company policies and working conditions) are identical with Herzberg's top hygiene factors. Salary is mentioned as a best feature more often by FAA controllers than by many other occupational groups (see also Smith, Cobb, and Collins, 1971; Smith, 1973), and is probably based on the fact that pay is relatively high for the ATC entry-level experience and education requirements. Responsibility, usually a motivating factor, was the third most common "worst" feature for this sample. However, this was mostly the case for attritions, but not significantly so.

Section C of the Questionnaire

Data from this part of the questionnaire were collected for purposes outside the scope of the present paper.

Section D of the Questionnaire

The majority of the 206 respondents to the questionnaire complied with the request in Section D for *two* suggested changes in the ATC system; however, several submitted none and a few only one. The 40 attrited females submitted a total of 57 recommendations, rather than 80,

Table 2

Percentages of categorised recommendations concerning changes in the ATC system suggested by male and female retentions and attritions in section D of the questionnaire.

Recommendations concerning:	Male Retentions		Female Retentions		Male Attritions		Female Attritions	
	N	%	N	%	N	%	N	%
Training	11	10.4	20	23.3	42	46.2	22	38.6
Management	22	20.8	18	20.9	16	17.6	8	14.1
Work Itself	7	6.6	7	8.2	12	13.2	7	12.3
ATCS Selection	14	13.2	5	5.8	1	1.1	6	10.5
Transfers	8	7.5	9	10.5	6	6.6	2	3.5
Promotions	15	14.2	10	11.6	1	1.1	2	3.5
Equipment	9	8.5	3	3.5	5	5.5	3	5.3
Work Schedule	8	7.5	6	7.0	2	2.2	2	3.5
Discrimination	4	3.8	5	5.8	1	1.1	3	5.3
Miscellaneous	8	7.5	3	3.5	5	5.5	2	3.5
Total	106	100.0	86	100.0	91	100.0	57	100.0

reflecting a relative response rate of 71.3%. Corresponding rates were 78.2% for the female retentions, 87.5% for the male attritions, and 89.8% for the male retentions.

Of the total of 340 changes suggested for the ATC system (Table 2), most concerned ATC training (28% of all recommendations) and management (19%). Aspects of the work itself were the object of 10% of the recommendations, followed by promotions (8%), ATCS selection standards (7%), transfers (7%), equipment (6%), and work schedule (5%).

Of the 95 suggestions specifically mentioning training, 24% pertained to improving facility training, 22% were general in nature, 15% criticized the pace of training, and 13% suggested changes concerning the selection and training of facility instructors. Fifty-two percent of the 64 recommendations directed at management criticized a perceived "up or out" or "feast or famine" policy. These comments apparently referred to a practice whereby trainees either advanced to journeyman level after a specified amount of training or were attrited from the air traffic system due to very limited opportunities for transfers to other types or levels of facilities or to other FAA job series. Many of these statements alleged a negative attitude on the part of ATC management and a lack of concern for people by management.

Discrimination is seldom an area recommended for change by any of the groups. Even among the women who offered suggestions dealing with discrimination (five retentions and three attritions) sex discrimination against women was mentioned less than special favors granted to "minority" groups, which include women.

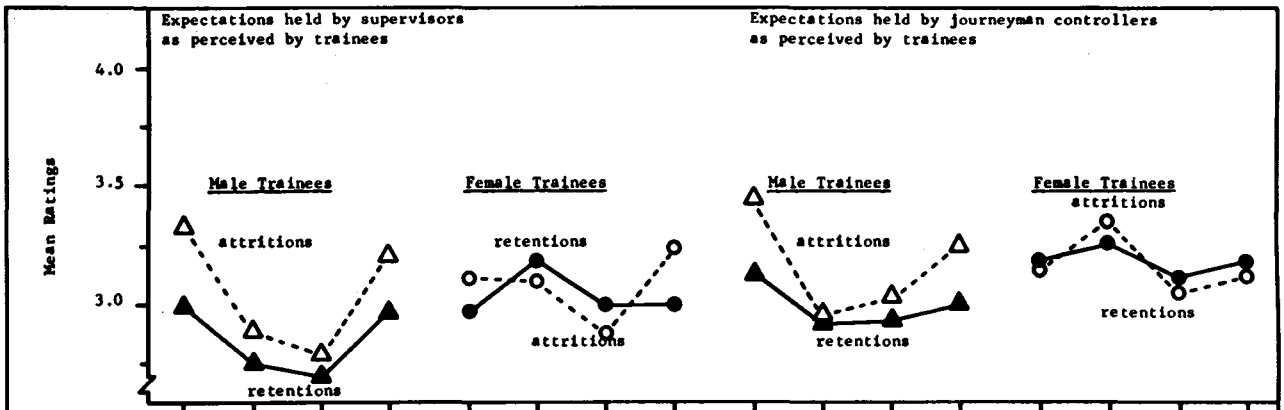
No overall sex differences exist in the frequencies of any of the categorized recommendations. When retentions and attritions are compared, both male and female attritions each gave significantly more responses (46% to 39%, respectively) concerning ATC training than did their counterpart retention groups (10% and 23%, respectively). Other significant differences involve only males, among whom attritions recommended fewer changes regarding promotions than did retentions (1% vs. 14%) and also gave fewer recommendations (1% vs. 13%) concerning aspects of ATCS selection (such as raising or lowering educational, experience, and age requirements).

Section E of the Questionnaire

A. *Perceived Expectations of Trainee Groups.* The mean rating by all subjects regarding what they perceived to be the expectations held by supervisors (or crew chiefs) toward all new trainees in general was 3.11, or slightly higher than "about what should be" (i.e., code 3, or the neutral point on the response continuum). Considering separately the women, minority groups, and trainees over 35 years of age, the mean ratings of supervisory expectations are 2.99, 2.84, and 3.13, respectively; all are very close to "about what should be."

For the item dealing with what the subjects perceived to be the expectations held by journeyman controllers toward trainees, the overall mean scores are: all trainees, 3.27; female trainees, 3.14; minority trainees, 3.06; and trainees over age 35, 3.16. With the exception of ratings of journeymen's expectations of trainees in general, all the means varied only .16 of a point from 3 (i.e., from "about what should be"), indicating that most subjects felt that being a female, a minority group member, or an older trainee did not have a negative effect on the expectations of supervisors or journeyman controllers regarding job duties of trainees.

However, some differences reached the .05 level of statistical significance when ratings were compared between items and between groups of subjects. Thus, when "all new trainees in general" is used as a standard for comparison, some significant mean differences (paired sample t tests) in ratings were obtained between items (see Figure 1). Specifically, there was a significant trend ($p<.05$) for men to rate the expectations held by supervisors and journeymen of the job performance of female trainees and of minority trainees as less than expectations of all trainees in general. Correspondingly, in sex-group comparisons, men tended to rate the expectations held by both supervisors and journeyman controllers toward the job performance of female trainees lower than did the women ($p<.05$). Although no significant differences were detected between the female retentions and attritions on any of the items concerning job duty expectations, the male attritions as com-



Trainee Groups																
Retentions																
Mean	3.00	2.75	2.70	2.98	2.98	3.20	3.04	3.06	3.17	2.94	2.96	3.02	3.22	3.30	3.15	3.22
S.D.	.62	.69	.82	.49	.57	.88	.97	.47	.65	.73	.81	.49	.60	.96	.97	.67
Attritions																
Mean	3.34	2.89	2.78	3.23	3.14	3.16	2.89	3.25	3.46	2.98	3.06	3.27	3.19	3.38	3.09	3.15
S.D.	.56	.78	.79	.63	.49	.93	.90	.77	.73	.85	.86	.64	.58	.89	.92	.62
Combined																
Mean	3.16	2.81	2.73	3.10	3.04	3.19	2.98	3.14	3.31	2.96	3.01	3.14	3.21	3.33	3.13	3.19
S.D.	.61	.73	.81	.57	.54	.89	.94	.61	.70	.78	.83	.58	.59	.93	.94	.65

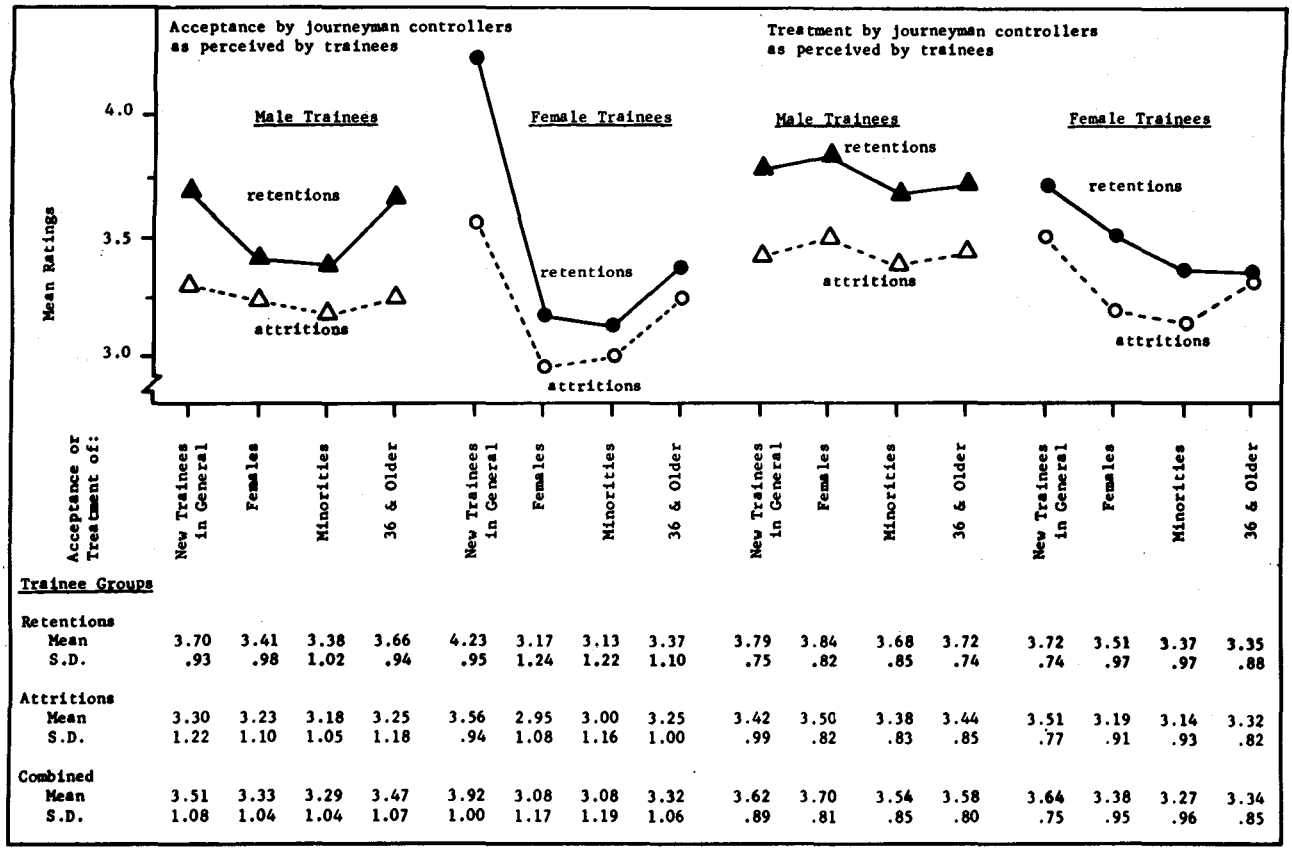
FIGURE 1. Mean ratings by male and female retentions and attritions of their perceptions of supervisory and journeyman controllers' expectations of trainees.

pared to male retentions indicated that they felt more was expected of all new trainees in general and of older trainees by both supervisory and journeyman personnel ($p<.05$).

B. *Perceived Acceptance and Treatment of Trainee Groups by Journeyman Controllers.* The mean rating for all subjects with respect to perceived *acceptance* by journeyman controllers of "all trainees in general" is 3.68, indicating that the majority of subjects felt they were accepted to some degree by journeymen (a neutral situation "neither accepted nor rejected" was coded 3; "partially accepted" was coded 4). Mean ratings of the acceptance by journeymen of the other trainee groups are: female trainees, 3.20; minority trainees, 3.17; and trainees over age 35, 3.39. With regard to the *treatment* of trainees by journeymen, the mean ratings from all subjects are: trainees in general, 3.61; female trainees, 3.52; minority trainees, 3.40; and older trainees, 3.47 (i.e., all ratings are about midway between "neither good nor bad"—coded 3—and "good"—coded 4). While mean rated *acceptance* by journeymen of female and minority trainees is about one-half point lower than that for trainees in general, the average *treatment* rating was only .21 lower.

Comparisons of ratings between items yielded no significant effects for the male groups, but both female attritions and retentions tended to rate *acceptance* by journeymen of female, minority, and older trainees as significantly lower ($p<.05$) than acceptance by journeymen of trainees in general (see Figure 2). Female attritions and retentions also rated journeymen's *treatment* of both female and minority trainees significantly lower ($p<.05$) than that of trainees in general. Female retentions (but not attritions) rated journeymen's treatment of older trainees significantly lower ($p<.05$) than that of trainees in general.

Comparisons between sexes yielded some significant differences, viz, women rated *acceptance* by journeymen of all new trainees in general higher than did men ($p<.01$) and also rated significantly lower ($p<.05$ in each case) than did



Acceptance or Treatment of:	New Trainees in General	Females	Minorities	36 & Older	New Trainees in General	Females	Minorities	36 & Older	New Trainees in General	Females	Minorities	36 & Older	New Trainees in General	Females	Minorities	36 & Older
Trainee Groups																
Retentions																
Mean	3.70	3.41	3.38	3.66	4.23	3.17	3.13	3.37	3.79	3.84	3.68	3.72	3.72	3.51	3.37	3.35
S.D.	.93	.98	1.02	.94	.95	1.24	1.22	1.10	.75	.82	.85	.74	.74	.97	.97	.88
Attritions																
Mean	3.30	3.23	3.18	3.25	3.56	2.95	3.00	3.25	3.42	3.50	3.38	3.44	3.51	3.19	3.14	3.32
S.D.	1.22	1.10	1.05	1.18	.94	1.08	1.16	1.00	.99	.82	.83	.85	.77	.91	.93	.82
Combined																
Mean	3.51	3.33	3.29	3.47	3.92	3.08	3.08	3.32	3.62	3.70	3.54	3.58	3.64	3.38	3.27	3.34
S.D.	1.08	1.04	1.04	1.07	1.00	1.17	1.19	1.06	.89	.81	.85	.80	.75	.95	.96	.85

FIGURE 2. Mean ratings by male and female retentions and attritions of their perceptions of journeyman controllers' acceptance and treatment of trainees.

men the *treatment* accorded females, minorities, and older trainees by journeyman controllers. Sex differences by attrition-retention status yielded only three significant effects: female retentions rated the *acceptance* by journeymen of trainees in general higher than did female attritions, and male retentions rated higher than did male attritions the *treatment* by journeymen of (a) trainees in general ($p<.05$), and (b) female trainees ($p<.05$).

To examine possible age effects, both sexes were combined and the attritions and retentions were separately divided into age groups of "younger than 35" and "35 and older." Concerning journeymen's *acceptance* of older trainees, the older attritions (N=19) gave significantly lower ratings (mean=2.74) than did the younger (N=73) attritions (mean=3.40). In contrast, older retentions (N=16) gave higher ratings (mean=3.88), but not significantly so, than the younger (N=98) retentions (mean=3.45). An analysis of means for journeymen's *treatment* of older trainees yielded similar results. The mean for older attritions (3.00) was significantly lower than that of younger attritions (3.50) and the mean for older retentions (3.81) was higher (but not significantly) than that of younger retentions (3.48). In addition, for both items, the ratings submitted by the older attritions were significantly lower than those rendered by older retentions. No significant differences were detected between age groups in responses to either of the items dealing with expectations in terms of job duties. With respect to the attritions, it appears that belonging to a group different from the majority of controllers (e.g., female or older trainees) is associated with negative perceptions of acceptance and treatment of that identity group by the majority. This does not, however, explain the relatively negative ratings by female retentions of journeyman controllers' expectations, acceptance, and treatment of female trainees.

Section F of the Questionnaire

This section, comprising reasons for leaving ATC work, was administered only to attritions; the findings have been detailed elsewhere (Mathews, Collins, and Cobb, 1974). Briefly, over 80% of the major reasons for attrition were accounted for by training difficulties, family factors, other employment, and perceived discrimination (mostly from co-workers). Aside from training difficulties, the primary reasons for attrition were family factors for women and other job opportunities for men; perceived bias of one form or another was next in rank for both sexes. However, 88% of the women and 92% of the men indicated they might possibly seek reemployment with the FAA, and 76% and 58%, respectively, said they would consider reapplying for FAA air traffic control work.

IV. Overview.

To provide a summarized picture of the responses of subjects to Section A of the questionnaire, an overall attitude profile was constructed by calculating a mean "favorable attitude" score for each of the 10 areas in Section A, by sex and attrition-retention status. Specifically, for each group of subjects, the proportion of favorable responses to each item in a given area (e.g., four items on entry-level pay) was summed and a mean was calculated to provide a rough indication of overall attitude toward each of the 10 work areas. A band of favorable attitudes between 65–75% was arbitrarily selected as a reference and only scores above or below that range were plotted (see Figure 3). In no case was there a mean "favorable attitude score" below 50%, although assignments uniformly elicited the least favorable attitudes (51–59%) from all four groups of trainees. Other mean scores below 65% favorable were those by female attritions and retentions for facility management, by female attritions for facility training, by male and female retentions for promotions, and by male retentions for entry-level pay. The areas of co-workers and of work itself received "favorable attitude scores" of 75% or more from all four groups of trainees. In addition, the retentions had highly favorable attitudes toward supervision, male retentions were highly positive toward facility training, women viewed entry-level pay very positively, and female retentions and male attritions had high scores for shift work.

Although the *overall profile of work attitudes is a positive one for retentions and attritions of both sexes*, there were some specific differences between the groups. For example, in general more women than men were inclined to perceive that they were treated differently than men by both management and supervision, that facility management was not informed, and that supervisors and co-workers discriminated against them. Women also tended more than men to report vulgarity and overly-friendly behavior on the part of co-workers, isolation of their work place, and difficulty in managing outside responsibilities due to shift work; however, they saw more chance for personal growth in their work and had more positive attitudes toward entry-level pay.

In comparing those trainees who left the FAA with those still in ATC work, it was found that, irrespective of sex, attritions tended to perceive more discrimination from facility management than did retentions, and they were also more inclined than the latter to view facility training as being too hurried and not adequate. However, more attritions were inclined to perceive fairness in promotions and better quality in the equipment than did retentions.

Some of these differences appear directly related to reasons for attrition; others may have more to do with job satisfaction. With respect to the former, both men and women cited training difficulty as the primary reason for leaving ATC work (Section F of the questionnaire) and substantial proportions (i.e., 43% to 61%) of the attritions (Section A of the questionnaire) felt that facility training was too hurried and was neither adequate nor good. Related to these attitudes was the finding that the most frequent types of suggestions for improving the ATC system (Section D of the questionnaire) involved training improvements and criticism of perceived "up or out" policies on the part of management.

Other than training difficulty, only one other category concerning reasons for attrition (Section F of the questionnaire) reached significant proportions for men, i.e., another job opportunity. A major basis for it may lie in the fact that about one-third of the men felt that ATC entry-level pay was not better than that which they could obtain elsewhere, only one-third felt

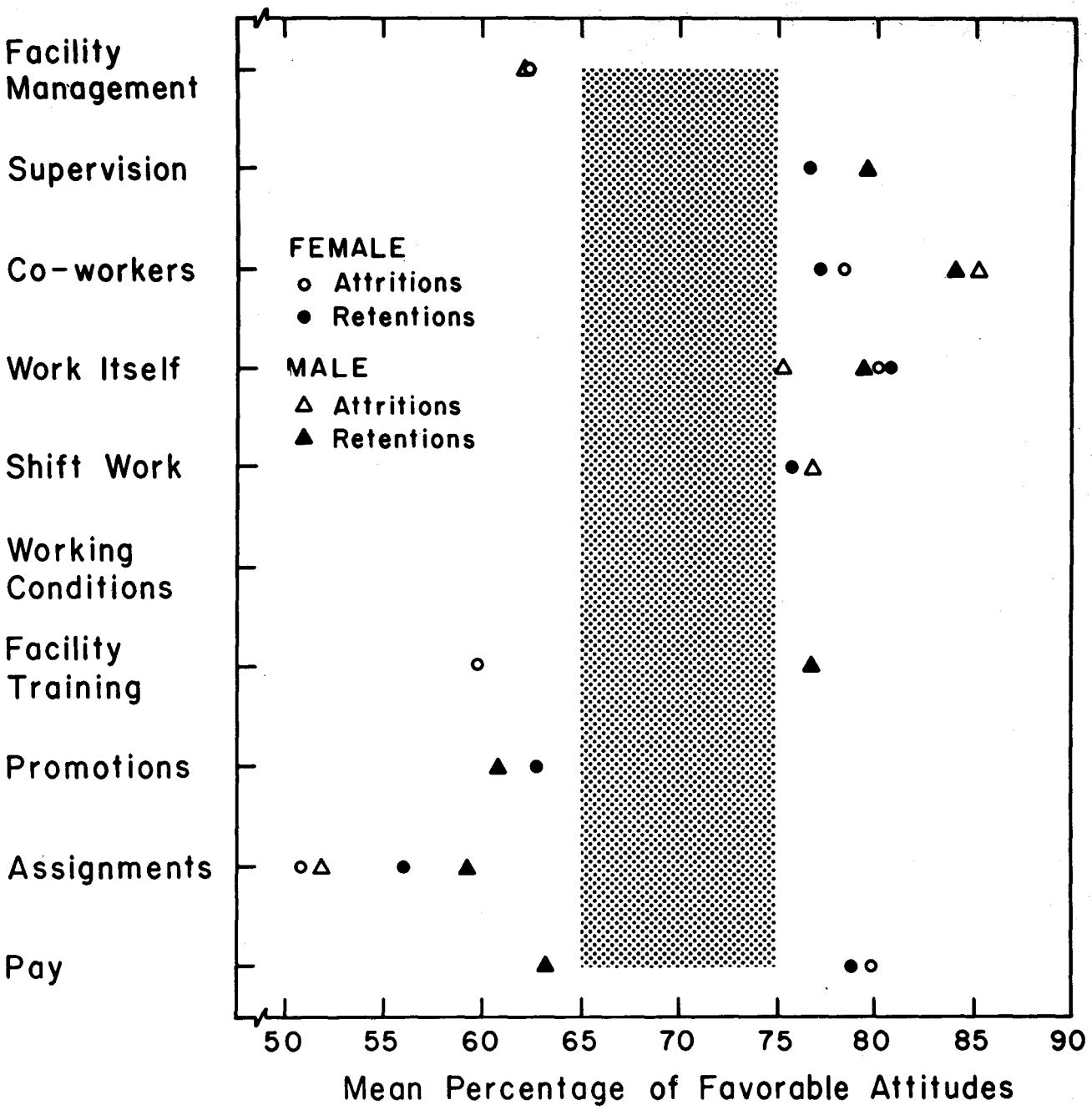


FIGURE 3. Mean favorable responses by subgroups on 10 job attitude areas. Only those group means are shown which deviated from the arbitrarily selected range of 65–75% favorable responses; all other mean scores fell within the stippled area.

that they were highly paid, and almost as many saw no chance for personal growth in ATC work.

It was noted earlier that the post-Academy attrition rate of female trainees was about twice that of males (Cobb, Mathews, and Lay, 1972). In general, women experienced higher attrition rates than men in a variety of occupations and family-type reasons are a major underlying factor (cf., Mathews, Collins, and Cobb, 1974); the ATC job is no exception. Almost half of the female attritions agreed that ATC work upset their family lives and 30% or more reported that shift rotations were too frequent, that their families did not make a satisfactory adjustment to shift changes, and that it was difficult to manage their outside responsibilities.

Perceived discrimination was another major reason for female attrition and most of the discrimination was attributed to co-workers. Results from the questionnaire (Section A) provide an interesting elaboration of this factor, viz, that approximately one-fourth of the women who had left ATC work and a comparable proportion of the female retentions perceived discrimination from co-workers. About the same proportion of female attritions felt that both supervisors and management also evidenced negative discrimination; however, only about 9% of those women still in the ATC system felt this to be so. Such findings differed from those obtained for the men. More male attritions reported discrimination from all three sources (management, supervisors, and co-workers) than did those who remained as ATCSs. Thus, whether women leave or remain in ATC work, about one-fourth of them perceive discrimination from their co-workers. Whether these perceptions are correct or not, it seems evident that the influx of women into a traditionally male occupation (and in an area associated with "maleness") might generate negative feelings, insecurity, and, possibly, negative behavior on the part of the men. At the same time, however, women are likely to feel somewhat insecure in entering a "man's world" and their perceptions and behavior may be negatively affected. Related to this is the fact that the men in this study perceived that less was expected of female trainees by supervisors and journeyman controllers than did the women (Section E of the questionnaire), and tended to feel that women were better treated than were other controllers (Figure 2). On the other hand, women in this study tended to feel that more, not less, was expected of them by supervisors and journeymen and that they were less well accepted and less well treated by journeyman controllers than were trainees in general. Although one might anticipate the development of these reactions of men and women under the conditions described, the tensions produced thereby are likely to result in perceptions and behavior which, for a while at least, will tend to cause some tensions in the work situations.

V. Implications.

The data obtained in this study have some significant implications in terms of ATC attritions and ATC job satisfaction. Most workers in other occupations, irrespective of sex, rate interesting and challenging work above all other job factors (e.g., Herzberg, 1968)—ATC trainees are no exception. The trainees also have high regard for the skills and dedication of their co-workers, enjoy most aspects of the ATC job, and generally have positive attitudes toward the air traffic control work situation.

However, occupational studies have also reported that good co-workers, supervision, and work hours are generally more important to women than to men (e.g., Jurgensen, 1947), while men prefer good promotional opportunities, pay, and job security (e.g., Hardin, Reif, and Heneman, 1951). If these are valid aspects of job satisfaction and if they are important to an employee in deciding whether to leave or to continue in a job, the present data are suggestive of areas for improvement in the ATC environment. For example, over 40% of the female attritions reported that shift work upset their family lives and that shift rotations were too frequent. About one-fourth of the female attritions perceived discrimination against them by co-workers, supervisors, and facility management; they saw their co-workers as vulgar, supervisors as annoying, and management as setting different standards for them. With regard to men's preferences, 30% or more of male trainees agreed that the work provided no chance for personal growth, that transfer opportunities were not good, and that entry-level pay was not better than most jobs they could get. These latter attitudes could well account for the fact that, aside from training difficulties, the major reason for male attrition from ATC work was another job opportunity.

Results of this study indicate that ATC retention rates might be improved (particularly for women) and job satisfaction increased by:

(a) improving the orientation of prospective hirees regarding nature, demands, and rewards of ATC work,
(b) modifying the pace of training so that increased attention is given to the more difficult aspects of the training course,
(c) basing assignments on ability wherever possible,
(d) improving the opportunities for transfer,
(e) implementing regular shifts whenever possible,

(f) modifying those practices at facility management levels which appear discriminatory,

(g) training ATC instructors with regard to fair treatment of all trainees, motivational techniques in instruction, and the psychology of both the teaching and learning process,

(h) assuring fairness in promotions for all options,

(i) educating all new employees with regard to the phychology of discrimination (e.g., by training films).

References

1. Blum, M. L., and J. J. Russ: A Study of Employee Attitudes Toward Various Incentives, PERSONNEL, 19:438–444, 1942.
2. Burke, Ronald J.: Are Herzberg's Motivators and Hygienes Unidimensional? JOURNAL OF APPLIED PSYCHOLOGY, 50:317–321, 1966.
3. Centers, R., and D. E. Bugental: Intrinsic and Extrinsic Job Motivations Among Different Segments of the Working Population, JOURNAL OF APPLIED PSYCHOLOGY, 50:193–197, 1966.
4. Cobb, B. B., J. J. Mathews, and C. D. Lay: A Comparative Study of Female and Male Air Traffic Controller Trainees. FAA Office of Aviation Medicine Report No. AM–72–22, 1972.
5. Cobb, B. B., J. J. Mathews, and Peter L. Nelson: Attrition-Retention Rates of Air Traffic Control Trainees Recruited During 1960–1963 and 1968–1970. FAA Office of Aviation Medicine Report No. AM–72–33, 1972.
6. Dunnette, M. D., and J. Maetzold: Use of a Weighted Application Blank in Hiring Seasonal Employees, JOURNAL OF APPLIED PSYCHOLOGY, 39:308–310, 1955.
7. Farrell, R. A.: Air Traffic Control Specialist Attrition, Official FAA Memorandum from AMN–23 to AAC–118, March 31, 1972.
8. Fleiss, Joseph L.: *Statistical Methods for Rates and Proportions*, New York, Wiley, 1973.
9. Hardin, E., H. G. Reif, and H. G. Heneman: Stability of Job Preferences of Department Store Employees, JOURNAL OF APPLIED PSYCHOLOGY, 35:256–259, 1951.
10. Herzberg, F.: *Work and the Nature of Man*, New York, World Publishing Company, 1966.
11. Herzberg, F.: One More Time: How Do You Motivate Employees? HARVARD BUSINESS REVIEW, 46:53–62, 1968.
12. Hilgert, Raymond L.: Satisfaction and Dissatisfaction in a Plant Setting, PERSONNEL ADMINISTRATION, 34:21–27, 1971.
13. Hoppock, R.: *Job Satisfaction*, New York, Harper & Bros., 1935.
14. Hulin, Charles L.: Job Satisfaction and Turnover in a Female Clerical Population, JOURNAL OF APPLIED PSYCHOLOGY, 50:280–285, 1966.
15. Hulin, Charles L.: Effects of Changes in Job-Satisfaction Levels on Employee Turnover, JOURNAL OF APPLIED PSYCHOLOGY, 52:122–126, 1968.
16. Hulin, Charles L.: Sources of Variation in Job and Life Satisfaction: The Role of Community and Job-Related Variables, JOURNAL OF APPLIED PSYCHOLOGY, 53:279–291, 1969.
17. Jurgensen, Clifford E.: In E. S. Ellman, *Managing Women in Business*, Waterford, Connecticut, Prentice Hall, 22, 1963.
18. Jurgensen, Clifford E.: Selected Factors Which Influence Job Preferences, JOURNAL OF APPLIED PSYCHOLOGY, 31:553–564, 1947.
19. Kaley, Maureen M.: Attitudes Toward the Dual Role of the Married Professional Woman, AMERICAN PSYCHOLOGIST, 26:301–306, 1971.
20. Katzell, Mildred E.: Expectations and Dropouts in Schools of Nursing, JOURNAL OF APPLIED PSYCHOLOGY, 52:154–157, 1968.
21. Kuhlen, R. G., and G. H. Johnson: Changes in Goals With Adult Increasing Age, JOURNAL OF CONSULTING PSYCHOLOGY, 16:1–4, 1952.
22. Kuhlen, Raymond G.: Needs, Perceived Need Satisfaction Opportunities, and Satisfaction With Occupation, JOURNAL OF APPLIED PSYCHOLOGY, 47:56–64, 1963.
23. Lodahl, T. M., and M. Kejner: The Definition and Measurement of Job Involvement, JOURNAL OF APPLIED PSYCHOLOGY, 49:24–33, 1965.
24. Lunden, Walter A.: Men of New Scotland Yard, POLICE, Nov.-Dec.:6–16, 1968.
25. Mathews, J. J., W. E. Collins, and B. B. Cobb: A Sex Comparison of Reasons for Attrition of Non-Journeyman FAA Air Traffic Controllers. FAA Office of Aviation Medicine Report No. AM–74–2, 1974.
26. Mead, Margaret: The Life Cycle and Its Variations: The Division of Roles, DAEDALUS, 96:871–875, 1967.
27. Nealey, S. M., and J. G. Goodale: Worker Preferences Among Time-Off Benefits and Pay, JOURNAL OF APPLIED PSYCHOLOGY, 51:357–361, 1967.
28. Saleh, S. E., R. J. Lee, and E. P. Prien: Why Nurses Leave Their Jobs: An Analysis of Female Turnover, PERSONNEL ADMINISTRATION, 28:25–28, 1965.
29. Schuh, Allen J.: The Predictability of Employee Tenure: A Review of the Literature: PERSONNEL PSYCHOLOGY, 20:133–152, 1967.
30. Smith, P. C.: The Development of a Method of Measuring Job Satisfaction: The Cornell Studies, In E. A. Fleishman (Ed.), *Studies in Personnel and Industrial Psychology*, Homewood, Illinois, Dorsey, 1969.
31. Smith, R. C., B. B. Cobb, and W. E. Collins: Attitudes and Motivational Factors in Terminal Area Air Traffic Control Work. FAA Office of Aviation Medicine Report No. AM–71–30, 1971.
32. Smith, R. C.: Job Attitudes of Air Traffic Controllers: A Comparison of Three Air Traffic Control Specialties. FAA Office of Aviation Medicine Report No. AM–73–2, 1973.
33. Snedecor, G. W., and W. G. Cochran: *Statistical Methods*, Ames, Iowa, Iowa State University Press, 1967.
34. Tiffin, J., B. T. Parker, and R. W. Habersat: The Analysis of Personnel Data in Relation to Turnover on a Factory Job, JOURNAL OF APPLIED PSYCHOLOGY, 31:615–616, 1947.
35. Waters, L. K., and D. Roach: Relationship Between Job Attitudes and Two Forms of Withdrawal From the Work Situation, JOURNAL OF APPLIED PSYCHOLOGY, 55:92–94, 1971.

Appendix A

AIR TRAFFIC CONTROL ATTRITION STUDY: QUESTIONNAIRE

Name _____ Birth Date _____

A. In terms of your job as an FAA-ATC, please indicate whether you "Agree" or "Disagree" with each statement listed below by placing an "X" in the appropriate column. Be sure to check either an "Agree" or "Disagree" response for each statement.

FACILITY MANAGEMENT	Agree	Disagree
Concerned		
Cold		
Informed		
Regimented		
Impartial		
Good planning		
Sufficiently capable		
Too bureaucratic		
Gave too few benefits		
Provided good training		
Inflexible		
Sympathetic		
Discriminated against me		
Tried to protect me too much		
Treated me as different		
Set different standards of achievement for me		

SUPERVISION	Agree	Disagree
Helpful		
Hard to please		
Praised good work		
Tactful		
Annoying		
Stubborn		
Intelligent		
Too little supervision		
Quick tempered		
Told me where I stood		
Knew job well		
Unsympathetic		
Discriminated against me		
Tried to protect me too much		
Treated me the same as others		
Set different standards of achievement for me		

CO-WORKERS		
Discriminated against me		
Loyal		
Boring		
Talk too much		
Responsible		
Easy to meet		
Vulgar		
Pleasant		
Easy to make enemies		
Intelligent		
No privacy		
Interests same as mine		
Too friendly		
Tried to protect me too much		
Treated me as equal		
Set different standards of achievement for me		

WORK ITSELF		
Good job security		
Fascinating		
Routine		
Respected		
Useful		
Frustrating		
Pleasant		
Challenging		
Bad for health		
Sense of accomplishment		
Boring		
Fatiguing		
Harder than I expected		
Easier than I expected		
Responsibility too great		
No chance for personal growth		

ENTRY-LEVEL PAY	Agree	Disagree
Too low	___	___
Highly paid	___	___
Less than I deserved	___	___
Better than most other jobs I might get	___	___

ASSIGNMENTS	Agree	Disagree
Facility I wanted	___	___
Based on ability	___	___
Option I wanted	___	___
Good opportunity to transfer	___	___

FACILITY TRAINING		
Good	___	___
Much too hard	___	___
Harassed me more than most	___	___
Different standards for me	___	___
Timely	___	___
Adequate	___	___
Too hurried	___	___
Should come after Academy training	___	___

PROMOTIONS		
Poor opportunity for advancement	___	___
Opportunity somewhat limited	___	___
Promotion on ability	___	___
Fair for all ATC options	___	___
Infrequent	___	___
Too fast	___	___
Reflect greater responsibility	___	___

WORKING CONDITIONS		
Location good	___	___
Comfortable	___	___
Surroundings unpleasant	___	___
Hours advantageous	___	___
Marginal	___	___
Insecure	___	___
Equipment up-to-date	___	___
Adequate work space	___	___
Needed improvements	___	___
Isolated	___	___

SHIFT WORK		
Unhealthy	___	___
Rotations too frequent	___	___
Shift length o.k.	___	___
Night work pleasant	___	___
Desirable	___	___
Busy shift best	___	___
Upset family life	___	___
Difficulty to manage outside responsibilities	___	___
Family adjusted o.k.	___	___
Fatiguing	___	___

B. Please complete the following statements. If there is not sufficient space for your response, you may continue on the reverse side of this sheet.

The best feature of being an FAA air traffic controller is _____

_____

The worst feature of being an FAA air traffic controller is _____

_____

C. Check the adjective which best describes your FAA-ATC experience.

	Excellent	Good	Neither good nor bad	Bad	Very bad
a. When I accepted appointment as an ATC, my information about ATC job duties was.....	___	___	___	___	___
b. When I accepted appointment as an ATC, my information about how and when I might be eliminated from training was.....	___	___	___	___	___
c. When I accepted appointment as an ATC, my information about ATC career progression was.....	___	___	___	___	___
d. When I accepted appointment as an ATC, my information about opportunities for transfer to non-ATC jobs was.....	___	___	___	___	___
e. The training at the FAA Academy was.....	___	___	___	___	___
f. The training at my facility was.....	___	___	___	___	___
g. The training ability of FAA Academy instructors was..	___	___	___	___	___
h. The training ability of my facility instructors was..	___	___	___	___	___
i. The ability of FAA Academy instructors to determine which trainees were likely to be good, and which were likely to be poor, at ATC work was.....	___	___	___	___	___
j. As a result of FAA Academy training, my understanding of ATC work and my ability to apply that understanding was.....	___	___	___	___	___
k. As a result of facility training, my understanding of ATC work and my ability to apply that understanding was.....	___	___	___	___	___

D. Please complete the following statements. If there is not sufficient space for your response, you may continue on the reverse side of this sheet.

If I could make <u>two</u> changes in the total ATC system, I would recommend:

(1) _____

_____

(2) _____

_____

E. For each question listed below, check the one phrase which best describes your answer.

	Much more than should be	More than should be	About what should be	Less than should be	Much less than should be
1.					
(a) How much in terms of job duties do supervisors or crew chiefs <u>expect of</u> new trainee and developmental controllers <u>in general</u>?	___	___	___	___	___
(b) How much in terms of job duties do supervisors or crew chiefs <u>expect of</u> new trainee and developmental controllers <u>who are females</u>?	___	___	___	___	___
(c) How much in terms of job duties do supervisors or crew chiefs <u>expect of</u> new trainee and developmental controllers <u>who are from minority groups</u>?	___	___	___	___	___
(d) How much in terms of job duties do supervisors or crew chiefs <u>expect of</u> new trainee and developmental controllers <u>who are over 35 years of age</u>?	___	___	___	___	___
2.					
(a) How much in terms of job duties do journeyman controllers expect of new trainee and developmental controllers <u>in general</u>?	___	___	___	___	___
(b) How much in terms of job duties do journeyman controllers <u>expect of</u> new trainee and developmental controllers <u>who are females</u>?	___	___	___	___	___
(c) How much in terms of job duties do journeyman controllers <u>expect of</u> new trainee and developmental controllers <u>who are from minority groups</u>?	___	___	___	___	___
(d) How much in terms of job duties do journeyman controllers <u>expect of</u> new trainee and developmental controllers <u>who are over 35 years of age</u>?	___	___	___	___	___

3.	Completely accept	Partly accept	Neither accept nor reject	Partly reject	Completely reject
(a) How do journeyman controllers accept new trainee and developmental controllers in general?.....	___	___	___	___	___
(b) How do journeyman controllers accept new trainee and developmental controllers who are females?.....	___	___	___	___	___
(c) How do journeyman controllers accept new trainee and developmental controllers who are from minority groups?.....	___	___	___	___	___
(d) How do journeyman controllers accept new trainee and developmental controllers who are over 35 years of age?.....	___	___	___	___	___

4.	Very good	Good	Neither good nor bad	Bad	Very bad
(a) What kind of treatment do journeyman controllers give new trainee and developmental controllers in general?.....	___	___	___	___	___
(b) What kind of treatment do journeyman controllers give new trainee and developmental controllers who are females?.....	___	___	___	___	___
(c) What kind of treatment do journeyman controllers give new trainee and developmental controllers who are from minority groups?.....	___	___	___	___	___
(d) What kind of treatment do journeyman controllers give new trainee and developmental controllers who are over 35 years of age?.....	___	___	___	___	___

Appendix B

Methods used in analyzing data from the questionnaire for Sections A, D, and E.

Section A. Responses to the 107 agree-disagree items were treated with the chi square statistic. First, a total 2 x 4 chi square value was obtained based on agree-disagree frequencies for the four groups of male and female retentions and attritions. Then, this summary value was partitioned (Fleiss, 1973) into values based independently on a sex comparison and then on retention-attrition comparisons within each sex group.

Possible interaction effects were measured by summing the changes in proportions for the four subgroups and using a critical ratio to test the significance of interaction between sex and retention-attrition status (Snedecor and Cochran, 1967). An assessment of the degree of intercorrelation of the ten factors or areas of Section A was accomplished, for the retentions and attritions separately, by assigning a value of "one" for each positive answer and summing the items for each area. Then, the scores for all possible pairs of areas were correlated across all subjects in the group. This was done separately for male and for female retentions and attritions, and for retentions and attritions of each sex.

Section D. Each subject was asked to suggest two changes for the ATC system. The suggestions were sorted into several empirically derived categories (e.g., training suggestions). The percentages of all suggestions which were assigned to the various categories were then computed. Where appropriate, subdivisions within general categories were established and within-category percentages were computed.

Section E. The mean response scores for male and female retentions and attritions were computed and t tests were used to make comparisons. For intergroup comparisons, independent sample tests were used while inter-item differences for each group were tested by dependent (paired) sample t tests.

Appendix C

Additional analyses of data from Section A of the Questionnaire.

Discrimination. An inspection of the differences between the "agree" responses of men and women on the three items dealing with discrimination was made separately for attritions and retentions. That is, sex differences were obtained by subtracting the percentage of men from the percentage of women who agreed that they were discriminated against by management, supervisors, or co-workers. For attritions, the percentage differences so obtained are 11%, 14%, and 17% respectively; for attritions on the same items, the differences are 6%, 7%, and 21%. In both cases, only the difference pertaining to perceived co-worker discrimination is statistically significant ($p<.05$). Thus, although women consistently reported more discrimination than did men, no statistically significant sex differences were obtained in perceived discrimination by management or by supervisors among either attritions or retentions. However, among both attritions and retentions, women perceive significantly more negative discrimination by co-workers than do men. No significant inter-item differences for any of the groups were detected for responses to "set different standards of achievement for me" or "tried to protect me too much."

Interaction Between Sex and Retention-Attrition Status. Interactions between sex and retention-attrition status were tested using critical ratios. For example, for the item "desirable" under shift work (see Appendix B), the percentages agreeing are 60% and 69%, respectively, for male retentions and attritions and 82% and 62%, respectively, for female retentions and attritions. While the proportion of men agreeing to "desirable" went up 9% from retention to attrition status, the proportion of women went down 20%, resulting in a net change of 29% ($t=2.09$, $p<.05$). This implies that "relative to those who stay, women who leave ATC think shift work is less desirable than do men who leave ATC." Testing all items in this manner revealed only two more differences significant at the .05 level; the female attritions were relatively more negative concerning "night work pleasant" while the male attritions were more inclined to report the work itself as being "routine."

Two differences which did not quite reach the .05 level (the usually accepted level of statistical significance) are consistent with the high proportion of family-related reasons given by women for leaving ATC work (Mathews, Collins, and Cobb, 1974). At the .10 level, female attritions agreed more often that shift work "upset family life" and made it "difficult to manage outside responsibilities." Only one other difference was significant at the .10 level: the male attritions were relatively more negative concerning promotional opportunities. This may be one reason why more men than women said they left for another job (Mathews, Collins, and Cobb, 1974).

Intercorrelations Among the Ten Areas of Section A of the Questionnaire. An assessment of the degree of intercorrelation among the ten areas (e.g., work itself, co-workers, etc.) sampled in Section A was accomplished by assigning a value of "one" for each positive answer and summing those scores for all items within a given area for each subject; a variety of product moment correlations could then be computed. For all subjects combined, 33 of the 45 intercorrelations were significant at the .05 level; the exceptions were all nine correlations involving entry-level pay (i.e., there were no significant relationships between attitudes toward pay and attitudes toward any of the other work areas) and three concerning shift work (i.e., those with co-workers, facility training, and promotions). The highest r (.70) was between management and supervision, i.e., favorable (or unfavorable) responses to management items were associated with similar attitudinal responses to supervision items. The lowest correlation (.00) was between pay and shift work, and the median r was .31. Five correlation values were .50 or greater, including all intercorrelations of the matrix of management, supervision, and facility training, and the r's for co-workers with management and with supervision; these correlations indicate a substantial relationship between positive (or negative) attitudes toward an area of work and positive (or negative) attitudes toward the paired area of work.

In male-female comparisons, "work itself" correlated highly with other aspects of the ATC job for the males, eight of the nine r's being significant at the .05 level compared to four for the females. Only the correlation between work itself and shift work (.53 for males and .16 for females) significantly differed for the sex groups. The higher r's for men between "work itself" and other aspects of work are consistent with reports which indicate that occupation is psychologically more critical to men than women. For example, Kuhlen (1963) obtained higher r's between need deficiency and job satisfaction for male teachers, and Centers and Bugental (1966) found males valued self-expression in work more than did females. Hulin (1969) obtained greater r's for males between job and life satisfaction. In another study, Kuhlen (1952) concluded that occupation is a secondary role for many women. The greater proportion of non-job-related reasons (i.e., family reasons) for attrition of women from ATC work (Mathews, Collins, and Cobb, 1974) and similar findings reported by others for different occupational groups supports the latter conclusion.

In comparing male retentions and attritions, five r's were significantly larger for retentions; these differences involved intercorrelations (a) of shift work with facility management, supervision, and facility training and (b) of coworkers with facility management and supervision. Female retentions differed significantly from attritions only in that attitudes toward pay and promotions correlated higher for retentions.