ATTRITION IN U.S. AIR TRAFFIC CONTROL SPECIALIST (ATCS) TRAINING: A REVIEW OF 50 YEARS OF DATA

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Aptitude testing and "screening" at the FAA Academy have been viewed as keys to reducing field ATCS training attrition. To what extent have ATCS field training attrition rates changed over time with testing and screening? Historical data on training outcomes were extracted from FAA reports and other documented sources for controllers hired in five non-overlapping cohorts spanning 50 years. *Academy Attrition Rate* averaged 26% (SD=18%) over the 50 years and across options, compared to 25% (SD=4%) in field training. Lower *Field Training Attrition Rates* coincided with no screening (22%, 1968–1970) and intensive screening (19%, 1986–1992). Elimination of screening did not result in an increase in the En Route *Field Training Attrition Rate* in 2005–2010, but the Terminal *Field Training Attrition Rate* tripled (29%) from the 1986–1992 low of 9%. The lack of a consistent pattern suggests that field training itself warrants investigation to better understand the dynamics of attrition.

Air Traffic Control Specialist (ATCS) training in the U.S. averages two to three years to achieve Certified Professional Controller (CPC) status. Attrition in that expensive and extensive training has long been a concern for the Federal Aviation Administration (FAA) and its stakeholders. For example, researchers in 1960 noted that "[P]roviding training for those employees who eventually will either drop out or be washed out of the training program has become expensive in time and money. The current attrition rate indicated that has become a serious problem" (Davis, Kerle, Silvestro, & Wallace, 1960). Similar concerns were noted in the 1970 report of the Air Traffic Controller Career Committee (Corson, Bernhard, Catterson, Fleming, Lewis, Mitchell, & Ruttenberg, 1970). High field attrition rates caught the attention of the U.S. Congress in 1975, resulting in a hearing and Congressional recommendations on how to reduce such losses (*Selection and Training of FAA Air Traffic Controllers*, 1975). Training attrition rates were a significant concern all through the 1980s as the FAA rebuilt the controller workforce following the 1981 strike by the Professional Air Traffic Controller Organization (PATCO) (U.S. General Accounting Office, 1986, 1987).

A central idea over the past 50 years is that training attrition rates can be "…solved or reduced by developing a realistic selection program for controllers" (Davis, et al.). Similarly, the U.S. Congress found in 1975 that the "[T]he selection process for admission to the ATC program is inadequate to predict with reasonable accuracy the selectees' potential for successfully completing the training program" (*Selection and Training of FAA Air Traffic Controllers*). From 1961 through 1975, the FAA used a one-stage selection process based on prior experience and education and placed new controllers into Academy training. Aptitude testing was incorporated into the selection process in 1963. Initial training was conducted at the FAA Academy on a pass/fail basis but without any explicit intention to eliminate or "screen out" new controllers. From 1976 through 1992, the FAA used a two-stage selection process with the expectation of a lower attrition rate in field training. The first stage was aptitude testing of applicants. The second stage of selection was "screening" at the FAA Academy where the explicit intent was to "screen

out" those new controllers unlikely to succeed in field training. The "screening" component was incorporated into FAA Academy training in 1976 at the specific direction of the U.S. Congress (see the recommendations in *Selection and Training of FAA air traffic controllers*, 1975) and was especially prominent during the post-strike recovery period (see Broach, 1998). In the period 2005 to 2010, FAA reverted to a one-stage selection process based on a computerized aptitude test battery and training at the FAA Academy was conducted on a "pass/pass" basis. The question addressed in this review is to what degree attrition rates in field training varied over this 50-year interval (1960–2010) as the controller selection process changed. It is important to note that the training for each cohort reflected the technology, procedures, and traffic of that time period.

Method

Historical data on selection and training were extracted from FAA reports and databases maintained for research purposes at the FAA's Civil Aerospace Medical Institute (CAMI) for five non-overlapping cohorts (Table 1). Attrition rates in Academy and new hire field training were calculated from these primary sources. Descriptions of the selection process used for each cohort and FAA Academy training programs (Table 2) were also extracted from these and other sources such as training documentation.

Table 1
Primary ATCS data sources by cohort

Cohort	N	Source
1960 – 1963	1,741	Cobb, et al. 1972
1968 –1970	4,094	Cobb, et al, 1972
1981 –1985	13,533	CAMI Post-Strike ATCS Tracking Database
1986 –1992	14,392	CAMI Post-Strike ATCS Tracking Database
2005 – 2010	6,158	CAMI Next Generation ATCS Tracking Database

Attrition and retention rates were computed as follows for each cohort. Attrition from FAA Academy training (*Academy Attrition Rate*) was computed as the ratio of Academy losses (failures and withdrawals) to total entrants into the Academy for a given cohort. Attrition in field training (*Field Training Attrition Rate*) was computed as the ratio of losses from new hire field training (excluding deaths) to the number of persons (developmentals) entering new hire field training after completion of the FAA Academy. Total attrition (*Net Attrition Rate*) was computed as the ratio of the sum of Academy and field training losses to the total number of entrants into the Academy at the start of the training process. Persons with prior ATC experience hired at higher grade levels and placed directly into field ATC facilities (bypassing the FAA Academy) were excluded from this analysis of attrition rates.

Results

Historical Academy, field training, and total attrition data and rates by option and combined are presented in Table 3 for persons hired into the FAA Academy by year (or time period) and cohort. The combined (both options) Academy and field training attrition rates are illustrated in Figure 1.

Table 2
Summary description of selection and Academy training 1960–2010

Cohort	Selection	Academy
1960–1963	Prior education & experience No aptitude testing No maximum age at entry	By option, pass/fail 8-weeks (for both options) No explicit screening
1968–1970	Prior education & experience Aptitude testing for GS-5/7 No maximum age at entry	By option, pass/fail 8.5 weeks No explicit screening
1981–1985	Aptitude testing (OPM test) Top-down hiring based on score Maximum age at entry of 31	By option, pass/fail 11 weeks En Route (Fundamentals & Non-radar) 15 weeks Terminal (Fundamentals, Tower, Non-radar) Explicit screening
1986–1992	Aptitude testing (OPM test) Top-down hiring based on score Maximum age at entry of 31	Combined, pass/fail 9 weeks Explicit screening
2005–2010	Aptitude testing (AT-SAT) Hiring based on score bands (Qualified, Well Qualified, determined by AT-SAT score) Maximum age at entry of 31	By option, pass/pass 17 weeks En Route (Basics, En Route) 13 weeks Terminal (Basics, Tower) No explicit screening

Inspection of the data in Table 3 and as illustrated in Figure 1 suggests that the *Field Training Attrition Rate* varied less across time than did the *Academy Attrition Rate*. The *Academy Attrition Rate* spiked at over 40% for the 1981–1985 and 1986–1992 cohorts hired after the 1981 PATCO strike. In contrast, the *Field Training Attrition Rate* is flatter across years, varying 19 to 32% across both options and cohorts, even during the post-strike recovery period. The attrition rates by option (Table 3) follow the same pattern with large variations in *Academy Attrition Rate* as second-stage "screening" was introduced for the post-strike cohorts and then eliminated for the 2005–2010 cohort.

One might expect that removal of the "screening" component of the Academy training program might result in a higher *Field Training Attrition Rate* in subsequent years. But as shown in Figure 1 (and in Table 3 by option), the combined *Field Training Attrition Rate* did not dramatically increase for the 2005–2010 cohort following removal of the "screening" element in FAA Academy training. The En Route *Field Training Attrition Rate* for 2005–2010 (28%) is very comparable to the 1986–1992 En Route *Field Training Attrition Rate* of 27%. However, the Terminal *Field Training Attrition Rate* for the 2005–2010 cohort of 29% is approximately triple the 1986–1992 Terminal attrition rate of 9%. The increase in Terminal *Field Training Attrition Rate* might be attributable to the elimination of "screening" at the FAA Academy. However, other explanations such as changes in new hire aptitude, prior ATC experience and education and changes in field training rigor might be possible and should be evaluated.

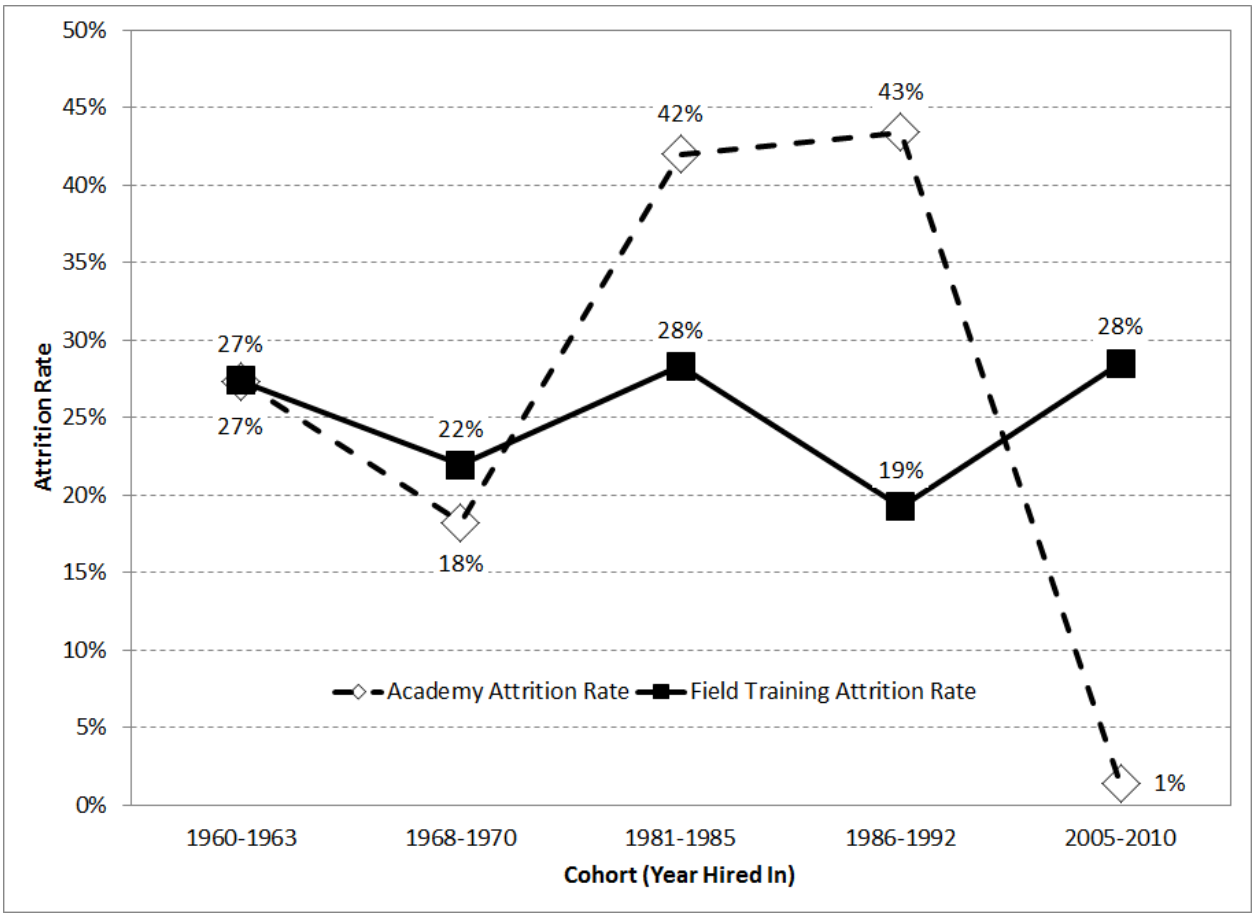

Figure 1. Academy and field training attrition rates for combined options by cohort

Discussion

Attrition in field training is a significant and persistent concern for the FAA and its stakeholders. For many years, "better" first-stage selection and explicit second-stage "screening" at the FAA Academy were held out as key methods for reducing field attrition. One might expect field training attrition rates to decrease with the introduction of second-stage "screening" at the FAA Academy over time. No such consistent decline is apparent. On the other hand, elimination of second-stage "screening" might be expected to result in higher field training attrition rates. This seems to be the case in the Terminal but not in En Route option for the 2005–2010 cohort.

While a selection process is needed for practical (and legal) reasons, it does not appear that first-stage selection and second-stage screening will *necessarily* reduce the new hire *Field Training Attrition Rate*. Rather, the relationship appears to be complex, and organizational circumstances, candidate characteristics, technology, and traffic might play significant roles. Furthermore, while selection and screening processes are reasonably well documented, the field training process itself is less well documented. Field training is conducted within a framework established by the ATCS technical training order (FAA, 2015) but is necessarily decentralized and facility-specific. Future research should explore in greater depth historical circumstances for each cohort and the interplay between selection, screening, and especially the field training process itself to better understand the dynamics of controller attrition.

Table 3

Historical ATCS hire, attrition, and retention data by cohort and option

Cohort[1]	N Enter Academy[2]	N Academy Loss	Academy Attrition Rate	N Academy Pass	N to Field[3]	N Field Training Loss	Field Training Attrition Rate	N Retentions[4]	N Losses	Net Retention Rate	Net Attrition Rate
					En Route Option						
60–62	1,008	323	23%	685	685	229	33%	456	552	45%	55%
68–70	3,159	565	18%	2,594	2,594	640	25%	1,954	1,205	62%	38%
81–85	8,536	4,073	48%	4,463	4,461	1,629	37%	2,832	5,702	34%	66%
86–92					4,732	1,237	26%	3,495			
05–10	2,753	49	2%	2,704	2,704	763	28%	1,941	812	71%	29%
					Terminal Option						
60–63	733	153	21%	580	580	117	20%	463	270	63%	37%
68–70	935	180	19%	755	755	94	12%	661	274	71%	29%
81–85	4,997	1,607	32%	3,390	3,384	590	17%	2,794	2,198	56%	44%
86–92					3,298	308	9%	2,990			
05–10	3,405	35	1%	3,370	3,370	967	29%	2,403	1,002	71%	29%
					Combined Options						
60–63	1,741	476	27%	1,265	1,265	346	27%	919	822	53%	47%
68–70	4,094	745	18%	3,349	3,349	734	22%	2,615	1,479	64%	36%
81–85	13,533	5,680	42%	7,853	7,844	2,478	32%	5,373	8,160	40%	60%
86–92	14,392	6,243	43%	8,149	8,030	1,545	19%	6,485	7,788	45%	54%
05–10	6,158	84	1%	6,074	6,074	1,730	28%	4,344	1,814	71%	29%

Notes: [1]60–62=1960–1962; 68–70=1968–1970; 81–85=1981–1985; 86–92=1986–1992; 05–10=2005–2010

[2]Hires into FAA Academy only, excludes hires direct to facilities; Losses are withdrawals and failures

[3]Numbers passing Academy and number reporting to field facilities are sometimes less due to no shows at the facility. "No shows" are not included in the calculation of field training attrition and net retention and loss rates

[4]Number of retentions (achieved Full Performance Level or Certified Professional Controller or still in training to be consistent with Cobb, et al., 1972) at 1st facility only; Losses are those that failed or transferred before completing field training at the 1st facility (excluding only deaths)

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