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The Utility of AT-SAT in Hiring Graduates of an Air-Traffic Collegiate Training Initiative Program

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THE UTILITY OF AT-SAT IN HIRING GRADUATES OF AN AIR-TRAFFIC COLLEGIATE TRAINING INITIATIVE PROGRAM

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The FAA recruits applicants for Air Traffic Control Specialist (ATCS) positions from multiple sources. Each hiring source has requirements that applicants must meet for eligibility. These hiring sources include the Air Traffic – Collegiate Training Initiative (AT-CTI), for applicants with specialized education in air traffic control (ATC) and General Public (GP), for applicants with no prior ATC education or experience. Both AT-CTI and GP applicants must take and pass the Air Traffic Selection and Training (AT-SAT), a computerized pre-employment test battery designed to assess an applicant's aptitude for performing the duties of an ATCS. The current research effort compares the selection and training performance of AT-CTI and GP trainees to provide an initial assessment of the utility of AT-SAT as part of the hiring process for AT-CTI graduates.

The Federal Aviation Administration (FAA) hires and trains Air Traffic Control Specialists (ATCSs) to maintain a workforce of approximately 15,000 controllers (FAA, 2012). These ATCSs control air traffic within the National Airspace System at both Terminal and En Route facilities. Terminal facilities include air traffic control towers and Terminal Radar Approach Controls (TRACONs). It is the responsibility of ATCSs within Terminal facilities to organize the flow of air traffic into and out of airports. As air traffic leaves the terminal airspace, the responsibility for control transfers to ATCSs at air route traffic control centers (ARTCC), referred to as En Route facilities.

The Controller Workforce Plan, updated each year, presents the FAA's strategy for hiring, placing, and training controllers to safely meet the demands of air traffic. In 2011, the FAA hired 824 controllers and anticipates selecting more controllers each year through 2020 (FAA, 2012). Multiple hiring sources, with differing criteria are used to solicit applicants. Hiring source and criteria are reflected in the official job announcement. Two controller hiring sources are the General Public (GP) for those without aviation education or experience and the Air Traffic-Collegiate Training Initiative (AT-CTI) program for those with specialized education in aviation.

The AT-CTI program is maintained by the FAA as a collaborative effort with 36 colleges and universities approved to participate in the program. The AT-CTI program produces graduates with a basic understanding of air traffic control. The FAA provides schools in the program with air traffic curriculum, which includes approximately 200 hours of classroom instruction on air traffic control. The schools integrate the FAA-developed coursework into their own 2 or 4-year aviation program. AT-CTI graduates selected for an ATCS position bypass the first five weeks of basic qualification training in air traffic control at the FAA Academy. While they receive no guarantee of employment with the FAA, AT-CTI graduates are considered as a primary hiring source of ATCSs (FAA, 2012).

To be eligible for selection by the FAA as an air traffic controller, AT-CTI graduates and GP applicants must take and pass the Air Traffic Selection and Training (AT-SAT) test battery. AT-SAT is a computerized pre-employment test battery designed to assess an applicant's aptitude for performing the duties of an ATCS. For a detailed description of the development and validation of AT-SAT, see the two volume technical report edited by Ramos, Heil, and Manning (2001a, 2001b). A score of 70 is required to pass AT-SAT. Those applicants who score from 70 to 84.9 are categorized as "Qualified" and those who score from 85 to 100 are categorized as "Well- Qualified."

The FAA engages in an on-going program of research to develop and continually improve strategies to select, train, and place candidates most likely to succeed as air traffic controllers. The purpose of the current research effort is to examine the utility of the AT-SAT test battery as part of the selection process for AT-CTI program graduates. To do so, we examine both the AT-SAT test scores and the training performance of AT-CTI graduates. A GP applicant group is used for comparison. The question examined in this study is whether or not AT-CTI applicants should continue to take AT-SAT as part of the selection process

Method

Sample

We created two samples for our study. The first sample, the applicant sample, included 14,843 applicants for an ATCS position. These applicants took AT-SAT as part of their job application process from April, 2007 through December, 2009. Based on 90% of the applicants reporting gender, the applicant sample was 23.6% female and 76.4% male. Of these applicants, 2,765 were enrolled in and nearing completion or had graduated from an AT-CTI program and 12,078 were applicants from the general public. From the applicant sample, we extracted a second sample, the trainee sample. The trainee sample, included those applicants selected for an ATCS training position by January, 2013. The trainee sample was used to examine training performance of AT-CTI graduates and GP applicants. There were 4,187 ATCS trainees in this second sample: 1,500 AT-CTI graduates and 2,687 GP applicants (18.7 female, 81.3 male).

Measures

We examined AT-SAT scores and AT-SAT category scores (*qualified or well-qualified)* by hiring source (*AT-CTI or GP*) and in relationship to selection decisions and training performance. Selection decisions were o*n board* or no*t on board.* These terms were used because there may be applicants in the database who were selected but have not attended or completed the FAA Academy as of January, 2013 or applicants in the database that may be selected by the FAA after January, 2013. Training performance was captured at the FAA Academy and the trainee's first facility. There were four potential training performance outcomes: *Academy failed or terminated; field training completed successfully; currently in field training; or unsuccessful in field training (facility training failure or transferred to lower level facility)*. A fifth outcome was included for those with missing facility training performance data.

Analyses

The first set of analyses used the applicant sample to examine the AT-SAT scores, and category scores, and selection statistics for AT-CTI graduates and GP applicants. The next set of analyses used the trainee sample to compare training performance of AT-CTI and GP trainees at the FAA Academy and the first facility. Throughout the results, we did not report the statistical significance of the differences found in the data. When using datasets with a large number of participants, the likelihood of attaining statistical significance, even with relatively small differences, is high. Therefore, our approach is to describe the data, highlighting differences regardless of statistical significance.

Results

The average AT-SAT score and standard deviation (S.D) for the applicant sample was as follows: AT-CTI (Mean = 87.65, S.D. = 8.23); GP (Mean = 85.69, S.D. = 9.48). On average, the AT-CTI applicants scored 1.96 points higher on AT-SAT than did the GP applicants.

Also examined were the AT-SAT category scores, assigned to AT-CTI graduates and GP applicants. Recall that a minimum score of 70 was needed to pass AT-SAT. The number (N) and percentage (%) of AT-CTI graduates and GP applicants scoring within each of the defined AT-SAT category scores (Not Qualified (< 70), Qualified (70-84.9), and Well-Qualified (85-100)) are shown in Table 1.

Table 1.
AT-SAT Category Scores by Hiring Source

AT-SAT Category Score	AT-CTI N (%)	General Public N (%)
Not Qualified	75 (2.7%)	829 (6.9%)
Qualified	910 (32.9%)	4,318 (35.8%)
Well-Qualified	1,780 (64.4%)	6,931 (57.4%)
Total	2,765 (100%)	12,078 (100%)

Less than three percent (2.7%) of the AT-CTI graduates received an AT-SAT score less than 70, compared to 6.9% of GP applicants. The largest proportion of both AT-CTI graduates and GP applicants were classified as Well-Qualified, with 7% more of the AT-CTI graduates than GP applicants achieving the Well-Qualified category score. A slightly higher percentage of GP applicants achieved a Qualified category score than AT-CTI graduates (see Table 1).

As of January, 2013, 4,187 (28.2%) graduates/applicants who applied from 2007 through 2009 were selected for an ATCS position with the FAA. Of the AT-CTI graduates, 1,500 (54.2%) were selected, while only 2,687 (22.2%) of the GP applicants were selected.

Table 2 shows the AT-SAT score category of those applicants selected for ATCS positions by hiring source. The majority of those selected from both hiring sources scored in the

Well-Qualified score category. A higher proportion of selections were made from the Qualified score category for AT-CTI graduates (25.7%) than GP applicants (5.7%). There were 14 applicants (11 AT-CTI, 3 GP) selected from the Not Qualified score category. It is assumed that these applicants had taken AT-SAT a second time and earned a qualifying score. The dataset used in this study was based on the first administration of AT-SAT. Thus, those scoring in the Not Qualified score category were removed from the dataset. Training performance data will be examined for those who scored as Qualified or Well-Qualified on the first administration of AT-SAT.

Table 2.
Selected Applicants' AT-SAT Score Category by Hiring Source

AT-SAT Score Category	AT-CTI N (%)	General Public N (%)
Qualified	382 (25.7%)	153 (5.7%)
Well-Qualified	1,107 (74.3%)	2,531 (94.3%)
Total	1,489 (100%)	2,684 (100%)

Training Performance

The next set of analyses examined training performance, first at the FAA Academy and then at the first facility assigned. Trainees must pass the FAA Academy before entering training at their first facility. Most trainees were successful at the FAA Academy and were in or had completed training at their first facility (see Table 3). All differences between AT-CTI and GP trainees were less than two percentage points. Slightly more than 50% of both AT-CTI and GP trainees had completed training as of January 2013.

Table 3.
Training Performance by Hiring Source

Performance Category	AT-CTI N (%)	General Public N (%)
Academy		
Failure	98 (6.6%)	191 (7.1%)
Resigned/Declined	15 (1.0%)	29 (1.1%)
First Facility		
Unsuccessful	50 (3.4%)	94 (3.5%)
Successful	753 (50.6%)	1,377 (51.3%)
In Training	373 (25.1%)	618 (23.0%)
Transfer	10 (0.7%)	41 (1.5%)
Passed Academy/Facility Data Missing	190 (12.7%)	334 (12.4%)
Total	1,489 (100%)	2,684 (100%)

We then examined AT-CTI and GP trainees who had completed training either successfully or unsuccessfully. An "Overall Unsuccessful" category was created by combining

the FAA Academy failures with those who were unsuccessful at their first facility from Table 3. As shown earlier, a slightly higher proportion of GP trainees were successful than AT-CTI trainees (AT-CTI 50.6%, GP 51.3%). In addition and using the overall unsuccessful measure, we found that a slightly lower proportion of AT-CTI trainees were unsuccessful than GP trainees: AT-CTI 148 (10%); GP 285 (10.6%).

The last step was to examine the relationship among successful and unsuccessful trainees and AT-SAT category scores. For this analysis, we combined the AT-CTI and GP trainee performance data to examine the proportion of successful and overall unsuccessful trainees by AT-SAT score category. As shown in Table 4, a higher proportion of well-qualified trainees succeeded in training (84.1%) than did qualified trainees (76.8%). In addition, qualified trainees (23.2%) were unsuccessful more often than well-qualified trainees (15.9%).

Table 4.
Training Completion by AT-SAT Category Score

	Successful	Overall Unsuccessful	Totals
Qualified	262 (76.8%)	79 (23.2%)	341 (100%)
Well-Qualified	1,868 (84.1%)	354 (15.9%)	2,222 (100%)

Discussion

These data paint a picture of the selection and initial training performance of ATCSs hired from among AT-CTI graduates and GP applicants. These groups are required to take and pass AT-SAT as part of the hiring process. The cost to the FAA for administering AT-SAT is approximately $360 per applicant (L. Waterford, personal communication, February 9, 2012). The question examined in this study is whether or not AT-CTI applicants should continue to take AT-SAT as part of the selection process.

In reviewing the data, we found that the AT-CTI applicants tested from April, 2007 through December, 2009 scored an average of 1.96 points higher on AT-SAT as compared to GP applicants. More than 97% of the AT-CTI graduates and 93% of GP applicants passed AT-SAT and scored as Qualified or Well-Qualified. Given the high pass rate, it is clear that AT-SAT is not eliminating as many applicants, especially those with aviation education, as it did before reweighting (Wise, Tsacoumis, Waugh, Putka, & Hom, 2001). In addition, the majority of both AT-CTI graduates (64.4%) and GP applicants (57.4%) scored in the Well-Qualified score category. However, there was variability in AT-SAT score categories, with more than 30% of all applicants taking AT-SAT scoring in the Qualified score category.

Of those AT-CTI graduates who passed AT-SAT, a majority (54.2%) were selected for an FAA ATCS position by January, 2013. This compared to the selection of only 22.2% of GP applicants who passed AT-SAT. For GP applicants, only 36.5% of those who scored as Well-Qualified on AT-SAT and less than 5% of those scoring as qualified were hired. This finding seems to indicate that the selection panel has a preference for selecting AT-CTI graduates over GP applicants. However, the difference between AT-CTI and GP trainees in training performance at the first facility does not seem to support a preference. The difference in the

percent of AT-CTI and GP trainees successfully completing training at the first facility was less than 2 points.

The selection panel also seems to have a preference for hiring those in the Well-Qualified score category, and these data do seem to support that preference. A difference was found between Successful and Overall Unsuccessful completion of training by AT-SAT category score (Qualified or Well-Qualified). Those who had scored as Well-Qualified were successful 84.1% of the time, while 76.8% of those who scored as Qualified were successful; a difference of 7.3%. In addition, qualified trainees (23.2%) were unsuccessful, more than Well-Qualified trainees (15.9%). This difference may support a relationship between AT-SAT category score and training performance. In a recent investigation, Broach et al. (in press) have shown that Well-Qualified ATCS's are more likely to certify as controllers than those scoring as Qualified.

Conclusion and Recommendation

At this time, we conclude that the utility of AT-SAT in hiring AT-CTI graduates may in its ability to categorize them into Qualified and Well-Qualified score categories, information that can be used by the selection panel as a tool to eliminate applicants from consideration. Our recommendation is to continue to use the AT-SAT test battery to hire AT-CTI graduates and, when possible, select graduates who score as Well-Qualified on AT-SAT. We also recommend reanalyzing the dataset when those who had not yet completed their first facility training have completed it, either successfully or unsuccessfully. It would also be useful to examine the data by type of facility assignment (Terminal or En Route). At that time it might be possible to make more definitive statements regarding the training performance of AT-CTI graduates relative to GP applicants and the utility of the AT-SAT test battery in selecting ATCSs.

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