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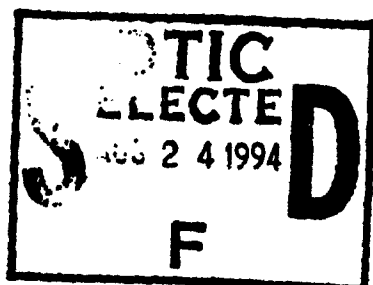
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**Relationships of Type A
Behavior With Biographical
Characteristics and Training
Performance of Air Traffic
Controllers**

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Final Report

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16. Abstract While there has been a considerable amount of research concerning the relationships between various cognitive measures and the selection and subsequent performance of Air Traffic Control Specialists (ATCSs), data concerning the potential importance of personality factors are quite limited. As part of an expanded research program, selected personality measures and biographical questionnaires have been administered to ATCSs at the time of their entry into the FAA Academy Nonradar Screen Program. A considerable body of research surrounds the Jenkins Activity Survey (JAS) as a measure of Type A behavior, coronary proneness, and other health problems. More recently, a revised JAS scoring procedure has been developed for Achievement Striving (AS) and Impatience-Irritability (II) scales; those scales have been significantly and differentially related to job performance, academic achievement, job satisfaction, and negative affect (e.g., depression). The JAS and a biographical questionnaire were administered to 474 ATCS students at the beginning of the nine-week screening program. Scores on the traditional JAS, AS, and II scales were compared with measures of FAA Academy performance, and attitudinal and biographical data. Analyses of the JAS questions confirmed the presence of the AS and II factors. In contrast to previous research, which documented a positive relationship between AS and academic achievement in college, correlations between AS and Academy achievement were non-significant. It may be that in less academic settings, <i>achievement striving</i> is a relatively less important predictor of training success compared to specialized cognitive abilities. The AS scores were significantly correlated with self-reported expectations of job performance and satisfaction. II scores were related to a number of life-style behaviors, including alcohol consumption. Results provide further evidence in support of the existence of the AS and II dimensions of the JAS. Concurrent validity of the two components with the criterion measures was partially supported in the present setting. Given the historical use of the JAS and current support for the existence of the new scales, longitudinal studies could examine the effectiveness of the JAS in predicting both the long-term job success of air traffic controllers and prospective health-related problems that might arise.			
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RELATIONSHIPS OF TYPE A BEHAVIOR WITH BIOGRAPHICAL CHARACTERISTICS AND TRAINING PERFORMANCE OF AIR TRAFFIC CONTROL SPECIALISTS

A considerable amount of research surrounds the Jenkins Activity Survey (JAS) as a measure of Type A behavior pattern (TABP), coronary proneness, and other health problems. More recently, a revised JAS scoring procedure has measured Achievement Striving (AS) and Impatience-Irritability (II) scales, which have been significantly and differentially related to job performance, academic achievement, job satisfaction, and negative affect (e.g., depression). The first purpose of the present study was to validate the existence of the AS and II scales as constructs with a sample of subjects from an occupation that is quite different from most previous studies. Traditionally, research concerning the selection of Air Traffic Control Specialists (ATCSs) has focused on the role of cognitive abilities and biographical/ demographic factors. As part of an expanded program of research (Collins, Schroeder, & Nye, 1991; Nye & Collins, 1993; Schroeder, Broach, & Young, 1993), we have been evaluating the importance of personality traits that have historically demonstrated some utility for predicting academic or job success in other settings. Therefore, the second purpose of this study was to determine the extent to which the JAS scale scores predicted the performance of students in the Federal Aviation Administration (FAA) Academy screen. Additionally, this study was designed to provide information concerning the relationship between the JAS measures and 2 attitudinal measures; job satisfaction expectations and self-reported performance expectations at the beginning of the Academy screen. Lastly, we wanted to examine the association of TABP, especially the AS and II constructs, with regard to certain health-related activities, (e.g., smoking and alcohol consumption) and coping strategies for dealing with stress.

Individuals who possess the Type A behavior pattern are described as being impatient, competitive, hard driving, and time-pressured. A commonly used measure of TABP is the JAS, a self-report measure that was developed by Jenkins, Zyzanski, and Rosenman (1971, 1979) as a substitute for the more costly, time-consuming psychiatric interview

used to measure coronary prone behavior. The JAS provides an overall global measure of Type A behavior (JAS-AB), along with subscales measuring speed and impatience (JAS-SI), hard-driving and competitiveness (JAS-HDC), and job involvement (JAS-JI). As part of their analysis of the relationship between the TABP and achievement, Pred, Helmreich, and Spence (1986) demonstrated the presence of 2 distinct factors. One, which they labeled Achievement Striving (AS), was significantly related to the overall grade point average of students (Spence, Helmreich, & Pred, 1987) and to scientific productivity (Helmreich, Spence, & Pred, 1988). The second, Impatience and Irritability (II), measured more negative qualities and was correlated with the self-reported presence of a number of health symptoms (Helmreich, et al., 1988). Bluen, Barling, and Burns (1990), using the AS and II measures of the JAS, found that the AS predicted sales performance and job satisfaction, while II scale scores were positively correlated with depression. In a study involving a survey of airline crew members, higher AS scores were associated with better performance ratings, while higher II levels were related to increased tension and lower quality of sleep (Chidester, 1990).

These findings, along with more recent research by Burns and Bluen (1992), reflect trends to view TABP as a multidimensional construct comprised of both "toxic" and "non-toxic" components and to expand the initial research that examined the relationship of TABP with coronary heart disease (Friedman & Rosenman, 1959) to include the correlations between TABP and various employee reactions in the work environment. Additional research is needed to clarify the presence of the AS and II scales on the JAS in different populations and provide further evidence to support the use of those scales as measures of positive achievement and poor health, as suggested by Helmreich, Spence, and Pred (1988). In this study, the ATCS scores for the traditional JAS scales were compared with both occupational norms (Jenkins, 1979) and the results of a recent study of U. S. Navy students in flight training (Shull, Dolgin, & Gibb, 1988). Subsequently, a series of

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confirmatory factor analyses were evaluated to help determine the construct validity of the AS and II scales.

The connections have not been well established between global, overall levels of TABP and individuals' job performance or educational success. Specifically, Ivancevich and Matteson (1988) described TABP employees as "workaholics" who are constantly seeking to accomplish more and improve their performance. In certain organizational settings, those qualities may result in higher levels of performance or greater achievement. Matthews, Helmreich, Beane, and Lucker (1980), using the Jenkins Activity Survey, demonstrated that scientists possessing the TABP had a greater number of publications and more citations than their Type B colleagues. Taylor, Locke, Lee, and Gist (1984) also found Type A faculty to be more productive. In academic settings, Type A's have higher grades (Waldron et al., 1980) and earn more academic honors (Glass, 1977). In contrast to those results, Shull, et al., (1988) found that the traditional JAS scores were unrelated to performance in a group of pilots involved in a Navy flight training program. Using supervisor ratings of the job performance of white-collar workers, Jamal (1985) found that Type A's exerted greater effort on the job; however, Type B's were rated higher on quality of performance. There were no differences between the 2 groups on quantity of performance and promotions received. In a field study of sales personnel, Ivancevich, Matteson, and Smith (1983) found that Type A's were more ambitious, but did not differ from Type B's in performance. Matteson, Ivancevich, and Smith (1984) found that Type A life insurance sales personnel did not differ from their Type B counterparts on 3 objective sales measures.

In this study, the performance criterion was performance in the FAA Academy screening program for newly hired air traffic controllers. Applicants for the job of air traffic controller with the FAA are generally required to pass a battery of paper-and-pencil selection tests that primarily measure cognitive aptitudes. At the time of this study, less than 10% of those who initially applied to become air traffic control specialists were selected (Manning, Della Rocco, & Bryant, 1989) to enter a second-stage screening process de-

signed to eliminate individuals lacking in aptitudes not easily measured using paper-and-pencil cognitive tests. While there has been considerable research concerning some of the cognitive abilities that predict success in the FAA Academy (Rock, Dailey, Ozur, Boone, & Pickrel, 1982; Schroeder, Dollar, & Nye, 1990; VanDeventer, 1984), evidence is more limited concerning the relationship between personality or behavioral characteristics and performance. Because the JAS-AS scale provides a measure of achievement striving, we hypothesized that those scores would be predictive of performance in the Academy screen program.

As with job performance, previous research concerning the relationship between Type A behavior and job satisfaction has been inconsistent. A positive relationship between Type A characteristics and intrinsic job satisfaction was demonstrated by Day and Bedeian (1991), who used a different measure of TABP than the JAS. However, using the Framingham Type A scale, Matteson, Ivancevich, and Smith (1984) found that Type A's and B's did not exhibit different levels of job satisfaction. We sought to determine whether Type A individuals differ from Type B's (at the beginning of their careers) in their expectations regarding job satisfaction in the future. An attitudinal measure that has been found to be significantly correlated with FAA Academy success is self-reported performance expectations at the beginning of the screen program (Collins, Nye, & Manning, 1992). We expected that achievement striving scores would be positively associated with entrants' expectations for success in their careers.

Finally, we wanted to develop a more complete understanding of the association of TABP, especially the AS and II constructs, with regard to smoking and alcohol consumption, and coping strategies for dealing with stress. A study of college students (Jordan & Perry, 1987) found that Type A behavior (measured by JAS-AB scores) was not related to such behavioral risk factors as smoking, alcohol consumption, and lack of physical exercise. However, with a sample of healthy, middle-aged men where Type A behavior pattern was determined by structured interview, the group classified as Type A reported significantly greater consumption of alcohol (Camargo, Vranizan,

Thoresen, & Wood, 1986). By contrast, Burke and Weir (1980), using the structured interview for classification, reported that Type A managers were *less* likely to be smokers and regularly consumed *less* alcohol.

METHOD

Subjects and Instruments. The sample of 474 had a mean age of 26.1 years ($SD = 3.0$ years), and included 13.1% women and 8.0% minorities. The JAS and a biographical questionnaire (BQ) were administered to Air Traffic Control Specialist (ATCS) students during the third day following their entry into the Nonradar Screen Program (NRSP) at the FAA Academy in Oklahoma City, OK. The NRSP was the second stage of the selection process for ATCSs. At the time of this study, the screen was a 9-week program and assessed entrants' ability to learn air traffic procedures and then to apply those procedures during a series of laboratory simulations, not involving radar. Performance in this program included a final paper-and-pencil test of air traffic control skills called the Controller Skills Test (CST) and the final Academy composite grade (COMP) based on the CST, academic tests, and technical and instructor assessments of student performance on laboratory problems. More specifically, the percentages assigned to each component for determining the final grade were as follows: the CST (20%), academic tests (20%), and the two evaluations of performance on the best five of six graded laboratory problems - instructor assessment (30%) and technical assessment (30%). A final grade of 70.0 was required for successful completion of the NRSP.

The BQ contains a total of 145 items, some of which provide information concerning the entrants' prior educational and work experiences. Another section of the BQ measures attitudes regarding self-expectations of job satisfaction and job performance. General information is also requested regarding lifestyle issues such as alcohol and tobacco usage. This questionnaire has been used to evaluate the role of biographical factors in screening/training success (Collins, Manning, & Taylor, 1984; Collins, et al., 1992). A single item "extent to which you expect to be

satisfied with your job" with a 5-point rating scale (from "not at all" to "to a very great extent") was used to measure job satisfaction expectations. Self-expected job performance was determined by the sum of ratings on 2 BQ items, "how long it will take to become fully effective in your current job (from "much longer" to "much less time than others")" and "percentile of performance expected compared to all ATCSs (from "the lowest 10%" to "the top 10%")". Alcohol consumption was measured by the combined responses to 2 items on the BQ; the frequency of use (5 categories; from "non-drinker" to "every day") and the usual number of alcoholic drinks per occasion (4 categories; from "1-2" to "12 or more"). Tobacco usage was indicated by the amount of tobacco smoked daily (from "non-smoker" to "2 packs or more per day"). The sample was comprised of 18.4% non-drinkers and 81.9% nonsmokers. Respondents to the BQ also indicated how frequently (from "almost never" to "almost always") they engaged in certain activities when they feel "nervous or tense." The behavioral options listed included: a) using a relaxation technique such as meditation; b) engaging in physical activity such as jogging or exercise; c) having an alcoholic drink; and d) talking with a friend, co-worker, or family member.

The JAS item responses were transformed into unit weights in order to compensate for the varying number of response categories, which ranged from 3 to 5, thus applying the scoring procedure suggested for the AS and II scales by Spence, et al. (1987). Standard procedures established by Jenkins, Zyzanski, and Rosenman (1979) were used to calculate scores for the 4 traditional scales; the JAS-AB, JAS-SI, JAS-HDC, and JAS-JI. The items from the JAS that comprised the AS and II scales are listed in Appendix A.

Analyses. Mean standard JAS scores were computed for the ATCS trainees and compared to normative data, as reported by Jenkins, et al. (1979) and with average scores of U. S. Navy student aviators reported by Shull, et al. (1988).

A series of confirmatory factor analyses were performed to test for the presence of the AS and II constructs. The goodness-of-fit measures obtained from LISREL VI (Joreskog & Sorbom, 1986) included the chi square statistic for the fit between the

data and the model, the ratio of chi square to degrees of freedom index (χ^2/df), and the adjusted goodness-of-fit index (AGFI). One set of criteria (Hoelter, 1983) for an acceptable model include a χ^2/df ratio of less than 2.0 and an AGFI of .90 or greater. Initially, an analysis was performed in which the 14 items, shown in Appendix A, were considered to be 1 factor. This unidimensional factor model was then compared to the hypothesized 2-factor structure in which each item loaded only on 1 factor. The third model contained the AS and II factors, but each item was allowed to load on both factors if both loadings were statistically significant. The chi square difference test (Bentler & Bonett, 1980) was also utilized to contrast the models and determine the best model based on goodness-of-fit characteristics.

Pearson correlation coefficients were determined between JAS scores, from the traditional scales as well as AS and II, and a) Academy performance measures and b) relevant items from the Biographical Questionnaire to determine whether the observed relationships were consistent with expectations based on the findings from earlier research. We were especially interested in determining the extent to which AS scores predicted success in the Academy screening program. Furthermore, a multi-stage Bonferroni procedure (Crosbie, 1986; Larzelere & Mulaik, 1977)

was applied to the set of correlations to prevent inflating the Type I error rate. Specifically, for this study, the approximate r required for the $p < .05$ level of significance was .15 for a one-tailed test and .16 for a two-tailed test. While the use of single items from the BQ provided preliminary information concerning the associations with the JAS scales, future research should evaluate these relationships using more psychometrically reliable measures of the attitudinal and behavioral risk factors.

RESULTS

Average JAS scores. The mean standard scores obtained for the ATCS trainees fell into the predesignated 55th, 45th, 50th and 50th percentiles for AB, SI, HDC, and JI respectively (Jenkins, et al., 1979). Mean standard scores were also compared to occupations in the Western Collaborative Group Study (Jenkins, et al., 1979), a large scale study concerning the prediction of coronary heart disease. We found that ATCSs were lower than administrators on the overall measure of Type A behavior (JAS-AB) and each of the 3 subscales, higher on all 4 compared with clerical personnel, but very similar to other professional/technical personnel, as shown in Figure 1.

Figure 1.

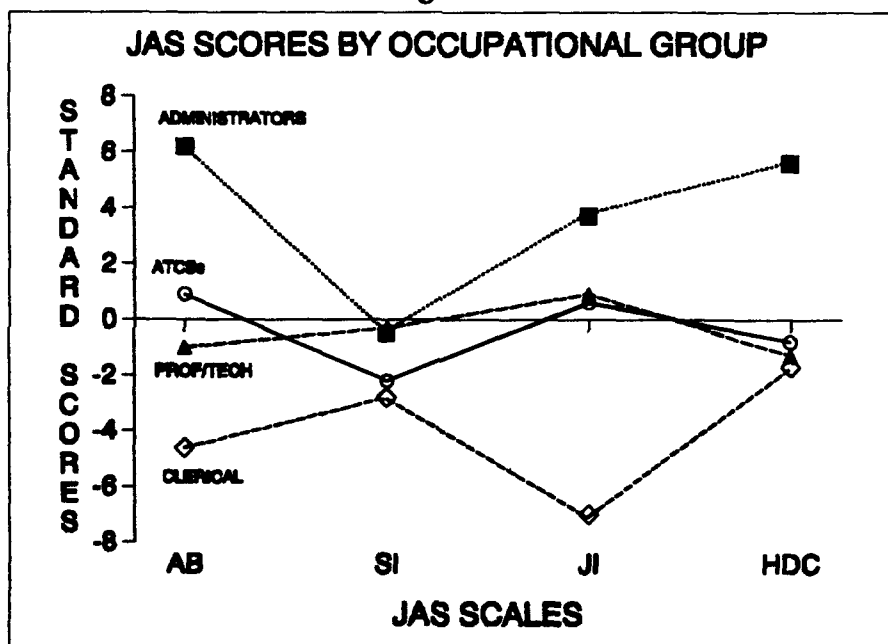


TABLE 1 - CONFIRMATORY FACTOR ANALYSES USING MAXIMUM LIKELIHOOD METHOD FOR HYPOTHESIZED ACHIEVEMENT STRIVING (AS) AND IMPATIENCE-IRRITABILITY (II) SCALES OF THE JENKINS ACTIVITY SURVEY

Items	Unidimensional 14 Items	AS and II - Orthogonal Item Loadings		AS and II - Oblique Item Loadings	
		AS	II	AS	II
ACHIEVEMENT STRIVING					
JAS- 2	15	18		19	
JAS- 17	47	54		53	
JAS- 13	36	41		42	
JAS- 20	39	48		48	
JAS- 30	28	38		37	
JAS- 42	18	38		64	-38
JAS- 46	39	53		51	
IMPATIENCE-IRRITABILITY					
JAS- 4	25		29		29
JAS- 9	41		45		43
JAS- 12	49		52		51
JAS- 14	29		35		35
JAS- 22	49		56		58
JAS- 23	56		54	26	35
JAS- 26	46		53		57
Degrees of freedom	77		76		74
Chi square	287.50 ($p<.001$)		191.10 ($p<.001$)		151.69 ($p<.001$)
Adjusted goodness-of-fit	.874		.922		.935

CHI SQUARE DIFFERENCE TESTS:

Model 1 with Model 2;
 $\chi^2 (1) = 96.40$ $p<.001$

Model 2 with Model 3;
 $\chi^2 (2) = 39.41$ $p<.001$

Note: Decimals of item loadings are omitted.

ATCS scores on each of the JAS scales were compared to the group of Navy student aviators in flight training (Shull, et al., 1988); 234.5 versus 276.4 on the overall JAS measure (JAS-AB), 163.3 versus 169.7 for *speed and impatience* (JAS-SI), 122.6 versus 123.6 on *hard driving and competitive* (JAS-HDC), and 221.5 versus 284.2 for *job involvement* (JAS-JI). The results of *t*-tests indicated significant between-group differences for comparisons between the ATCS entrants and the Navy aviator students on the JAS-AB and JAS-JI scales. The ATCS group had a lower

average JAS-AB score ($t=-7.2$, $p<.001$), as well as a lower mean JAS-JI score ($t=-19.4$, $p<.001$). These results suggest that while recently-hired ATCS students possess average levels of the TABP overall, they exhibit significantly less job involvement, when compared to Naval aviation candidates.

Confirmatory factor analysis. As shown in Table 1, the χ^2/df index was 3.73 and the AGFI was .87 for the model in which all 14 items were considered to comprise a single factor. Thus, the goodness-of-fit characteristics of the unidimensional factor did not

meet the criteria for an acceptable model. The second model, in which correlated AS and II scales were postulated, had a X^2/df index of 2.51 with an AGFI of .92. The chi-square difference test ($X^2 (1)=96.40$, $p<.001$) also indicated that the 2-factor model containing the AS and II constructs represented a better fit of the data than the single factor model. Each of the individual items had a significant loading ($t > 2.0$) on its hypothesized construct and the estimated true correlation was .50 between the AS and II scales. The reliability for each scale, as indicated by the coefficient of determination, was .70 for the AS items and .76 for the II items. The third model, allowing for correlated factors and items to load on both factors if both loadings were statistically significant, was a significant improvement ($X^2 (2)=39.41$, $p<.001$) over the second model and the goodness-of-fit indices were somewhat better ($X^2/df=2.05$ and AGFI=.94). The correlation was .51 between the AS and II constructs.

Item 42, "Amount of effort put forth in your present occupation" represented the highest loading ($\lambda = .64$) on AS, but was inversely related ($\lambda = -.38$) with II. Item 23, "People who know you well agree that you tend to do most things in a hurry," was positively related to both constructs. Thus, the post hoc analysis indicated that only two items had significant loadings on both factors.

Prediction of Academy success. Consistent with the Shull, et al. (1988) study, significant correlations were not found between the traditional JAS scales and overall screen performance as measured by final Academy grades (COMP). As shown in Table 2, the highest correlation ($r=.10$) was between the JAS-SI scale and the CST scores. These results are in contrast with the Spence, et al. (1989) study in which the AS scale predicted academic achievement in college.

TABLE 2 - MEANS AND CORRELATIONS OF JAS MEASURES WITH SCREEN/TRAINING SCORES AND BIOGRAPHICAL VARIABLES

VARIABLE	MEAN	S.D.	AS	II	AB	SI	JI	HDC
AS	25.6	3.6	—					
II	20.7	3.9	.29	—				
AB	234.5	69.3	.68	.43	—			
SI	163.3	57.5	.24	.67	.51	—		
JI	221.5	42.3	.26	.03	.17	.06	—	
HDC	122.6	28.6	.62	.10	.59	.11	.16	—
COMP	73.2	11.7	-.02	.01	.04	.09	-.09	.04
CST	75.6	14.6	-.08	.04	-.00	.10	-.03	.06
JOBSAT	3.9	0.7	.29 (.18)	-.05	.21	-.05	.15	.25
PEREXP	7.8	1.2	.19 (.03)	-.00	.21	.03	.08	.27
IMBIB	4.4	1.5	-.06	.17 (.14)	.04	.11	.01	-.01
TOBACC	1.4	0.8	.06	.09	.08	.04	-.05	.06
RELAX	1.6	0.9	-.03	-.06	-.01	-.13	.06	.02
PHYACT	3.3	1.0	.17 (.05)	-.03	.18	-.01	.13	.21
ALCODR	2.1	1.0	-.02	.17 (.15)	.04	.09	.01	-.01
TALK	3.8	0.9	.24 (.14)	.04	.18	.03	.08	.21

Note: Pearson correlation coefficients, using Bonferroni multi-stage procedure, were significant at .15 or greater ($p < .05$, one-tailed test) and .16 or greater ($p < .05$, two-tailed test). AS = Achievement Striving; II = Impatience-Irritability; AB = overall TABP; SI = Speed and Impatience; JI = Job Involvement; and HDC = Hard-driving and Competitive. () values are partial correlations controlling for SI, JI, and HDC scale scores.

Relationships between JAS and BQ items. Results shown in Table 2 indicated a significant correlation between future job satisfaction — "Extent to which you expect to be satisfied with your job" (JOBSAT)— and AS scores ($r=.29$), but not the II scale scores ($r=-.05$). In addition, overall Type A and HDC subscale scores were significantly correlated with expectations of future job satisfaction. Thus, individuals who were achievement striving and hard-driving/competitive were more likely to report greater expectations of future job satisfaction.

Table 2 also shows, as expected, that AS scores were significantly associated ($r=.19$) with the measure of expected job performance (PEREXP). The JAS-HDC and JAS-AB scale scores were similarly correlated. Thus, in addition to expectations of greater job satisfaction, individuals who were achievement striving and hard-driving/competitive expected that they were likely to perform better on the job.

Consistent with the findings of Jordan and Perry (1987) for their sample of college students, overall Type A behavior pattern (JAS-AB) was not significantly related to reported alcohol (IMBIB) or tobacco consumption (TOBACC). However, the II scale scores were associated with alcohol consumption ($r=.17$). This finding adds another dimension to the Spence et al. (1987) suggestion that the impatience-irritability scale might predict health problems; namely that the II scale scores were associated with certain life-style characteristics, which can also lead to potential health problems.

The AS and II scale scores had different patterns of correlations with the entrants' preferred method(s) of handling anxiety/stress. Higher AS scores were associated with the preferences of engaging in a physical activity (PHYACT; $r=.17$) and talking with a friend, co-worker, or family member (TALK; $r=.24$). Similarly, relationships were found between the JAS-AB and JAS-HDC scale scores and these methods of coping with stress. Thus for our sample, greater overall Type A behavior pattern was related to a higher use of both exercise and social support as methods of coping. The later finding was consistent with studies (Lobel, 1988; Chesney, Black, Chadwick, & Rosenman, 1981) that found those identified as Type A's to be more extroverted. By comparison, II scale

scores were higher for those who more frequently consumed alcohol in response to being nervous or tense (ALCODR; $r=.17$). As for alcohol consumption (IMBIB), the overall measure of Type A behavior pattern was not significantly correlated with alcohol consumption as a response to feeling nervous or tense.

Partial correlations, controlling for the effects of the JAS-SI, JAS-JI, and JAS-HDC scales, were determined to establish the residual relationships of the AS and II scales with the attitudinal and behavioral measures. As shown in Table 2, the partial correlations were nonsignificant for achievement striving with job performance expectations, the preference for engaging in physical activity when nervous or tense, and the preference for social interaction when anxious. However, the AS scores accounted for significant variance in job satisfaction expectations. Most of the association between II and alcohol consumption patterns was not explained by SI, JI, or HDC levels.

CONCLUSIONS

While ATCSs represent a select group with respect to certain cognitive abilities, their JAS scores were similar to overall normative response patterns reported by Jenkins, et al. (1971). The pattern of ATCS scores differed from those of certain other occupational groups (administrator and clerical) as well as other aviation trainees (Navy flight students).

Results of this study provide further confirmatory evidence of the existence of the AS and II factors in the Jenkins Activity Survey. Model testing procedures clearly suggested that the 2 constructs were distinguishable aspects of the JAS responses for a sample of trainees at the FAA Academy screen program. Discriminant validity of the scales representing positive (AS) and negative (II) components of TABP was further demonstrated by the differential correlations between these recently developed scale scores and various attitudinal and biographical data. The favorable, work-related correlates of *achievement striving* included self-expectations of both future job satisfaction and better job performance. By contrast, *impatience-irritability* levels were found to be slightly higher for those who reported greater usage of alcohol. The findings of this study suggest that relationships

between TABP and the development of health concerns might be confounded by significant relationships among TABP components, such as *impatience-irritability*, and life-style behaviors which also can represent potential health risks.

This study supports the viewpoint that Type A behavior pattern is a multidimensional construct in which only some of the components are associated with potentially negative attitudes and behaviors. Clearly, research that attempts to measure only overall TABP risks missing significant subscale correlations. Similarly, some of the inconsistency found across previous studies could have been the result of sample differences in the combinations of the "toxic" and "non-toxic" subscale levels which could not be accounted for when using overall TABP scores.

In general, future research using a longitudinal design with this sample could determine whether the JAS subscales are predictive of health outcomes and employee attitudes such as job satisfaction and self-reported "burnout". This study provided base line data for potential use in examining changes in TABP over time and for other research. For example, DeFrank, Jenkins, and Rose (1987), using data from the Air Traffic Controller Health Change Study (Rose, Jenkins, & Hurst, 1978), reported a possible causal link between stress and greater alcohol consumption that, in turn, resulted in elevated diastolic blood pressure levels. Given our results, a hypothesis would be that individuals who either exhibited (at base line) or developed higher levels of impatience-irritability are more susceptible to stressors at work and likely to engage in greater consumption of alcohol. Thus, the nature of the TABP relationship with the development of hypertension could be shown to be limited to specific components of TABP and indirect; in that the correlation was mediated by factors such as workplace stress and individual behavioral patterns (e.g., alcohol consumption).

Overall, the ATCSs in this study were not indirectly "de-selected" to any significant extent during the Academy screen based on their self-reported levels of Type A behavior pattern. Similarly, evidence concerning the utility of *achievement striving* as a predictor of training performance was not supported in this setting, possibly because the sample comprised an

already highly qualified group in terms of aptitude for the occupation. Also, the TABP scales and performance criteria were examined across a relatively short time-frame of less than 3 months. As illustrated by Helmreich, Sawin, and Carsrud (1986), job-related personality measures can exhibit larger associations with longer-term, rather than shorter-term, job performance. Thus, potential relationships should be explored between TABP scores and more long-term job performance criteria including on-the-job training success, and subsequent promotion to, and performance as, supervisory ATCSs in the FAA.

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APPENDIX A

ITEMS CONTAINED IN THE ACHIEVEMENT STRIVING (AS) AND IMPATIENCE-IRRITABILITY (II) SCALES OF THE JENKINS ACTIVITY SURVEY

ACHIEVEMENT STRIVING

- JAS 2 How often does your job "stir you into action"? - less often than most people's jobs, about average, more than most people's jobs
- JAS 17 Nowadays, do you consider yourself to be? - definitely more hard-driving and competitive, probably more hard-driving and competitive, probably more relaxed and easygoing, definitely more relaxed and easygoing
- JAS 19 Would your spouse (or closest friend) rate your general level of activity as - too slow, about average, too active?
- JAS 20 Would people you know well agree that you take your work too seriously? - definitely yes, probably yes, probably no, definitely no
- JAS 30 Do you ever set deadlines or quotas for yourself at work or at home? - no; yes, but only occasionally; yes, once a week or more

**Items 42 and 46 ask the respondent to compare him/herself
with the average worker in his/her present occupation**

- JAS 42 In amount of effort put forth, I give. - much more effort, a little more effort, a little less effort, much less effort
- JAS 46 I approach life in general. - much more seriously, a little more seriously, a little less seriously, much less seriously

IMPATIENCE-IRRITABILITY

- JAS 4 How often are you faced with minor (or major) annoyances or frustrations? - several times a day, about once a day, a few times a week, once a week, once a month or less
- JAS 9 When you listen to someone talking, and this person takes TOO LONG to come to the point, how often do you FEEL like hurrying the person along? - frequently, occasionally, almost never
- JAS 12 How often do you find yourself hurrying to get places even when there is plenty of time: - frequently, occasionally, almost never
- JAS 14 When you have to "wait in line" at a restaurant, a store, or the post office, what do you do? - accept it calmly, feel impatient but not show it, feel so impatient that someone watching can tell I am restless, refuse to wait in line, and find ways to avoid such delays
- JAS 22 Would people you know well agree that you tend to get irritated easily? - definitely yes, probably yes, probably no, definitely no
- JAS 23 Would people who know you well agree that you tend to do most things in a hurry? - definitely yes, probably yes, probably no, definitely no
- JAS 26 How is your temper nowadays? - fiery and hard to control, strong but controllable, no problem, I almost never get angry