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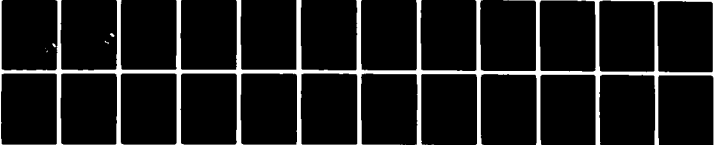
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LONGITUDINAL ANALYSES OF STRESS AND PERFORMANCE AMONG MARINE CO--ETC(U)  
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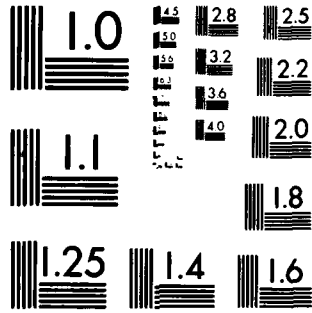
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Report AR-ONR-007

LONGITUDINAL ANALYSES OF STRESS AND PERFORMANCE AMONG  
MARINE CORPS DRILL INSTRUCTORS

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April 22, 1982

Technical Report

Approved for Public Release

Prepared for:

OFFICE OF NAVAL RESEARCH  
800 North Quincy Street  
Arlington, Virginia 22217

This report was prepared under the Navy Manpower R & D Program of the  
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AR-ONR-007	2. GOVT ACCESSION NO. AD-A44	3. RECIPIENT'S CATALOG NUMBER 4843
4. TITLE (and Subtitle) Longitudinal Analyses of Stress and Performance among Marine Corps Drill Instructors		5. TYPE OF REPORT & PERIOD COVERED Technical Report
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Raymond W. Novaco                      Frank J. Cunningham Irwin G. Sarason Gregory L. Robinson		8. CONTRACT OR GRANT NUMBER(s) N00014-77-C-0700
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Psychology, NI-25 University of Washington Seattle, Washington 98195		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62763N, RF 63521802, NR 156-058
11. CONTROLLING OFFICE NAME AND ADDRESS Organizational Effectiveness Research Group Office of Naval Research (Code 442) Arlington, Virginia 22217		12. REPORT DATE April 22, 1982
		13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Supported by Office of Naval Research Manpower R & D Program.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Drill Instructor                      Longitudinal Study Stress                                      Blood Pressure Type A                                      Anger		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Drill instructors were studied with regard to stress from the time of their training in Drill Instructor School to three months after and then one year after graduation - significant changes over time in coronary-prone behavior, blood pressure, and heart rate were obtained. The DI's self-perceived stress was inversely related to their job performance and directly related to their anger levels.		

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Acknowledgements

We very much appreciate the advice, cooperation, and assistance given to this project by the Drill Instructor School at Marine Corps Recruit Depot, San Diego. We also are indebted to our colleague, Thomas Cook, for his collaboration and assistance in gathering the data.



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Summary

Two cohorts of drill instructors were studied with regard to stress using a longitudinal panel design, from the time of their training in Drill Instructor School to three months after and then one year after graduation. Cognitive, personality, and physiological variables were assessed for their changes over time. In this regard, stress was measured by self-ratings of various job components for their stressful qualities, by a test of coronary-prone behavior patterns, by blood pressure and heart rate, and by personality scales related to stress and adjustment. Ratings of job performance were also obtained from battalion sergeant majors of each drill instructor.

For both cohorts, there were highly significant increases over time in the speed/impatience dimension of the coronary-proneness test (Jenkins Activity Survey) at both the three months and one year follow-ups. The overall Type-A behavior index also increased significantly from training to one year. Similarly, the self-ratings of "DI Stress" increased very significantly for both cohorts. These increases occurred primarily between the three months and one year follow-ups. Highly significant increases in heart rate were found for both cohorts, and significant increases in systolic and diastolic blood pressure occurred for one of the cohorts. The "DI Stress" ratings were inversely related to job performance evaluations and directly related to speed/impatience and to level of anger. Level of anger was inversely related to job performance evaluations.

The findings are discussed with regard to the prospects of learning more about the exact nature of the stress measure increases, such as what might be learned in comparisons between drill instructors who successfully adapt to job pressures and those who manifest adverse psychological and physiological reactions. In addition, it seems important to identify critical periods when stress becomes particularly acute so as to more efficaciously develop and target stress coping interventions.

LONGITUDINAL ANALYSES OF STRESS AND PERFORMANCE AMONG MARINE CORPS  
DRILL INSTRUCTORS

The effects of the work environment on personal well-being have received extensive attention in the growing field of occupational stress (Cooper and Payne, 1978; 1980). Among the job factors that have been linked with stress are heavy task demands, excessive competition, long working hours, and conflicts with supervisors. These stress-related conditions are a conspicuous part of the occupational role of the Marine Corps drill instructor whose recruit training responsibilities may strain the person's adaptive capacities, causing undesirable consequences for health and adjustment.

Our interest in the drill instructor has two key sources. In certain recruit-focused research projects (Novaco, Sarason, Cook, Robinson, and Cunningham, 1979; Sarason, Novaco, Robinson, and Cook, 1981) we have discovered strong training unit influences on recruit performance and attention. Since the drill instructor team shapes the training unit environment, the importance of studying the drill instructor became more salient, particularly since variations in the way training is conducted can have far-reaching effects on recruits. We have observed such effects as long as 30 months after graduation from recruit training.

A second reason for interest in drill instructors is that in the course of our recruit stress research we were often told by drill instructors that we should study them. In a variety of formal and informal interviews, drill instructors informed us of the stressful nature of their job and disclosed aspects of personal difficulties that they attributed to job stress.



In our process monitoring of recruit training, observations of drill instructors and their tasks were consistent with the concerns that they reported.

To investigate the stress-related dimensions of being a drill instructor, we adopted a longitudinal approach. We examined cohorts of drill instructors at Marine Corps Recruit Depot, San Diego, beginning with their entry at Drill Instructor School. This report concerns two such cohorts and the assessment of them up to a point of one year of active duty as a drill instructor.

The focus of our assessment is upon changes in psychological and physiological states occurring in our subject groups over time. Through repeated measurements of blood pressure, heart rate, mood, attitudes, personality and performance we sought to map potential stress effects hypothetically induced by the occupational role.

Among the psychological factors that were studied, we had a special interest in what is known as Type-A behavior or the coronary-prone behavior pattern (Friedman and Rosenman, 1974). This behavior pattern is characterized by time-urgency, competitive drive, and generalized hostility and has been found consistently to be associated with coronary heart disease (Jenkins, 1978). These behavior pattern dimensions seem particularly appropriate for study with regard to drill instructors whose job demands involved time pressures, high achievement striving, competition, and frustration. Moreover, our methodology allows us to test the hypothesis that the Type-A behavior pattern is engendered by the work environment (as opposed to being a stable trait). (Chesney and Rosenman, 1980). The highly energized, intense atmosphere of the training environment may induce the presence of Type-A characteristics among those responsible for recruit training. We therefore tracked physiological, cognitive, and personality variables as they changed over time from the start of Drill Instructor School to one year after graduation. It was expected that increases would occur on various stress measures as a function of length of time served as a drill instructor.

## Method

### Subjects

Two cohorts of Marines in Drill Instructor School participated in the study. These men comprised the fourth (4-80) and fifth (5-80) DI classes of 1980. In the class of 4-80, there were 33 graduates of DI School from an initial total of 51 students. For the 5-80 cohort, there were 45 graduates from an entering class of 57 men.

### Design

Multiple testings were conducted during Drill Instructor School, and then each cohort was again tested at three months and at one year after graduation. The research design is thus a repeated measures design with a replication. The number of repeated testings varied across dependent measures, since all test instruments were not administered at every testing occasion.

### Procedure

Testing began on the first day of Drill Instructor School, when a set of self-report questionnaires/scales were administered, and blood pressure and heart rate were measured by an automatic recorder (Physiometrics SR-2). Although a number of self-report instruments were used in the testing during the DI School phase, administered at various time points, this report will be concerned with a subset of them and with physiological measures. The self-report instruments that we will report on here are the Jenkins Activity Survey (JAS), the Rotter Locus of Control (IE) Scale, and the DI Questionnaire that we specially devised to assess drill instructor attitudes and beliefs pertaining to recruit training.

The standard procedure was to assemble the men in the main classroom where the questionnaires would be administered. For the initial testing, the nature and the purpose of the project were described in a consent form that accompanied the test materials. As the questionnaires were completed, the men went individually to a small conference room for the physiological assessments. While waiting their turn, they completed a mood scale and a short health questionnaire.

This procedure was conducted on five occasions during Drill Instructor School, which occurred on the first two days, on the tenth day, on the day of the Techniques of Military Instruction exam (T-21), and just prior to graduation (T-44). The two follow-up testings (3 months and 1 year) were conducted in a similar manner in a classroom at the Special Training unit of the Recruit Training Regiment.

### Measures

The Jenkins Activity Survey (JAS) is a 52 item self-report scale designed to measure coronary-prone behavior patterns. The JAS contains four separate factors, each derived from a discriminant function analysis; these are: Type A, Speed and Impatience (Factor S), Job Involvement (Factor J), and Hard-Driving and Competitive (Factor H). The Type-A scale is an aggregate index of the core components of the other three factors. The Factor S scale is particularly important for the drill instructor population, because items concerning temper and irritability load heavily on this scale. The JAS was administered at the start of DI School and at the three month and one year follow-ups.

The Rotter Locus of Control (IE) Scale is a 29 item forced-choice scale that assesses generalized expectations about control (internal vs. external) of reinforcement. (Rotter, 1966). Internal locus of control refers to the belief that reward outcomes are the result of skill or ability, whereas

external locus of control beliefs view reinforcement as due to chance, luck, or powerful others. We have previously studied locus of control expectations among recruits and have found them to be linked with training unit environments (Cook, Novaco, and Sarason, in press). High attrition training units engender external control beliefs, and low attrition units foster internal control beliefs.

The DI Questionnaire obtains personal background and demographic information and assesses attitudes, expectations, and appraisals about aspects of recruit training. The respondent is asked to rate recruits in general on a variety of dimensions (e.g. intelligence, motivation), to evaluate the importance of particular behaviors of recruits (e.g. unquestioned obedience, control of emotions), to rate the effect of specified factors (e.g. education of recruits, DI attitudes) on platoon attrition rates, and to rate the degree of stress for recruits associated with particular training tasks and conditions (e.g. physical training, marksmanship, being punished for mistakes). Attitudes about a variety of issues concerning recruit training (e.g. whether summer recruits are better than winter recruits) and concerning leadership principles (e.g. reminding recruits of their strengths as well as their weaknesses) are also measured on a scale of "strongly agree" to "strongly disagree". The respondent is also asked to rate the degree of stress that drill instructors experience in particular areas.

These latter "DI Stress" ratings are the portion of the DI questionnaire that is used in the present report. This set of items represent areas of potential stress associated with being a drill instructor. The respondent was asked to rate on a ten-point scale the degree of stress associated with (a) producing an outstanding platoon, (b) meeting expectations of commanding officers, (c) getting along with other drill instructors, (d) coping with personal problems at home, (e) controlling emotions, (f) long working hours,

(g) not having enough freedom with the platoon, (h) trying to follow the SOP, (i) fear of being punished for SOP violations, including recruit allegations. The ratings across the items were compiled into a summary score index.

## RESULTS

### Cohort Composition and Success in DI School

Basic demographic and background data for these cohorts are contained in Table 1. The cohorts do not differ in age, race, education, marital status, and years in the Marine Corps, but there are statistically significant differences between cohorts in rank,  $\chi^2(3) = 10.16, p < .02$  (the 5-80 class has more corporals and more gunnery sergeants), and in combat experience,  $t(80) = 2.14, p < .04$  (the 5-80 class has more experience). Overall, the cohorts are very comparable.

None of these demographic/background factors are related to whether or not the individual successfully completes Drill Instructor School. Similarly, no effects were found for MOS with regard to graduation from DI School for the combined cohorts. Grouping MOS into three categories (ground combat personnel, support/administrative personnel, and air wing) we further found no differences between these groups in DI school performance as measured by tests of drill, weapons, individual combat training, and basic military subjects. Significant differences ( $p < .05$ ) were found between MOS groups for initial and final physical fitness testing, as air wing personnel had much lower scores initially and do gain the most during DI School, but are still lowest at graduation (267 vs. 278 for GC and 287 for SA).

Graduate and non-graduates of DI School were also compared on various attitudinal measures on our drill instructor questionnaire. While significant differences were found on a number of items, only one was replicated across cohorts. Non-graduates give significantly higher,  $F(1,97) = 8.30, p < .005$ , ratings than do graduates of the degree of stress experienced by recruits due

to separation from home and family.

Comparisons were also made for the JAS and IE measures. Graduates had higher job involvement (J) scores than did non-graduates,  $F(1, 97) = 9.10$ ,  $p < .003$ , and this effect was particularly strong in the 4-80 cohort,  $F(1, 44) = 13.73$ ,  $p < .0001$ . Also lower speed and impatience (S) scores were found for graduates in both cohorts,  $F(1, 97) = 3.93$ ,  $p < .05$ . No differences were found between graduates and non-graduates for the JAS Type-A (A) or hard-driving (H) scales or for the IE measure.

#### Psychological Questionnaires: Longitudinal Effects

Three measurements (one training and two follow-up) were made with the JAS and IE scales and the results of those assessments are contained in Table 2. The principal finding is that speed and impatience (S) increases very significantly across cohorts over time,  $F(2, 116) = 22.62$ ,  $p < .0001$ . Moreover, the significant increases in S occurs for each cohort for each repeated testing with one exception. That is, the 5-80 cohort increased in S from DI School to the three month follow-up,  $t(40) = 3.63$ ,  $p < .001$ , and from the three month to one year follow-up,  $t(36) = 2.16$ ,  $p < .04$ ; similarly, the 4-80 cohort increased in S from training to three months,  $t(31) = 3.82$ ,  $p < .001$ , but their increase from the three month follow-up to the one year follow-up was not statistically significant. For both cohorts, the increase in speed/impatience scores from DI School to the one year follow-up is a change of approximately one standard deviation.

Regarding the other JAS factors, no other factor was found to have a significant repeated measures (within subjects) effect, although the results approach significance for the Type-A score ( $p < .10$ ) and for H ( $p < .09$ ). However, when the Type-A scores were analyzed for change from DI School to the one year follow-up (eliminating the intermediate three month data point),

the overall increase was found to be significant across cohorts,  $t(67) = 2.02$ ,  $p < .05$ , with the largest increase occurring for the 5-80 cohort. The marginal effect that was obtained for the H factor occurs primarily because of a drop in H from DI School to the three month point,  $t(72) = 2.17$ ,  $p < .04$ , followed by an increase at one year. There were no between groups (cohorts) main effects or interactions within subjects for any of the JAS scales.

The analysis performed on the IE measure yielded a significant within subjects effect  $F(2, 112) = 5.07$ ,  $p < .01$ , but there was also a significant cohort x trials interaction,  $F(2, 112) = 5.05$ ,  $p < .01$ . While the 4-80 cohort decreased slightly in IE score (becomes more internal in locus of control) after DI School, with the three month and one year values being equivalent, the 5-80 cohort first decreases (becomes more internal) at three months and then increases (becomes more external).

In addition to the JAS and IE measures, which are formalized test instruments, we also obtained self-report ratings of stress by means of the Instructor Questionnaire. The "DI Stress" items, as indicated earlier, were summed for a composite index. The means and standard deviations for this index according to testing intervals and cohort groupings are presented in Table 3, which contains the data for all subjects at each testing point. Restricting the sample to a repeated measures panel (i.e. those with data for all three testings), an analysis of variance was performed and it was found that the repeated measures effect is highly significant,  $F(2, 104) = 10.51$ ,  $p < .0001$ . Both cohorts increase over time on the stress index. More specifically, this significant effect is attributable to the increase for both cohorts between the three months and one year assessment. Since the index at three months does not differ from its level at the time of graduation from DI School,

these findings suggest that there may be a period of stress sensitization around the one year point.

In order to understand more accurately the aspects of the job that drill instructors report as being increasingly stressful, the summary index was disaggregated into its component items, which we then separately analyzed for changes over time. Table 4 contains the means of the individual items according to cohort. A repeated measures analysis of variance, performed across cohorts, found significant increases over time for all items except "getting along with other drill instructors" and "fear of punishment for violations of the SOP". The statistical effects for these analyses are reported in Table 4.

As with summary "DI Stress" index, the significant effects over time are primarily due to increases between the three months and one year follow-ups. This was confirmed by separate analyses of changes between testings for each cohort. For the 4-80 cohort, there are significant ( $p < .05$ ) increases on 7 of 10 items between three months and one year, whereas only one increase significantly from DI School to three months. For the 5-80 cohort, 4 items increase significantly from three months to one year and one from DI School to three months. While there are no differences between cohorts on the "DI Stress" summary index at any time of testing, there are some statistically significant differences between cohorts for individual items at particular testings, as can be detected from the means in Table 4. These particular cohort differences are not so pertinent to this report, hence they are not presented here.



With regard to the item ratings (obtained on a scale of 0 to 9), the highest stress ratings (across cohorts and over time) were associated with "produce an outstanding platoon" (M=7.3), "meeting expectations of commanding officers" (M=6.5), and "long working hours" (M=6.2). The lowest stress ratings were associated with "outside studies of recruit training" (M=3.6) and "getting along with other drill instructors" (M=4.3). Intermediate values were associated with "personal problems at home" (M=5.1), "controlling emotions" (M=5.8), "not having enough freedom with the platoon" (M=5.2), "trying to follow the SOP" (M=5.7), and "fear of punishment for SOP violations and allegations" (M=5.5).

#### Physiological Measures

Heart rate and blood pressure were measured just prior to graduation from Drill Instructor School, three months after graduation, and one year after graduation. The means and standard deviations for these measurements are contained in Table 5.

The within subjects (repeated testings) main effect is highly significant for heart rate,  $F(2, 112) = 50.79, p < .0001$ , and the cohort x testing interaction is also significant,  $F(2, 112) = 3.15, p < .05$ . Heart rate increases significantly for both cohorts from DI School to the one year follow-up. The interaction effect results from the difference in the pattern of the increase. For the 4-80 cohort there is a sharp increase from graduation to the three month follow-up and a leveling off at one year, whereas the increase for 5-80 is linear across assessments.

For systolic blood pressure, there are no cohort or testing main effects, but the cohort x testing interaction is significant,  $F(2, 120) = 5.37, p < .006$ . Inspection of the means in Table 5 indicate that the interaction results from an increase in systolic pressure for the 4-80 cohort while there is slight decrease

for the 5-80 cohort. To examine this more fully, a within subjects ANOVA was performed separately for each cohort. The results of these analyses are that the increase in systolic pressure across testings is significant for the 4-80 cohort,  $F(2,48) = 4.04$ ,  $p .025$ , while the decrease for the 5-80 cohort was not significant,  $F(2,72) = 1.70$ ,  $p < .19$ .

A similar pattern of results was obtained for diastolic pressure. Here the cohort x testing interaction approaches significance,  $F(2,120) = 2.94$ ,  $p < .06$ , and the separate analyses of cohort changes finds that there is an increase in diastolic pressure across testings for 4-80,  $F(2,48) = 4.28$ ,  $p < .02$ , and there are no significant differences in the mean diastolic pressure of those in the 5-80 cohort.

In order to determine whether these changes in heart rate and blood pressure were due to covariations in factors other than exposure to drill field duty, analyses of covariance were conducted using variables likely to potentiate physiological arousal. Amount of smoking, coffee consumption, and body weight were entered as covariates into the between groups - within subjects statistical designs used above. None of these covariates, either individually or as a cluster, lowered the significance levels of the obtained effects, and, in the case of systolic pressure, the cohort x testing interaction is strengthened to  $p < .001$  with the cluster of covariates.

Together, the heart rate and blood pressure data indicate that drill instructors undergo significant changes in physiological arousal as a function of amount of time on the job. These elevations in arousal, moreover, are not attributable to smoking, coffee consumption, or body weight. In addition, it should be noted that the physiological measures were obtained after the subjects had been at rest (completing the self-report instruments) for a period of 60 to 90 minutes. Of particular note, is the fact that the frequency of high heart rate, and systolic and diastolic blood pressure readings increased noticeably

over time. The number of heart rate readings in excess of 80, systolic readings greater than 150, and diastolic readings greater than 90 all about doubled by second follow-up as compared with the Drill Instructor measurements.

#### Intercorrelations Among Stress Measures

A number of intercorrelational results were found that demonstrate the congruence of stress measures. Because of the large number of variables and the repeated testings on them, we chose a significance level of  $\alpha < .01$  as the decision rule for correlation coefficients. In addition, we have greater confidence in correlations computed from the combined cohorts, since the relatively small  $N$  for the individual cohorts could produce unstable coefficients. On the other hand, there are some statistically significant differences between the cohorts, so it may well be that certain relationships hold for one cohort but not for the other. For example, at the one year follow-up, there are cohort differences regarding job involvement (J) and systolic blood pressure. The 4-80 cohort ( $M=4.1$ ) has significantly higher J scores than the 5-80 cohort ( $M=-.02$ ),  $t(66)=-2.31$ ,  $p < .025$ , and systolic blood pressure is also significantly higher for 4-80 ( $M=136.9$ ) than it is for 5-80 ( $M=126.1$ ),  $t(66) = 3.04$ ,  $p < .003$ . Therefore, for those few variables on which cohort differences exist, the correlations for the separate cohorts were examined.

Among the principal findings reported earlier were significant increases over time in speed/impatience (S), "DI Stress" ratings, heart rate, and blood pressure. Significant correlations were found between the S factor and "DI Stress" at both the three month follow-up ( $r=.31$ ,  $N=72$ ,  $p < .004$ ) and the one year follow-up ( $r=.33$ ,  $N=63$ ,  $p < .004$ ). Neither of these variables was found to be significantly associated with heart rate or blood pressure. However, for the 5-80 cohort at the one year follow-up, a significant correlation was obtained

between J and heart rate ( $r = .43$ ,  $N = 39$ ,  $p < .003$ ). In addition, the J scores for both cohorts are also inversely related to Rotter IE scores at this one year point ( $r = -.42$ ,  $N = 60$ ,  $p < .001$ ), as a high level of job involvement is associated with an internal locus of control.

With regard to job performance, we obtained ratings from the battalion sergeants major of each drill instructor in the study. These ratings were made on a five-point scale of (1) poor, (2) weak, (3) ok, (4) good, and (5) excellent. We had gathered these evaluations at about the six months point and have just collected a second set of ratings which have not yet been analyzed. These performance ratings are inversely correlated with "DI Stress" at one year ( $r = -.31$ ,  $N = 58$ ,  $p < .009$ ). Lower job performance evaluations are associated with higher self-ratings on the the stress index. These "DI Stress" scores were also found to be significantly correlated with synchronous Rotter IE scores ( $r = .35$ ,  $N = 57$ ,  $p < .004$ ), as those high on the stress index tended to be external in locus of control.

One variable not specifically addressed in this report but which can be briefly noted here is that of anger. Using the Novaco Provocation Inventory, which we have used in studies of recruits (Robinson, Novaco, & Sarason, 1981), we found significant correlations at the one year follow-up between anger and "DI Stress" ( $r = .47$ ,  $N = 60$ ,  $p < .001$ ), and a significant inverse relationship between anger and the job performance evaluations ( $r = -.32$ ,  $N = 59$ ,  $p < .006$ ). Moreover, JAS Factor A scores at the three month follow-up were predictive of level of anger at one year ( $r = .34$ ,  $N = 59$ ,  $p < .004$ ). Anger, as well as other personality and health variables will be the subject of a subsequent report.

### Discussion

The findings across the several dependent measures and the two cohorts indicate that stress reactions among drill instructors increase significantly as a function of drill field duty. Both self-report and physiological changes in the direction of increased stress occurred for the two drill instructor cohorts during their first year after graduation from Drill Instructor School. In addition, performance evaluations made by their supervisors were significantly related to self-reported stress. That is, high stress was associated with poor performance evaluations.

One of the most important findings from a scientific standpoint was the stepwise increase in JAS speed/impatience scores. A working assumption of the coronary-prone behavior pattern concept has been that it is a disposition potentiated by an environmental context, yet there has been virtually no research that has provided empirical ground for that assumption. The present study has discovered that individuals indeed are shaped on Type-A behavior pattern dimensions by their occupational environment. Moreover, we found that the induced changes were quite specific to the behavior pattern dimensions. Significant increases occurred over time for Factor A, the general factor, but the strongest and most clear change occurred for Factor S. This factor deals with the time urgency behavior style of the Type-A pattern and involves the tendency to become irritated and to lose one's temper.

The exact nature of these changes in speed/impatience among drill instructors is far from clear. Not all of the drill instructors in our sample increased on Factor S; some, in fact, decreased. It remains, then, to identify further the personal attributes, experiences, and performances that are associated with change in Factor S and similarly with regard to physiological activation.

We plan to compare drill instructors who undergo large increases in Factor S to those who remain stable or show decreases in Factor S. Moreover, we will attempt to learn more about the implication of the speed/impatience changes as they might be associated with problems of psychological adjustment, health disturbances, or infractions in standard training procedures. Analyses of the many attitudinal measures on our DI Questionnaire, as well as data we have gathered on personality factors and performance should prove to be useful in this regard.

A more detailed examination of the components of the "DI Stress" index would also be helpful. The overall index increased significantly over time and was correlated with a number of other stress measures. It was inversely related to performance evaluations. While it might be thought that the correlation of the "DI Stress" index at one year with the performance evaluations by sergeants major at six months are causally linked (i.e. higher "DI Stress" resulting from criticism and pressure from supervisors), an analysis of the individual "DI Stress" items indicates otherwise. In correlations with the performance evaluation ratings, "meeting expectations of supervisors" has among the lowest coefficients for the set of items at both follow-ups. In contrast, significant correlations with the performance evaluations were found for "personal problems at home", controlling emotions", "long working hours", and "trying to follow the SOP". These associations are mentioned to point out that self-reported stress, as measured by the "DI Stress" index does not result from negative interactions with supervisors. Our interpretation of the correlation between the two measures is that stress is dynamically linked with performance impairments in a deficit-amplifying cycle. That is, stress debilitates performance, which in turn leads to greater stress.

This study was designed as a longitudinal panel with a replication. For the most part, our findings replicated across cohorts. However, in several instances (e.g. Factor J and systolic blood pressure), we found significant differences between cohorts. It is not clear how to interpret the cohort differences that were obtained. The cohorts were highly comparable at the time of entry into DI School. The occurrences of differences in the last follow-up may be due to sampling error, particularly in the light of the relatively small sample size. Yet, the differences may have been a product of variations in DI School training. There were different training personnel in DI School for these cohorts and this fact may account for the obtained differences. We will learn more about this as we perform detailed analysis of our DI Questionnaire data.

We are continuing the longitudinal investigation of the 4-80 and 5-80 cohorts, and we are also studying the 4-81 and 5-81 cohorts utilizing a similar research design. We hope to learn more about particular aspects of drill field duty that are stress inducing, as well as about particular periods of stress sensitization. If points in time and context when stress is most acute can be identified, procedures could be implemented to alleviate strain and occupational burn-out. Identifying such critical periods is integral to the development and targeting of stress reduction interventions. We are presently developing stress coping skills modules that will be based on this longitudinal research.

TABLE 1

DEMOGRAPHIC AND BACKGROUND DESCRIPTORS FOR THE  
DRILL INSTRUCTION SCHOOL COHORTS

<u>Cohort</u>	<u>Rank</u>				<u>Race</u>			
	<u>Corp</u>	<u>Sgt</u>	<u>SSgt</u>	<u>GSgt</u>	<u>Caucasian</u>	<u>Black</u>	<u>Chicano</u>	<u>Other</u>
4-80	6.3%	58.3%	35.4%	0%	47.9%	27.1%	14.6%	10.4%
5-80	18.2%	61.8%	14.5%	5.5%	58.2%	20.0%	12.7%	9.1%

<u>Cohort</u>	<u>Age</u>	<u>Education</u>					
		<u>College Grad</u>	<u>Some College</u>	<u>HS Grad</u>	<u>Voc. Sch. Grad</u>	<u>HS Equiv.</u>	<u>Non HS Grad</u>
4-80	23.7	2.1%	34.0%	53.2%	0%	10.6%	0%
5-80	23.8	0%	23.6%	58.2%	9.1%	5.4%	3.6%

<u>Cohort</u>	<u>Marine Corps Years</u>	<u>Combat Months</u>	<u>Marital Status</u>			
			<u>Single</u>	<u>Married</u>	<u>Divorced</u>	<u>Separated</u>
4-80	5.9	.2	22.9%	70.8%	6.3%	0%
5-80	5.6	2.4	30.9%	61.8%	3.6%	3.6%



Table 2  
 Jenkins Activity Survey (A,J,S,H) and Rotter (IE) Scale Means  
 at Training and Follow-up Assessments for Each DI Cohort

Cohort and Time of Testing	Type A	Factor S	Factor J	Factor H	IE
<u>Training</u>					
4-80 (N = 25)	3.28 (7.17)	-4.60 (8.70)	3.92 (7.48)	4.00 (8.11)	8.77 (4.66)
5-80 (N = 35)	2.32 (8.87)	-6.16 (7.00)	1.46 (6.88)	4.97 (9.04)	7.53 (3.26)
<u>Follow-up (3 mo.)</u>					
4-80 (N = 25)	5.44 (9.63)	1.72 (12.39)	2.96 (6.90)	1.88 (10.75)	7.86 (3.98)
5-80 (N = 35)	4.00 (8.78)	-1.41 (8.89)	2.57 (6.45)	2.00 (11.03)	6.56 (3.09)
<u>Follow-up (1 yr.)</u>					
4-80 (N = 25)	4.68 (9.60)	3.72 (11.43)	3.96 (7.61)	5.80 (11.33)	8.00 (4.97)
5-80 (N = 35)	5.21 (8.03)	1.54 (9.21)	1.03 (6.15)	2.51 (10.07)	9.11 (4.13)

Note. The tabled data are for those in the sample at all three time points. Standard deviations are given in parentheses below the means. The repeated measures or trials effect is significant across cohorts for Factor S ( $p < .0001$ ) and for IE ( $p < .01$ ). Individual cohort effects and particular time comparisons are reported in the text.

Table 3  
 "Drill Instructor Stress" Summary Index Means by Cohort at  
 DI School Graduation and Follow-up Assessments

DI Cohort	DI School Graduation	Three Month Follow-up	One Year Follow-up
4-80 Cohort	43.9 (17.4) N=30	45.8 (20.6) N=32	57.3 (24.3) N=25
5-80 Cohort	50.9 (19.4) N=40	49.6 (15.3) N=43	58.5 (19.5) N=39

Note. The "Drill Instructor Stress" index is a summary score of the self-ratings on a set of items representing areas of potential stress in being a drill instructor (see method section of text). The values in parenthesis below the means are standard deviations. The increases over time across cohorts for those subjects in the repeated measures panel are significant ( $p < .001$ ).

Table 4  
 Mean Self-Report Stress Ratings for  
 Item Components of "DI Stress" Index According to  
 Cohort (4-80 & 5-80) and Time of Assessment

Item Component of "DI Stress"	DI School Graduation		Three Month Follow-up		One Year Follow-up		Within Subjects ANOVA	
	4-80	5-80	4-80	5-80	4-80	5-80	F	P
"Produce an Outstanding Platoon"	6.5	6.8	7.5	7.1	8.4	7.6	11.87	<.0001
"Meet Expectations of Commanding Officers"	5.5	6.4	6.8	6.3	7.6	6.6	3.39	<.04
"Getting Along with Other Drill Instructors"	4.4	4.4	4.4	3.5	4.4	4.6	1.44	NS
"Personal Problems at Home"	5.1	4.7	3.7	5.3	6.1	5.6	3.72	<.03
"Controlling Emotions"	4.4	6.0	5.7	5.3	6.8	6.2	3.85	<.03
"Long Working Hours"	6.0	5.8	6.6	5.2	7.6	6.6	5.69	<.005
"Not Having Enough Freedom with Platoon"	5.0	4.4	6.2	4.7	6.5	5.8	7.50	<.001
"Trying to Follow SOP"	4.5	5.1	5.4	5.8	6.7	6.4	7.28	<.001
"Outside Studies of Recruit Training"	4.0	3.1	3.7	2.7	4.5	4.2	4.35	<.01
"Fear of Punishment for Violations of SOP"	5.4	4.8	6.3	5.2	6.5	5.6	2.03	NS

Note. The self-report ratings were done on a scale of 0 to 9. The ANOVA test was performed across cohorts for N = 60. See text for overall ratings of particular items.

Table 5  
Physiological Measures According to Cohort  
and Time of Assessment

Measure & Cohort	N	DI School Graduation	Three Month Follow-up	One Year Follow-up
Heart Rate				
4-80	24	61.42 (7.33)	69.38 (7.62)	70.00 (8.21)
5-80	34	59.85 (5.73)	65.88 (6.26)	71.65 (7.87)
Systolic Blood Pressure				
4-80	25	125.96 (18.08)	127.00 (14.90)	133.60 (14.70)
5-80	37	129.46 (9.80)	126.54 (11.91)	125.78 (13.71)
Diastolic Blood Pressure				
4-80	25	71.76 (7.32)	76.00 (8.20)	77.08 (9.41)
5-80	37	74.43 (9.55)	72.49 (7.81)	74.35 (9.07)

Note. The within subjects effect is significant for heart rate ( $p < .0001$ ). The between groups x within subjects interaction is significant for heart rate ( $p < .05$ ) and systolic pressure ( $p < .006$ ) and approaches significance for diastolic pressure ( $p < .06$ ). The values below the means in parantheses are standard deviations.

References

- Chesney, M.A. & Rosenman, R.H. Type A behavior in the work setting. In C.L. Cooper & R. Payne (Eds.) Current Concerns in Occupational Stress. London, John Wiley, 1980, pp. 181-212.
- Cook, T., Novaco, R.W., & Sarason, I.G. Military recruit training as an environmental context affecting expectations for control of reinforcement. Cognitive Therapy and Research, in press.
- Cooper, C.L. & Payne, R. (Eds.). Stress at Work New York, John Wiley & Sons, 1978.
- Cooper, C.L. & Payne, R. (Eds.). Current Concerns in Occupational Stress. New York, John Wiley & Sons, 1980.
- Freedman, M. & Rosenman, R. Type-A behavior and your heart. New York, Fawcett, 1974.
- Jenkins, C.D. Behavior risk factors in coronary artery disease. Annual Review of Medicine, 1978, 29, 543-562.
- Novaco, R.W., Sarason, I.G., Cook, T., Robinson, G., & Cunningham, F. Psychological and organizational factors related to attrition and performance in Marine Corps recruit training (AR-001). Seattle, University of Washington, November 1979.
- Sarason, I.G., Novaco, R.W., & Sarason, B.R. A follow-up study of Marines two and a half years after recruit training (AR-006). Seattle: University of Washington, November 1981.
- Robinson, G.L., Novaco, R.W., & Sarason, I.G. Cognitive correlates of outcome and performance in Marine Corps recruit training (AR-005). Seattle, University of Washington, October, 1981.
- Rotter, J.B. Generalized expectations for internal versus external control of reinforcement. Psychological Monographs, 1966, 80 (1, whole number 609)

Footnotes

<sup>1</sup>The Jenkins Activity Survey (JAS) is a self-report questionnaire designed to measure the coronary prone behavior pattern. The questionnaire is constructed in a multiple-choice format which, when machine-scored, provides for the computation of raw and standardized scores on four scales or factors. The Type A scale is the overall behavior pattern index. In addition to the overall index, there are three component factors S, J, and H. Factor S, speed/impatience, assesses the stylistic aspect of Type A behavior and thus deals with time urgency, rapid performance or hurriedness, irritability, and loss of one's temper. Factor J, job involvement, pertains to one's degree of dedication to occupational activity, involving overtime, deadlines, and the preference of promotion to pay raises. Factor H, hard-driving, concerns perceptions of oneself as conscientious, responsible, serious, competitive, and intensely activated.

The four JAS scales have been derived from a discriminant function analysis of approximately three thousand men who were employees of large corporations. The scales were cross-validated by several other large sample studies. The S, J, and H factors are considered to be orthogonal, as determined by factor analyses, although we have found them to have significant intercorrelations in our samples (see Appendix 1).

## Appendix 1

Intercorrelations of JAS Factors Across  
Times of Assessment

	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>
A <sub>1</sub>												
A <sub>2</sub>	.59											
A <sub>3</sub>	.45	.52										
S <sub>1</sub>	.51	.29	.35									
S <sub>2</sub>	.39	.58	.43	.47								
S <sub>3</sub>	.27	.29	.61	.44	.63							
J <sub>1</sub>	.35	.19	.11	.26	.11	.10						
J <sub>2</sub>	.38	.41	.33	.37	.31	.15	.46					
J <sub>3</sub>	.24	.06	.20	.40	.27	.27	.44	.48				
H <sub>1</sub>	.55	.46	.34	.05	.15	.18	.28	.26	.08			
H <sub>2</sub>	.35	.53	.35	.03	.07	.04	-.02	.07	-.15	.48		
H <sub>3</sub>	.38	.44	.51	.07	.26	.32	-.02	.01	.05	.53	.61	

Note. The sample size is 101 at Time 1, 73 at Time 2, and 68 at Time 3.

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