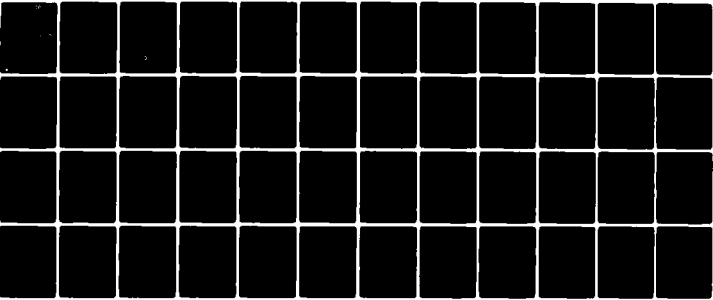


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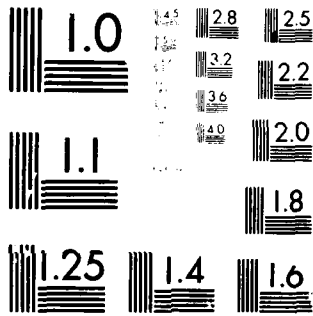
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Generalized Expectancies, Life Experiences, and Adaptation
to Marine Corps Recruit Training

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Technical Report

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This research studied the relationships of the training unit environment, life experiences, generalized expectancies, and personality variables to attrition and performance among Marine Corps recruits. Generalized locus of control expectancies and the training unit environment were found to play especially important roles in the success or failure of recruits. The research showed the value of an interactional view of adaptation to stress. This view emphasizes the need to investigate jointly the effects of personal and environmental factors.		

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Summary

This study is part of a continuing effort to identify the factors associated with adaptation and performance in Marine Corps Recruit Training. The research is guided by theories of psychological stress which emphasize the environmental context of behavior and the need for individuals to develop skills relevant to coping with the challenges of environmental demands.

The basic questions addressed are (1) the influence of generalized expectancies for control of reinforcement (Locus of Control) on psychological adjustment, performance, and success in training, and (2) the differential effect of training unit environments on expectancy change over the training cycle. The interest in environmental differences follows from our previously reported research which found attrition to be highly associated with training units, independent of the initial composition and performance of the unit.

The point of departure for the present study is the theory that people acquire a set of cognitive beliefs or expectancies about reinforcement as a result of ongoing transactions with their environment. Internal control refers to the belief that rewards are contingent upon personal effort and skill. External control refers to the belief that rewards are not under personal control but result instead from luck, chance, fate, or powerful others. Despite an abundance of research relating locus of control (internal/external) to behavioral and health outcomes, there have been few attempts to study the modification of locus of control expectancies in naturally occurring situations that are likely to influence generalized expectations.

Since large numbers of American youth pass through basic military training each year, this environment seems ideal for such an investigation. In addition, it is thought that recruit training is conducted in a context where individuals have the opportunity to relearn reward contingencies. Because recruit training

is conducted in a 'total environment,' changes in expectancies can readily be attributed to the contingencies in the environment.

The study was conducted with a sample from the October 1978 recruit cohort at the Marine Corps Recruit Depot, San Diego. A one-third random sample of the cohort was tested at two time points (pre-training and pre-graduation) and followed through the training cycle. Demographic, aptitude, and stress-related personality measures were included in individual assessments, along with measures of performance and subjective evaluations by training personnel. The major interest of the study concerned changes in locus of control expectancies over the training cycle as a function of training units classified according to their attrition rate (ATTRITVAR). The principal findings of the project are given below.

Locus of Control and Recruit Characteristics

Marine Corps recruits were not found to be substantially different in control expectancies from the general population of comparable sex, age, and education. Pre-training expectancies were found to be highly associated with educational attainment, standard measures of aptitude/intelligence, and the ability to detect "means-ends" relationships in problem-solving tasks associated with training situations.

Control expectancies were also found to be significantly related to parents' marital status (externals were more likely to come from broken homes), pre-training weight (internals were likely to be heavier), and the degree of self-reported problems and maladjustment (internals less likely to have such problems). An internal orientation was also positively related to self-report measures of test anxiety, sensation-seeking, and anger provocation. In light of the findings that external control expectations are associated with negative life experiences, it was speculated that externals may be inclined to deny their feelings.

Locus of Control Expectancies and Success in Training

Generalized expectancies for locus of control were found to be significantly related to attrition. Attrition rates were 17% for externals, 13% for the mid-group, and 7% for internals. In addition, recruits who were discharged for psychological/behavioral reasons were significantly more external than either those who graduated or who were discharged for other reasons. The predicted effects of locus of control on performance resulted only for the Oral Test of Military Knowledge, as internals have high performance scores, controlling for the effects of education.

Expectancy Change, Training Units, and Life Experiences

The most important findings of this study pertain to changes in locus of control as a function of training environment. Using a three-level classification (low, medium, high) of training units according to attrition rate (ATTRITVAR) it was found that change in the internal direction occurred in the low and medium groups while change in the external direction occurred in the high attrition group. These effects were clarified by the inclusion of initial expectancy level (external/internal) and pre-training life experience variables. Recruits who had the most negative life experiences (failure to complete high school, negative perceptions of home life and school experiences, and negative life change events) changed most in the internal direction, especially if assigned to units later found to have low or moderate attrition rates. These effects were not found for the high attrition group, where externals remained so and internals became more external.

Implications

To the extent that internal locus of control beliefs have adaptive value, especially in high stress environments, our findings suggest that certain

recruits benefit psychologically from the basic training experience. It is probable that many recruits who have a history of failure and negative life experiences can develop a new belief system that associates success with personal effort. This appears to be especially true when recruits are trained in units where reward contingencies are favorable to the formation of internal/locus expectancies. Conversely, those who are exposed to training environments where the reward contingencies are not clear and consistent are likely to either maintain the belief that outcomes are not under personal control or modify their beliefs in the external direction to accommodate the realities of the situation. The link between expectancy changes and the attrition rate characteristics of training units not only provides information about an important dimension of the training unit environment but also has implications for training procedures and the subsequent adaptation of the recruit.

Generalized Expectancies and Adaptation to Recruit Training

Organizations, as well as individuals, recognize the importance of minimizing factors that have negative impact on health and performance and maximizing conditions that promote adaptation. When persons are exposed to rapidly changing social and physical environments, such as occur in Marine Corps recruit training, the process of adaptation is particularly complex.

The demands encountered by those who enter the Armed Forces require a substantial amount of adjustment during a relatively short period of time. During recruit training, successful adaptation requires changes in both psychological functioning and physiological conditioning. Congress and the Department of Defense are indeed concerned with the problems associated with adaptation to this environment and specifically with the premature discharge (attrition) of first-term enlistees.

The focus of the present research follows from an interest in human stress, adaptation to extreme environments, and the general effects of military life on later psycho-social adjustment. It is part of a larger research project concerning the role of stress coping skills in the Marine Corps recruit training environment. The basic questions to be addressed here concern (1) the influence of generalized expectancies for control of reinforcement (Rotter, 1966) on adjustment to recruit training, and (2) the differential effect of training unit environments on expectancy changes over the nine week training cycle. The interest in training unit environments follows from our previously reported research that found attrition to be highly associated with training units independent of the initial composition and the performance standards of platoons (Novaco, Sarason, Cook, Robinson, & Cunningham, 1979).

The theoretical perspective that guides the investigation is that of psychological stress (Appley & Trumbull, 1967; Lazarus, 1966; Novaco, 1979;

Sarason & Spielberger, 1975). This approach to behavior-environment relationships is transactional in nature and puts particular emphasis on the mediation of environmental influences by cognitive, personality, and social-psychological factors. Stress is viewed as a hypothetical state that results when environmental demands exceed resources for coping. The reactions resulting from such transactions may be manifested in physiological, behavioral, or social forms. The stress-engendering environmental forces encountered by the individual are called 'stressors' - aversive events that may be either real or imagined and that disturb equilibrium. Stressors are demands that require adaptation or coping. Stress reactions are the negative consequences of the failure to effectively cope with demands. The preponderant view at the present time is that stress is something occurring within the organism rather than being a characteristic of the situation. The realm in which stress is thought to exist is in the psychological environment that people create through their own cognitions (beliefs, attributions, appraisals, expectations, etc.).

The present research stemmed from the conjecture that adaptation to an extreme environment, such as military recruit training, would be mediated by the degree of stress experienced by the individual. Despite the attention given to the relationship between demographic, intelligence, aptitude, and attitudinal factors, there is insufficient research relating psychological variables to adjustment in military settings (Mobley et al., 1978). A key psychological factor that can be hypothesized to bear on adjustment is that of expectation. The work of Mobley and his colleagues has been concerned with recruit expectations regarding organizational roles, which they have found to be related to attrition. However, expectations as enduring personality variables have not been examined. Psychological research has shown that people can be characterized by generalized expectations associated with the

mechanisms by which satisfaction or reward is achieved. The generalized expectation for control of reinforcement, a concept known as "locus of control" (Rotter, 1966), pertains to the degree to which the person believes that outcomes are the result of skill or ability (internal locus) versus the result of luck or chance (external locus). The extensive research that has been conducted with regard to locus of control justifies its use in the present research program, particularly in view of the nature and intended products of recruit training.

Background

Each year, approximately 50,000 young men enlist in the Marine Corps. Of this number, 88% successfully meet the demands and challenges (Mobley et al., 1978; Novaco et al., 1979). The remaining 12% are discharged (attrite) for a variety of medical, psychological/behavioral, and other reasons. It can be noted that the question of how the 88% succeed and adjust is at least as, if not more, intriguing as why a small percentage fail.

The organizational structure of the military training environment provides a degree of natural control not often found in field research settings. Record systems are systematic and comprehensive, allowing the researcher to incorporate archival data and training process information at various levels of analysis. Naturally existing conditions allow the researcher, who has adequate knowledge of the system, to achieve an acceptable level of experimental control without having to resort to the artificial manipulation of persons or environmental conditions. Of particular importance is the fact that stress levels in recruit training are often quite high.

Psycho-Social Aspects of the Training Environment

All military recruits are required to undergo a period of basic training, normally 8-12 weeks in duration. The duration, intensity, and content of training varies considerably among services, as do the criteria used for recruit

selection. These variations are a function of the general organizational mission of the specific service and the anticipated demands on personnel, both in war and in peace. Recruit training in each service is designed to impart those skills, attitudes, and behaviors that are suited for mission performance. The combination of recruit selection and systematic training insures the continuity of mission accomplishment across time. While there are noticeable differences in content, duration, and intensity of training, the training process is more or less similar across services.

In reviewing the literature on military enlistment, reenlistment, and withdrawal, Hand, Griffeth, and Mobley (1977) cite 76 published reports which attempt to account for variance in the intentions and/or behaviors of interest. The vast majority of these studies were conceptually grounded in organizational/management theory and used such predictor variables as economic incentives, organizational practices, job content and satisfaction, and demographic/biographic data obtained from system records. Only three of the studies included psychological variables and the reviewers concluded that these either accounted for an extremely small percentage of the variance in question or were designed in such a way that analysis of variance was not possible. Minimal evidence was found for the association of psychological variables with forms of withdrawal behavior. These authors found that, with the exception of economic incentive variables, the independent variables selected accounted for minimal and often meaningless amounts of variance. Deficiencies in methodology and a lack of adequate process information were cited as the reasons for invalid results.

It is imperative that the researcher who enters such an environment as recruit training gain sufficient information about the process, content, and objectives of training. The goal of Marine recruit training is to impart the knowledge and practical experience necessary to produce a basic rifleman who

will survive and carry out the assigned mission on the battlefield. He must be essentially self-sufficient, function effectively when not in a combat area, and practice those personal and professional traits that distinguish a Marine.

The process of adjustment to military life may often begin years prior to the decision to enlist. Attitudes held by significant others, exposure to media portrayals of military life, and experience with life challenges similar to military training are all thought to influence the decision to enlist. While individual reasons for enlisting vary greatly, the first visit to a recruiter provides an initial screening point for both the potential recruit and the specific service. On the basis of this initial transaction, some persons reject the idea of enlisting. Others are not found qualified due to criminal history, aptitude deficiency, sexual preference, educational level, or physical/mental problems.

Those who choose to enlist, and are found qualified, are eventually transported to one of the two training locations (San Diego, CA; Parris Island, S.C.). Arrival at the training site initiates an intense process that lasts for approximately 87 days. Marine recruit training is systematically programmed in a four stage cycle.

The initial four to six day period, known as Processing, is designed to acquaint the individual with military life and the members of his training unit (platoon) and to complete administrative processing, testing, and medical evaluation. While the Marine Corps considers this time to be relatively uneventful and "low stress," it is often quite traumatic for the young recruit. From the moment he steps off the bus from the airport, he enters an alien environment composed of strange and unfamiliar sights, smells, faces, and rules. When first introduced to supervisory personnel (drill instructors), the recruit is confronted with an authority figure who is impeccable in bearing

and dress and in complete control of the situation. It is quickly apparent that the only acceptable behavior is that prescribed by the drill instructor. The message that unacceptable behavior and performance will be quickly punished by aversive consequences is continuously reinforced. Personal freedom and privacy are lost and it is expected that the new recruit quickly learn appropriate responses. Bourne (1967) characterizes this period as one of environmental shock and notes that "past experience with any remotely comparable event seems therefore to be the major factor in ameliorating the high level of stress during the period of environmental shock occasioned by basic training" (p. 190). The recruit who has been away from home, at college, played sports, or even experienced detention or confinement will have, in Bourne's view, a less severe reaction. Differential adaptation during the initial period appeared to be unrelated to the degree of psychopathology in the recruit's past. Bourne adds, however, that what may facilitate adjustment in the first few days may not be related to later adjustment.

It is highly probable that this period of introduction constitutes the point of maximum stress for most recruits. Bourne (1967) noted that following the first 24 hours, men exhibited a picture of dazed apathy. In addition, he cited research indicating that this acute reaction is most dramatically reflected in the 17-hydroxycorticosteroid levels which are comparable to those measured in schizophrenic patients during incipient psychosis. This is not surprising in that minutes after arrival the recruit has been stripped of his personal freedom, idiosyncratic behavior, hair, clothing, and other personal belongings. Previously learned verbal and non-verbal responses are quickly found to be inadequate and inappropriate, with the only appropriate response being under the control of the drill instructor. Any display of emotion (fear, anger, disgust, crying, smiling) brings an immediate negative reaction from supervisory personnel.

Some recruits have acute physiological reactions, resulting in referral for psychiatric screening. An analysis of archival records (Novaco et al., 1979), revealed that approximately 58% of those failing to adjust psychologically or behaviorally are discharged within 17 days (prior to the start of Phase II) of training. One is led to speculate that failure of these individuals to adapt begins during the first 24 hours and becomes progressively worse over time. Successful adaptation appears to be contingent upon the recognition that aversive stimulation decreases as the frequency and quality of desired behaviors increase. Those who are either slow or unwilling to modify their behavior accordingly are singled out for increased attention and possible disciplinary action or recommendation for discharge.

After processing, the recruit, along with his platoon, moves into Phase I which is a two week period of basic instruction in military skills and knowledge. Physical conditioning is given maximum emphasis, with the recruit quickly progressing from basic physical exercises to very strenuous tests of strength and endurance. The transition from Processing to Phase I requires adjustment to a new set of drill instructors who have been glorified by personnel in the processing phase. In essence, the recruits have been given a set of expectations regarding these new authority figures that is indeed anxiety-producing. There is little doubt in the recruit's mind that these drill instructors are in complete control of him. There is also no doubt that engagement with the demands of training has begun.

During this period a concerted effort is made to increase performance and to instill discipline. As training moves into full gear, anxiety begins to decrease, and what appears is a process described by Goffman (1957) as mortification. This process is characteristic of total institutions and results from the sharp distinction between the recruit class and the supervisory class.

The recruit comes to realize that he has no other identity within this environment other than that based on performance and conformity. Autonomous decisions are eliminated through the scheduling of daily activities. Most channels of communication with the outside world are broken or severely restricted.

Competition among individuals and units increases as pressure is applied to substandard recruits by drill instructors and fellow recruits. For those having difficulty meeting minimum performance standards, the demands of the total environment increase disproportionately. The strain is likely to be felt most by those who have achieved or been ascribed highest status in civilian life. One of the primary dynamics of the early phases of training is equalization. For those who have made minimal achievements in their past life, this period may lead to a new sense of accomplishment and pride. The recruits learn that rewards and positions of responsibility are earned by meeting established performance and behavioral criteria.

As training progresses, the recruit is expected to keep up with increasingly difficult physical training demands. He is also introduced to a new aversive event - "incentive training." When individuals or groups make mistakes, they are subjected to a series of exercises, with a prescribed number of repetitions, performed at a very rapid pace under close supervision. The incentive offered is removal of the threat of extra physical exercise, contingent on the satisfactory performance of tasks. Thus, the system relies on negative reinforcement to shape recruit behavior.

Phase II is devoted to two weeks of training with the service rifle, one week of combat training, and one week of work duty (mess duty or grounds maintenance). This phase marks a period of attainment for the recruit. The rifle range is located some 40 miles from San Diego and constitutes a new environment. Basic proficiency with the rifle is a result of individual effort and competition. Qualification marks the first tangible recognition of

the individual by the system, with silver badges awarded in accordance with levels of performance. It seems more than coincidental that this instance of positive reinforcement is paired with a skill highly valued by the Marines.

Following attainment of proficiency with the service rifle, recruits begin to internalize their new identity and are introduced to one week of combat related training, in a field setting. This training approximates what most recruits expect life to be like in the Marines. For most, it is an enjoyable as well as a demanding time. The recruit begins to see himself as a Marine in the setting of simulated combat. The learning that has taken place in prior training is constantly reinforced while under these simulated conditions.

After combat training, the recruit is assigned to one week of either mess duty (work in a dining facility) or grounds maintenance. In this week the recruit is given a glimpse of normal work life in the Marine Corps. While this is a fatiguing time for most, with long work hours, it is also the first real opportunity for recruits to have contact with Marines other than fellow recruits and drill instructors.

Of special significance is the reality that the recruit "passes over the hump" in a chronological sense during this period. He can now anticipate graduation as a Marine.

Phase III, the final two weeks of training, is spent preparing for tests of military proficiency and graduation. Most recruits eagerly await the day of departure, and a general sense of euphoria is present. This euphoria is also associated with feelings of great confidence and a general sense of invincibility. Many recruits see themselves as having survived the greatest challenge of their lives. Some even express a wish that it had been more demanding.

In order to fully understand the psycho-social demands of recruit training it is important to keep in mind that the primary purpose of Marine basic

training is to prepare recruits for the stress of combat. The Marine Corps is strongly committed to the position that the methods and techniques used in training are necessary to provide a realistic test of stress tolerance. From this perspective, the Marine Corps believes that it is prudent, and ultimately more humane, to provide this screening and learning under conditions where the probability of death due to error is very low than to send ill-prepared troops into combat. This assumption underlies both the process and content of training and is one which is often overlooked in discussion of the efficacy of methods used by the military.

Theoretical Implications and Hypotheses

Social learning theory (Rotter, 1975) states that through transactions with the environment over time an individual acquires a set of cognitive beliefs or expectancies about reinforcement contingencies. Internal control refers to the belief that reward outcomes are contingent upon personal behavior, capabilities, and attributes. External control refers to the belief that reward outcomes are not under personal control but are subject to the control of luck, chance, fate, and powerful others.

Despite the abundance of research on the effects of locus of control expectancies on behavioral and health outcomes (Lefcourt, 1966), there have been few attempts to isolate naturally occurring situations and life events that may affect and substantially modify generalized expectancies for control of reinforcement. The military training environment would seem to be a useful context for such an investigation. Recruit training is conducted in a context in which the individual has an opportunity to relearn reward control contingencies. Because it is a "total environment," observed shifts in locus of control beliefs can readily be attributed to the contingencies in the environment of the training unit.

It is assumed that recruits enter the training environment with expectations about the demands of training and about their capabilities regarding the perceived demands. As part of their cognitive system, they hold a set of generalized expectancies for control of reinforcement based upon their previous learning history. However, the vast majority of recruits have had little experience with any situation that resembles recruit training, and the nature of the training environment is such that there is an abrupt disruption in locus of control expectations. Any illusions about being prepared for the experience are dislodged by the situational reality. Any attempt by the new recruit to control or manipulate the immediate environment results in an immediate, aversive reaction from system personnel. Success in the early stages of training implies that the recruit has learned to recognize the relationship between the display of certain behaviors and the avoidance of aversive stimulation.

In this highly structured, authoritarian environment, it is plausible that some recruits will appraise the demands as a challenge and as an opportunity to learn contingencies that bear on success. Others, however, may appraise the demands as a thwarting of personal freedom and as a threat to self-esteem. The locus of control construct does not bear on the meaning analysis of the environment, but it hypothetically taps a cognitive orientation relevant to coping with stressful events. This pre-training cognitive orientation may influence training outcomes. Recruits who are internal in locus of control can be expected to engage in the behavior that is instrumental to successful performance. It has been found that in test situations where successful performance is contingent upon one's own efforts, internals perform better than do externals (Houston, 1972; Novaco, Stokols, Campbell, & Stokols, 1979; Rotter & Mulry, 1965). This is particularly true under conditions of high

arousal. Achievement in recruit training is surely dependent on personal effort (indeed, it must be intense and consistent), and it clearly involves a high arousal environment.

In the context of this study, some additional relationships are of particular interest. The first concerns the effects of background/demographic factors upon the formation of locus of control expectancies. Recent research has found that negative life experiences are associated ($r = .32$) with external locus of control expectancies (Sarason, Johnson & Siegel, 1978). People who have experienced life change events which they judge to have had a negative impact on their lives may, as a result of these experiences, form generalized expectancies that reinforcement will result from external circumstances rather than their own efforts. This, of course, is a causal proposition and requires more than simple correlational results for its confirmation. While our research on this question is correlational in design with regard to pre-training experiences, our analyses of changes over the training cycle do permit causal inferences. We also approach the question of the effect of life experiences by using several measures. In addition to the Life Experiences Survey (LES) developed by Sarason et al. (1978), the present study investigates the life experience → locus of control expectancy relationship with regard to the completion/noncompletion of high school and the person's overall evaluation of the quality of their home life and their school experiences.

Another question we examine concerns the interaction of locus of control, as an initial disposition, with environmental conditions (training unit characteristics) in terms of changes in expectations over the training cycle. At first thought, it would seem plausible that recruits who adapt to the demands of the authoritarian recruit training environment would shift their beliefs to an external orientation regarding control over reinforcement. Recruits are under the constant control of authority figures who give little

positive reinforcement and who often punish as a means of control. However, if training is conducted such that the withdrawal of aversive stimuli is contingent upon the performance of clearly defined behaviors, the individual should learn a more internal frame of reference. This shift toward internal locus would result in part from the learned association between appropriate behavior and the avoidance of aversive consequences. Such effects would be strongest under conditions where the occurrence of reward is highly predictable - when aversive consequences are indeed avoidable and escapable. The shift toward internal locus would also be expected as recruits experience the skill acquisition and successful performance associated with training. The recruit training process is remarkably effective. As we have found previously (Novaco et al., 1979), there is very little variability in the scores recruits attain on the various performance criteria used to evaluate recruit competence. Consequently, recruits who successfully complete training will hypothetically have become more internal in locus of control.

The general proposition is that shifts will occur in locus of control expectation as a function of systematic contingencies in the training environment. However, our previous research has found significant differences for training unit outcomes. This suggests that the reinforcement contingencies vary across training units.

We have found that while the overall attrition rate is 12% yearly, platoons vary in attrition rate from 0% to 28%. Importantly, this variation cannot be attributed to differences in the initial composition of platoons nor to differences in performance standards (Novaco et al., 1979). We therefore assume that variation in attrition results from the way training is conducted by unit leaders, particularly drill instructors, and that high attrition is a result of less effective ways of implementing the training

program. Since effective leaders can be thought to develop expectations of competence among recruits and the belief that successful outcomes result from one's efforts, changes toward an internal locus of control should vary inversely with the attrition rate of training units.

The present project does not identify the explicit dimensions of training units environments that shape locus of control expectancies. What it does attempt is to link expectancy changes over the training cycle to our previous findings regarding training units in terms of their attrition rates. Thus, we here examine the relationship between an outcome characteristic of training units (low, medium, and high attrition rates) with outcomes in generalized expectancies regarding control over reinforcement. The investigation of changes in locus of control expectancies is intended to provide some clarification about the nature of training unit environments as classified by attrition rate (*ATTRITVAR*).

These theoretical considerations lead to the following set of hypotheses regarding the effects of locus of control expectancies and the factors which shape them prior to and during recruit training:

1. Locus of control expectancies will be related to life experiences, such that recruits having a history of negative life experiences will be external in their locus of control beliefs. Negative life change events, the failure to complete high school, and subjective judgments of poor home life and school life will be higher for external locus than for internal locus recruits.
2. Locus of control expectancies at the start of training will significantly affect performance. Internals will be more likely to succeed (lower rate of attrition and higher performance scores) than will externals.
3. Shifts in locus of control expectancies over the course of training will be specifically influenced by training unit environments as

indexed by their attrition rates (ATTRITVAR). Recruits in high ATTRITVAR units will become more external in locus of control, while those in low ATTRITVAR units will become more internal in locus of control.

Method

Participants

Recruits arrive at the training site from geographic points located throughout the United States. Of those assigned to San Diego, 95% are from locations west of the Mississippi River with the remaining 5% being from East Coast locations. The majority (95%) arrive at San Diego on weekdays by airplane, usually during the early evening hours. Input by month fluctuates, with the largest accession months being June-September (\bar{X} = 2600/month) and the smallest being February-May (\bar{X} = 1375/month).

Selection of the October 1978 accession cohort was based on analysis of accession profiles for the preceding 24 month period. It was predicted that this cohort would be equivalent to yearly accessions on such variables as attrition distribution, age, education, aptitude, race, and place of enlistment. Marine Corps recruiting predictions made during September 1978 indicated that the October cohort would be approximately 1600. The representative nature of the October cohort and test sample *vis-à-vis* accessions for the period May 1977-April 1978 has been previously documented (Novaco et al., 1979).

Design

On the basis of archival data related to recruit accessions and discharges for the period of May 1977-April 1978 (Novaco et al., 1979) and extensive process monitoring, assessment of locus of control and other psychological variables was accomplished during the first 24 hours after arrival at MCRD. Assessment of recruits prior to entry was not practical. It was also believed

that pre-entry testing would be confounded by fantasy and rumor regarding the demands of training.

Past history indicated that the largest accession days could be expected during the first and the last days of the month, with the smallest falling in the middle of the month. For pragmatic reasons, days of the month were sampled rather than individuals. A computer generated, random sample of 33% of the accession days yielded 10 testing days distributed evenly throughout the month. All recruits who arrived on the designated days were included in the sample and administered the testing battery on the following day. In addition to test data, demographic, biographic, and aptitude data were obtained from the Recruit Administrative Management System (RAMS). Performance data were obtained from Regimental archives.

Locus of Control Expectancies: Pre-Training Variables. The association of locus of control expectancies with demographic, aptitude, and personality variables was examined using correlational, causal-comparative analyses (Campbell & Stanley, 1963; Isaac & Michael, 1972). True experimental control was not possible for these analyses since the treatment (recruit training) could not be withheld, nor was pre-entry assessment feasible. A three-level classification of locus of control scores was created (external, mid-range, internal) relative to the overall frequency distribution. This tertile partitioning of scores was then used as a blocking factor in analyses that compared the locus of control groups on various pre-training dimensions.

Locus of Control Expectancies and Training Outcomes. The structure of the military training organization lends itself to controlled experimentation. Since recruits arrive at the training site in an apparently random manner (day and time of arrival is determined at a local level), are assigned to platoons on the basis of time of arrival, and have no opportunity to choose their platoon, one can reasonably assume randomization in assignment to

training units. Furthermore, our previous research has found no significant differences on any demographic or aptitude measure for the training unit classifications (ATTRITVAR) in the cohort under study (Novaco et al., 1979). Locus of control expectancies (internal, mid-range, and external) were examined for the effects on completion of training (graduated/discharged) in a cross-tabulation design, and analysis of variance designs were used to investigate group differences in performance attainments.

Training Unit Effects on Expectancy Change. Following our previous research, we investigated training unit effects in terms of the classification of platoons according to a three-level factor (low, medium, high) based on attrition rates (ATTRITVAR). Interactions of ATTRITVAR with initial locus of control were examined in analysis of variance designs in which the locus of control variable was constructed as a two-level factor (internal/external) so as to insure adequate cell sizes. Additional blocking factors (life experiences variables) were incorporated into the design in subsidiary analyses aimed at clarifying the obtained results on expectancy changes.

Measures

The Locus of Control Scale (Nowicki & Strickland, 1973), as modified for adult populations, was used to assess generalized expectancies for control of reinforcement. This instrument was selected for its relative simplicity and documented validity and reliability with age and educational levels similar to the recruit population under study. This measure is thought to be particularly suitable in that the content appears to be related to the specific demands of the recruit training environment; these being (1) success-achievement orientation, (2) degree of personal responsibility for problems, (3) degree of personal responsibility regarding health, and (4) relations with powerful, significant others.

In the present study, locus of control expectancies were computed such that scores reflect the relative internality of subjects. For the pre-training sample, the obtained values for locus of control scores ($\bar{X} = 26.84$, $SD = 5.06$) are not significantly different from those reported by Nowicki and Strickland (1973) for male high school students. The demographic, aptitude, personality, and performance measures assessed in conjunction with locus of control have been described previously (Novaco et al., 1979). In addition, recruits were asked to evaluate the overall quality of their home life and their school experiences on five-point scales ranging from "good" to "terrible." Tertile partitionings of the distribution of these scores were used as blocking factors in analyses of life experiences.

Procedure

Testing was conducted in groups of approximately 50-90 recruits in large, open type classrooms, between the hours of 6 and 9 PM. All initial testing (Time 1) was completed on the day following arrival at the recruit depot. Sample recruits were not informed of their selection prior to entering the testing area. Marine supervisory personnel who delivered the recruits to the designated area were generally informed of the purpose of the research and then asked to depart for the duration of the testing period. It was agreed upon between the research staff and the Marine command that all testing would be controlled and supervised by the research team and that individual participation would be entirely voluntary. It was explained that results of individual protocols would be seen only by research staff and that the decision not to participate would in no way reflect on their evaluation as a recruit or become a part of their official record. Recruits were instructed that they could choose to participate in any or all of the testing. Those who chose not to participate were asked to sit quietly and either read or

rest. Approximately 93% of the sample chose to complete the entire test battery. Participants were given a consent form which they were asked to read along with the administrator and then sign if they agreed to participate.

A repeated testing was conducted just prior to graduation (Time 2). It was not practical, for administrative reasons, to retest all recruits. Of the 556 recruits who completed the pretest Locus of Control Scale, 254 were available for retesting. This subset of recruits was not found to be significantly different from the unselected ones on any demographic, aptitude, or personality pretraining measures, including, of course, initial locus of control.

In addition to those tested at the two time points (N=254), 149 recruits from the same monthly cohort, who were not included in the test sample, were administered the locus of control measure at Time 2, as a comparison group to check for the effects of repeated testing and selection bias. There were no significant differences between the test-retest group ($\bar{X} = 28.52$, $SD = 5.24$) and the retest-only group ($\bar{X} = 28.41$, $SD = 4.80$) on Time 2 locus of control scores.

Results

LOCUS OF CONTROL EXPECTANCIES AND PRE-TRAINING FACTORS

Education and Aptitude. The partitioning of locus of control scores according to educational attainment is presented in Table 1. There is a significant linear relationship ($p < .005$) between internal orientation and educational level. Recruits are more internal the more formal education they have attained.

Locus of control is significantly correlated with standard military measures of intelligence and aptitude, these being the Armed Forces Qualification Test (AFQT) and the subscales of the Armed Services Vocational Aptitude

Table 1

Initial Locus of Control Scores According to
Educational Level

Educational Level	N	M	SD
College Graduate	2	30.00	2.83
Some College	65	28.51	5.51
High School Graduate	267	27.34	4.66
Voc. School Graduate	12	26.92	5.66
H.S. Equivalency Test	39	26.15	4.99
Non H.S. Graduate	166	25.68	5.38
Sample Total	551	26.85	5.09

Note. The ANOVA test of the groups effect is significant,
 $F(5,545) = 3.41, p < .005.$

Battery (ASVAB). Significant positive correlations ($p < .01$) were obtained between locus of control scores and each of these measures, the strongest association occurring with the ASVAB Word Knowledge subscale ($r = .28$).

The relationship between locus of control expectancies and cognitive-intellectual functions was further assessed with regard to problem solving abilities, using a modification of the MEPS (Means-Ends Problem-Solving) procedure (Spivack, Platt, & Shure, 1976). Recruits were asked to formulate personal strategies related to six hypothetical problem situations pertaining to recruit training. The beginning and end of scenarios were provided, and recruits were to provide functional strategies for achieving the story ending. Each strategy judged as relevant and instrumental was scored as 1 and scores were added across stories. As shown in Table 2, scores for "relevant means" vary significantly ($p < .001$) as a function of locus of control. The ability to detect means-ends relationships in the hypothetical problem scenarios increases in a linear fashion with increases in internality.

Background and Demographic Factors. One-way analyses of variance (ANOVAs) were performed on selected biographic, demographic, and physical characteristic variables according to locus of control scores. Locus of control was not significantly related to age, race, size of hometown, sibling position or number of siblings in the family. A significant relationship was found, however, in parents' marital status. Recruits from intact families (62%) were more internal than those from families where the parents were divorced or separated, $F(1, 545) = 7.13, p < .008$.

Physical Attributes. Internals are on the average taller and heavier than externals at the beginning of training. The effects for weight are statistically significant ($p < .005$), and the group means are presented in Table 3. We have previously found (Novaco et al., 1979) that weight is

Table 2

Total Number of Relevant Means Recorded on Problem Solving Task
According to Locus of Control Category

Locus of Control	N	M	SD
External	128	5.47	3.37
Mid-Range	144	6.31	3.09
Internal	131	7.26	3.17

Note. The ANOVA test of group means is significant, $F(2,400) = 10.13$,
 $p < .001$.

Table 3

Pre-Training Weight According to Locus of Control

Locus of Control	N	M	SD
External	157	150.41	20.73
Mid-Range	183	151.70	23.88
Internal	167	157.90	22.30
Total	507	153.35	22.61

Note. The ANOVA test of group means is significant, $F(2,504) p < .005$

negatively associated with success in recruit training. Therefore, the finding that internal locus is positively associated with success (see below) is not an artifact of weight.

Life Experiences. Pre-training locus of control expectancies were examined for their relationship to life experiences by correlation with the various LES indices and by analysis of variance performed on the grouping of recruits according to the completion or noncompletion of high school. Consistent with our hypotheses, locus of control (internality) was negatively correlated with negative life experiences (LES) and with the quality of home life and school life and positively correlated with positive life experiences (LES). These correlations are small and are presented in Table 4. Significant differences were obtained in the ANOVA performed on high school completion, $F(1, 549) = 14.50, p < .0001$, as those completing high school ($\bar{X} = 27.50$) are more internal than those who have not completed high school ($\bar{X} = 25.83$). Significant differences were also found for quality of home life, $F(2, 544) = 5.90, p < .003$, and school experiences, $F(2, 544) = 11.11, p < .0001$. The judgment of these life domains as negative was associated with lower (more external) locus of control scores.

Pre-Training Personality Variables. The self-reported attitudes, expectations, and appraisals contained on the 100-item Recruit Attitude Survey (RAS) were analyzed for their association with locus of control. Table 5 contains items having correlation coefficients that are significant beyond $p < .002$. Fifteen of the 17 coefficients are negative, indicating that high agreement with the statement is associated with externality. In most instances, the item content is reflective of self-reported maladjustment. The pattern of correlations suggests a relationship between external locus of control and negative perceptions of self prior to training.

Table 4
Intercorrelation of Initial Locus of Control
and Life Experience Variables

	LES Good Events	LES G.E. Impact	LES Bad Events	LES B.E. Impact	(-) Quality Home Life	(-) Quality School Life
Locus of Control	.087	.105	-.093	-.112	-.108	-.186
LES Good Events		.864	.284	.190	.044	.057
LES Good Event Impact			.233	.210	.057	.027
LES Bad Events				.916	.142	.200
LES Bad Event Impact					.155	.173
Quality of Home Life						.293

Note. The LES indices are those from the Life Experiences Survey of Sarason, Johnson, & Siegel (1978).
The home life and school life indices were scored on five-point scales such that increases in value reflected more negative experiences.

Table 5

Correlations between Initial Locus of Control
(Degree of Internality) and Self-Reported Cognitions

Item	N	Correlation with Locus of Control
Sometimes I feel like hurting myself.	390	-.334
Up until now, my life has been a mess.	404	-.291
I don't know if I can make it through life.	406	-.289
I have trouble reading.	396	-.285
I wish my life had been different.	375	-.284
People of certain races make better Marines than others.	410	-.262
I think school is a waste of time.	388	-.236
I wish I hadn't joined the Marines.	411	-.219
My family and friends wouldn't care if I don't make it through training.	408	-.215
I think I am pretty smart.	410	-.208
I have been called a loser or quitter a lot.	411	-.201
I don't get along with many people.	410	-.200
I have trouble understanding what I am expected to do.	406	-.191
I don't like to be a failure.	410	.188
I often cry when under pressure.	398	-.184
I am a happy person.	405	.163
I don't like to be asked personal questions.	408	-.143

Note. All correlations are significant beyond $p < .002$.

The relationship between locus of control expectancies and three other personality measures (anxiety, sensation seeking, and anger) is presented in Table 6. For each of these measures, externals have the lowest mean score. The strongest association ($r = .38$) was obtained for test anxiety, as internals are significantly more anxious about test situations.

GENERALIZED EXPECTANCIES AND SUCCESS IN RECRUIT TRAINING

All recruits in the test sample were tracked to either graduation or discharge, and this outcome was crosstabulated with the three level locus of control factor. The attrition rates were 17% for externals, 13% for mid-range, and 7% for internals. These differences are statistically significant, $\chi^2(2) = 7.49$, $p < .05$, indicating that the internals have higher success rates.

The above findings confirm the hypothesis that internal locus of control would be significantly associated with successful completion of training. As a further test of that hypothesis, the locus of control scores were analyzed according to attrition categories (medical/erroneous enlistment, psychological/behavioral, and other). Recruits who attrited for psychological/behavioral reasons were significantly more external in their beliefs, $F(2, 70) = 3.56$, $p < .02$.

It was also hypothesized that initial locus of control would be significantly related to performance achievements. This was tested by analyses of variance for the set of standard performance measures (marksmanship, physical fitness, oral test, and written test) and our set of drill instructor ratings (motivation, intelligence, cooperation, and overall performance). For all variables, the performance scores of internals were higher than those for externals, although the differences between means are small. With regard to the standard training measures, only the effect for oral test (internals = 96.77 vs. externals = 95.71) was statistically significant, $F(1, 410) = 6.25$, $p < .01$. For the drill instructor ratings, only the effects for the ratings of intelligence were statistically significant, $F(1, 385) = 3.80$, $p < .05$. Since

Table 6

Locus of Control According to Selected Personality Dimensions

Locus of Control	Test Anxiety	Sensation-Seeking	Anger Provocation
External	10.85 (5.64)	10.53 (3.31)	264.89 (57.63)
Mid-Range	13.00 (5.26)	11.36 (3.86)	288.03 (38.60)
Internal	15.63 (5.01)	11.83 (3.34)	277.22 (41.72)

Note. The ANOVA tests of group means are significant for test anxiety ($p < .001$), Sensation-Seeking ($p < .02$) and Anger Provocation ($p < .005$). The standard deviations are given in parentheses.

it is plausible that these effects for locus of control are a function of education, an analysis of covariance was performed for educational level. The results of this analysis found that the effects for locus of control were basically unchanged and are therefore not an artifact of education. While these results do support our hypothesis of higher performance for internals, the magnitude of the differences between internal and external group means is quite small.

EXPECTANCY SHIFTS AND THE TRAINING ENVIRONMENT

Across all recruits, locus of control scores increased (became more internal) over the training cycle. The differences between T_1 ($\bar{X} = 27.27$) and T_2 (28.52) are small but statistically significant, $t = 3.78$, $p < .001$.

While this slight change in generalized expectancies occurred for recruits aggregated as a whole, our specific hypothesis was that expectancy shifts would vary as a function of training units classified according to their attrition rate (ATTRITVAR). Prior to the testing of the predicted expectancy shifts, the ATTRITVAR groups were examined for the equivalence on initial locus of control scores. The respective means are 26.83, 26.77, and 26.86 for the low, middle, and high ATTRITVAR groups, showing there to be no differences in initial locus of control. Since the training unit groups are equivalent in initial expectancy score, the analysis of ATTRITVAR effects was performed with initial locus of control (internal/external) as an additional blocking factor.

The expectancy shift means for this two-way classification analysis are presented in Table 7. The initial locus of control main effect is significant, $F(2, 247) = 39.70$, $p < .001$, and that for ATTRITVAR is also significant, $F(1, 247) = 5.35$, $p < .005$, but their interaction was not significant. These analyses and inspection of the means shows that change in locus of control

Table 7

Expectancy Shifts as a Function of Pre-Training Expectancies
and Training Unit Environments

Initial Locus of Control	Training Unit Environment		
	Low Attrition	Medium Attrition	High Attrition
External	3.37 (4.79)	4.20 (5.52)	0.27 (8.08)
Internal	-0.26 (3.75)	-0.22 (3.30)	-2.83 (7.12)

Note. The ANOVA tests are significant for both the locus of control ($p < .0001$) and the training unit ($p < .005$) main effects. The interaction is not significant.

during training is a function of locus of control at time of entry and of the platoon to which the recruit is assigned. Those recruits who are external at time of entry and who are assigned to platoons later found to have low to moderate attrition rates change significantly in the internal direction. In contrast, those recruits with similar orientations but who are assigned to high ATTRITVAR platoons, display little change, persisting in their external beliefs. Of particular interest are those recruits who begin training with an internal orientation and are assigned to high ATTRITVAR platoons. They display a marked shift in an external direction. This is in contrast to those internal locus recruits assigned to low or moderate ATTRITVAR units. These recruits show little change. Because of the variation that occurs across levels of ATTRITVAR, the finding that certain groups of externals become more internal (and conversely) cannot be attributed to regression to the mean.

In order to elucidate the expectancy shift findings, analyses were conducted on the possible role of life experiences. In view of our findings that (1) recruits who are external at the start of training have experienced more negative life experiences than have internals (negative life events → external locus) and that (2) recruits become more internal as a function of training (training → internal locus) particularly externals in low and moderate ATTRITVAR units, we then predicted that locus of control changes would be linked to negative life experiences. This follows from our view that reward control contingencies can be relearned in the training environment. Specifically, it was hypothesized that the greatest change toward internal locus of control would occur for recruits who were relatively high on negative life experiences, were initially external, and were in low and moderate ATTRITVAR groups.

This prediction involves the testing of a triple interaction which could not be performed because of inadequate cell sizes and because our measures of

life experiences and initial locus of control are not orthogonal. Therefore, locus of control was ignored as a blocking factor, and an ANOVA was performed on the ATTRITVAR groupings crossed with classifications of the life experience variables.

For the LES indices, the expected interaction was not significant, although the means are in the predicted direction. Another way of examining this hypothesized relationship between locus of control expectancy change, training environment, and life experiences was attempted by classifying recruits according to their direction of change and then analyzing for differences in negative life experiences. Thus, recruits were grouped as (1) changed in the external direction, (2) no change, or (3) changed in the internal direction. These groupings were crossed with ATTRITVAR, and the results were that no interaction occurred but that there was a significant effect, $F(2, 193) = 3.60$, $p < .03$, for the direction of change grouping with regard to number of negative life events. The group means are 4.70, 4.89, and 6.43 for external change, no change, and internal change, respectively. A similar relationship obtains for the subjective evaluation of the impact of these events (negative points), for which the respective means are 8.90, 10.63, and 12.84, and these differences are also significant, $F(2, 193) = 3.34$, $p < .04$. While these analyses do show a relationship between locus of control change and negative life experiences, the analyses are postdictive in nature.

The changes in locus of control expectancies were also examined with regard to the completion or noncompletion of high school. The logic here is that the failure to graduate high school may shape external locus expectancies which in turn might be modified by successful completion of recruit training. In a two-way ANOVA (high school x ATTRITVAR) for locus of control change the main effects for high school, $F(1, 246) = 8.24$, $p < .005$, and for ATTRITVAR,

$F(2, 246) = 3.81$, $p < .03$, are both significant, but there are no significant interactions. The relationship between high school graduation, initial locus of control, and ATTRITVAR upon changes in locus of control is shown in Figure 1. It can be seen that the greatest change in general and toward internal locus in particular occurs for those recruits who have not completed high school, who are initially external, and who are in low and moderate ATTRITVAR units. Virtually no change is shown by internals who are non-high school graduates, except of course in the high ATTRITVAR group where they become more external. Thus, the high school completion analyses sharpen our understanding of the general findings concerning locus of control shifts.

A further analysis of the expectancy change effects was conducted with regard to recruits' evaluations of the quality of their school experiences and their home life. Each of these variables was categorized as a three-level factor (good, fair, poor) and was crossed with initial locus of control and ATTRITVAR as blocking factors. The means for the various groupings are contained in Table 8. It can be seen that those recruits who change the most in the internal direction are those who are external, who judged themselves to have had poor school experiences and poor home experiences, and who are in the low and moderate ATTRITVAR groups. The three-way interaction is significant, $F(4, 232) = 3.08$, $p < .02$, for the home life factors.

The impact of life experiences as indexed by parents' marital status was also examined. No significant differences in expectancy change resulted for this factor either as a main effect or in interaction with ATTRITVAR.

Discussion

Our findings illustrate the dynamic interrelationships between the environment, cognition, and behavior. Locus of control expectancies are associated with background life experiences and differentially affect success

Figure 1

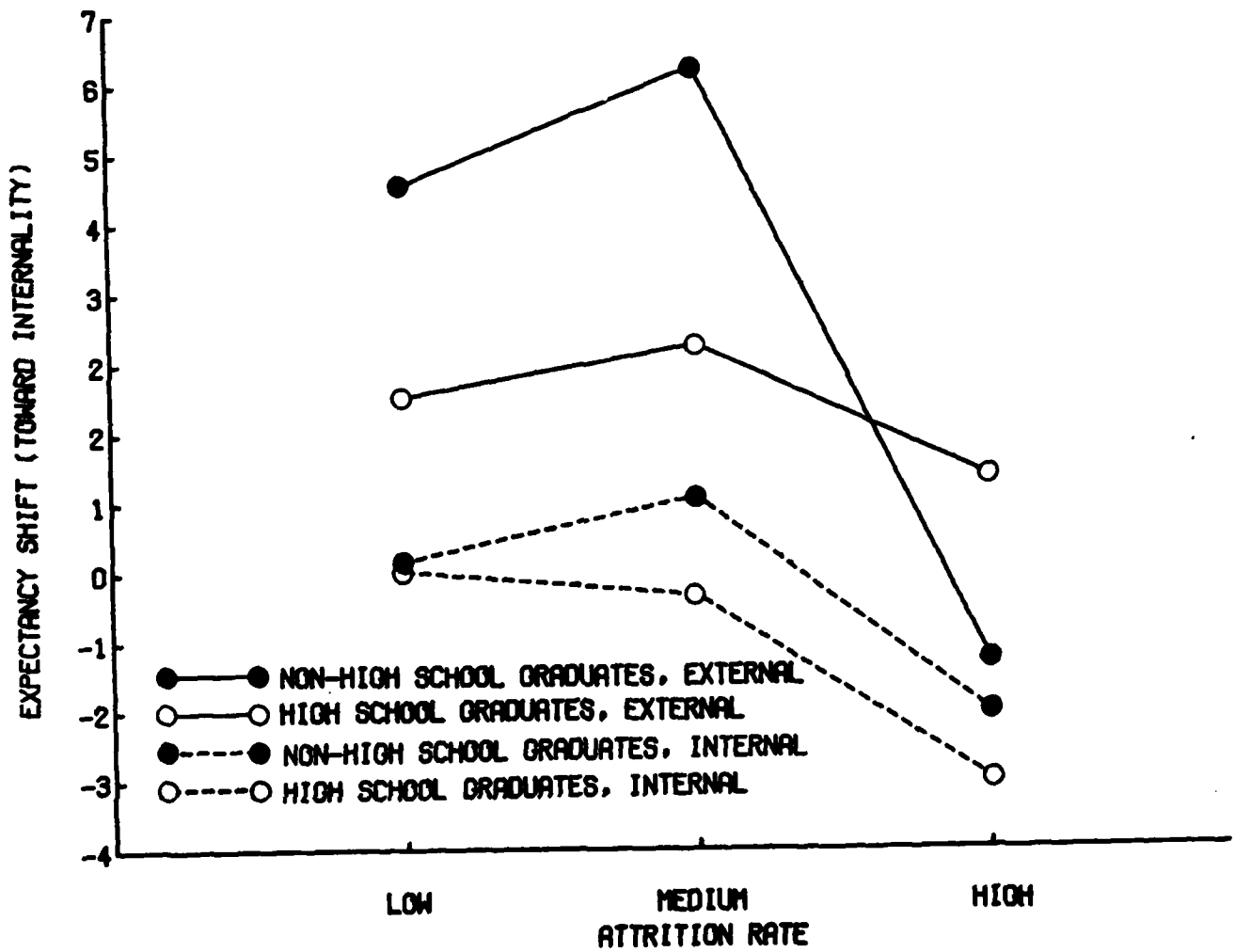


Table 8

Expectancy Changes as a Function of Initial Locus of Control,
Training Unit (ATTRITVAR), and Judged Quality of
School and Home Life

Groups	School Life			Home Life		
	good	fair	poor	good	fair	poor
<u>Externals</u>						
Low ATTRITVAR	2.36 (14)	2.75 (24)	4.52 (25)	2.74 (35)	4.20 (15)	4.08 (13)
Medium ATTRITVAR	4.25 (8)	4.00 (17)	4.64 (14)	3.07 (15)	4.36 (14)	6.00 (10)
High ATTRITVAR	2.00 (2)	-1.40 (5)	.88 (8)	3.75 (4)	-7.00 (2)	.33 (9)
<u>Internals</u>						
Low ATTRITVAR	.32 (25)	-.80 (25)	-.33 (18)	-.33 (30)	-.64 (25)	-.92 (13)
Medium ATTRITVAR	-.19 (16)	-.16 (19)	-.14 (14)	-.25 (28)	.40 (15)	-1.29 (7)
High ATTRITVAR	-2.33 (3)	-5.00 (9)	1.75 (4)	-4.43 (7)	1.00 (5)	-5.67 (3)

Note. The numbers in parentheses refer to the cell sizes resulting from the partitioning of subjects.

in training, particularly with regard to attrition. The training environment, in turn, induces changes in locus of control expectancies, particularly for certain combinations of life experiences, initial expectancies for control, and training unit types.

All of our hypotheses were confirmed, although with varying degrees of support. The prediction that locus of control expectancies would be related to life experiences received the most consistent support across dependent measures. External control expectations were consistently associated with reports of negative life experiences as measured by the LES indices and the ratings of home life and school life. These findings for subjective judgments were corroborated by similar effects for the failure to complete high school and for parents' marital status. External control expectations were also associated with attitudes about the self that reflect maladjustment and unhappiness in personal history.

The hypothesis that recruits with an internal locus would do significantly better in training was supported by the findings for attrition rates and by two performance measures (oral and drill instructor ratings of intelligence). The degree of statistical significance ($p < .05$) obtained for the attrition rate differences was not always strong in magnitude, but it must be recognized that this is a direct function of the low base rates for attrition (12%). Since 88% of all recruits do not attrite, it is very unlikely that one could obtain a highly significant chi-square value in testing for the attrition effects of locus of control or other person variables. However, it is noteworthy that the attrition rate differences, 17% for externals versus 7% for internals, are indeed sizeable.

The hypothesis concerning differential training success as a function of locus of control included predictions about performance achievements. Although the group means were all in the predicted direction, only two were statistically significant. There are several possible reasons for this failure to find the predicted effects. One is that externals have a higher attrition rate than internals. Assuming that those who attrite would perform poorly, the performance scores for externals are correspondingly elevated. Another reason is that there is little variation in the performance measures because of the effectiveness of training. Recruit training is a highly successful process which overshadows the effect of generalized expectations on the performance measures.

A third possibility is that locus of control expectancies change over the course of training, such that the initial internal/external groupings are no longer valid at the point when performance is being measured, which occurs at the end of the training cycle. The prediction was that internals would have higher performance scores because experimental studies have shown that when faced with a task on which outcome is dependent on skill, internals exhibit higher performance than do externals. However, since locus of control expectancies change during training, the internal/external classifications based on pre-training measurement may not be appropriate for testing the hypothesis. Therefore, an analysis of the performance measures was conducted using the locus of control scores at graduation as the basis for the internal/external classifications. The results were that the effects for the oral test are quite strong ($p < .0004$) and those for the written test approach significance ($p < .06$). There are no significant differences between internal and external groupings for either the drill instructor ratings or for physical fitness test. No effects obtained for marksmanship either, but that performance test is conducted midway through training.

A fourth possibility is that locus of control is not related to performance on certain of our measures. While the hypothesis concerning the better performance of internals may be true for cognitive tasks, it may not be true for physical endurance tasks like PFT or psychomotor tasks like marksmanship. Furthermore, internality-externality may have no consistent relationship to the classes of behavior or behavioral qualities to which drill instructors attend when they subjectively evaluate recruits.

Locus of control was found to be significantly related to attrition, but its predictive utility is rather small. For example, if locus of control is combined with aptitude measures and age in a multiple regression equation, this set of variables accounts for less than 3% of the total variation in attrition in our cohort sample, and locus of control is the best single predictor. For reasons that we have discussed previously (Novaco et al., 1979), attempts to predict attrition by *multiple regression analyses of pre-training person variables alone* may be exercises in futility. If one has the task of predicting which of 100 recruits will successfully complete training, the best course of action is to predict that they will all succeed - and in doing so you will be correct on the average for 88 of those recruits.

The assumed goal of attrition prediction is attrition reduction, and the findings of our research point to the central role of training process variables, rather than to personality profiles. Whether a recruit attrites and how he performs is a product of the interplay between person variables and environment variables. Our previous findings on the sizable variations in training unit outcomes indicate that the environment of the training unit merits considerable attention.

The most important findings of the study pertain to changes in locus of control over the training cycle. Following our previous research, and our logic about the formation of locus of control expectancies we hypothesized

that changes in generalized expectancies would occur and would be a function of ATTRITVAR training units. This hypothesis was confirmed, as it was found that change in the internal direction occurred in the low and middle ATTRITVAR condition. These effects were clarified by the inclusion of initial expectancy level in the analyses, which showed that it was the initially external recruits who became more internal in the low and middle ATTRITVAR groups and the initial internal recruits who became more external in the high ATTRITVAR group. Because of the variation in change across ATTRITVAR conditions, the obtained effects are clearly not effects of regression to the mean.

The ATTRITVAR classification of training units was constructed as a way to operationalize the as yet unspecified dimensions of training environments that result in attrition and associated psychological stress. The investigation of locus of control changes was intended to illuminate the nature of the ATTRITVAR conditions. Since locus of control expectancies are theoretically acquired by the learning of reward control contingencies, it is here suggested that the reinforcement contingencies of low and middle ATTRITVAR training units encourage the belief that successful outcomes result from skill and effort, while those of high ATTRITVAR units are more likely to shape the belief that powerful others, luck, fate, or chance control reinforcing outcomes.

In order to determine more accurately which recruits are most affected by the training environment influences on locus of control expectancies, we conducted subsidiary analyses on expectancy shifts with regard to pre-training life experience variables. It was found that those recruits who changed in the internal direction had experienced the greatest number of negative life events and negative impact from them, as measured by the Life Experiences Survey. This postdictive analysis was then corroborated by

findings with regard to our other measures of life experiences. Recruits who rate their home life and school experiences in a negative direction or who have failed to complete high school become significantly more internal when trained in low and middle ATTRITVAR units. Parallel findings did not obtain for having divorced or separated parents.

To the extent that internal locus of control beliefs have adaptive value, our findings suggest that certain recruits may profit in a particular way from their training experiences. Recruits who have had negative or failure experiences in life may develop the belief that success results from one's efforts when they are trained in units whose reward contingencies are favorable to the formation of internal locus expectancies. Conversely, we have also found that training environments that are characterized by high attrition may induce recruits to expect that rewards are controlled by forces outside of one's control.

The generalized expectancy for control over reinforcement has been one of the most frequently studied factors in the area of personality and social psychology. The present study has found that locus of control expectancies are associated with certain background experiences, intellectual aptitude, physical characteristics, self-reported maladjustment, and other personality measures of anxiety, sensation seeking, and anger.

The set of findings concerning the self-report of emotion and self-perceptions, juxtaposed with the findings on attrition, lead to no clear conclusion. Externals were found to have lower scores on the anxiety, anger, and sensation seeking measures yet they are more inclined to endorse statements about themselves that reflect negative self-perceptions. Perhaps externals at the start of training deny their emotions and this denial, combined with negative self-perceptions and the belief that success does not result from

one's efforts, has some link to training failure. Successful adaptation may require the accurate perception of feelings along with the enactment of behavior that is grounded in positive beliefs about personal efficacy.

The present findings offer some clues about the variations in training unit environments in terms of the induced changes in the cognitions of recruits. However, we have here studied expectancy changes as indexed by locus of control scores, and these scores are summary measures. The question remains as to the precise nature of the expectancy change with regard to the particular items on the scale. We are presently conducting that analysis. We are also engaged in efforts to understand the social environment of training units in a more comprehensive manner.

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