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THE CURRENT STATUS OF ENLISTED ATTRITION IN THE U.S. NAVY AND IN THE U.S. MARINE CORPS AND THE SEARCH FOR REMEDIES

BARRY E. GOODSTADT

ALBERT S. GLICKMAN

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November 1975

This report was prepared under the Navy All-Volunteer Force Manpower R&D Program and monitored by the Organizational Effectiveness Research Programs, Psychological Sciences Division, Office of Naval Research, under contract No. N00014-76-C-0266.

Principal Investigator: Barry E. Goodstadt

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Enlisted attrition has recently emerged as a significant manpower problem confronting the All-Volunteer Force. The aim of this project was to refine current understanding of attrition phenomenon and to develop recommendations for a program of policy-relevant research in the area. To meet these objectives, (1) a review was conducted of available military manpower data on attrition, (2) relevant civilian data on occupational/interfirm mobility and educational dropout rates was examined and (3) a critical analysis of ongoing and planned research (continued)

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by military laboratories and centers was undertaken. Preliminary findings of these efforts were fed back to relevant Navy and Marine decision-makers to obtain their comments and inputs.

As a result of this work, a series of research recommendations were offered. Recommendations focused on: 1) the need to identify organizational policies and conditions that lead to attrition, 2) the need to examine the personal and organizational consequences (i.e. cost/benefits) of attrition, and 3) the need to identify mechanisms to more effectively manage attrition.

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INTRODUCTION

With the implementation of an All-Volunteer Force came the recognition that the flow of recruits into the military services was no longer guaranteed by the pressure of the draft. Accordingly, the Navy and Marines invested heavily in systems designed to recruit enlisted personnel, to provide them with adequate skills, and through innovative incentives, to sustain their work interest and motivation to remain in the organization.

At an early stage of AVF, a manpower crisis was anticipated with projections of shortfalls in recruiting and less than adequate reenlistment rates. Since those early days, however, the priorities accorded various manpower problems have changed somewhat, with new problems emerging on the heels of what seemed, at first, to be a good solution.

Thus, as the services pause to assess the return on their investments in recruiting and training, they find that about one-third of Navy and Marine enlistees never complete their active duty obligated service, either because of actions taken at their "own initiative" or at the initiative of the service. Such attrition represents direct costs of considerable financial magnitude and irrecoverable opportunities for both the services and the individuals involved. Furthermore, it is apparent that attrition is a symptom of deeper organization problems that, in themselves, have consequences for *all* enlisted personnel, including those who are retained in the organization.

Attrition has always been a part of the military's manpower picture, but until recently, it has not received much attention from planners and policymakers. However, given increasing personnel costs and rising attrition rates, policymakers in the Department of Defense and the Navy Department have begun to recognize the organizational need to examine such losses and to develop mechanisms for controlling attrition-induced costs. Impetus underlying the need to examine attrition also stems from broader societal concerns and perspectives. Thus, Representative Les Aspin, of the House Armed Services Committee, recently voiced concern regarding some of the social and personal costs accompanying attrition,* focusing particular attention on the rising number and rate of "bad" discharges. He pointed out that, "the problem is that a sincere volunteer who is drummed out with a less than honorable discharge is marked for life." Furthermore, he speculated that, "it will become increasingly difficult to recruit an all-volunteer force, if young men and women realize that their chances for being stigmatized for life by this bad discharge are growing every year." This suggests that social costs to individual dischargees may ultimately revisit the organization in terms of lessened recruiting potential.

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*Press release dated 15 October 1975.

While there is growing concern with attrition and its consequences, it is also apparent that there are currently large gaps in our understanding of the underlying organizational conditions that affect attrition. If attrition and its adverse consequences are to be successfully managed, these information gaps need to be filled.

As a first step in bridging this knowledge gap, the American Institutes for Research, under the auspices of the Office of Naval Research, undertook an intensive, short-term effort (of 45 days duration) to review the issues and information available regarding personnel attrition and to attempt an integrated statement of current and planned research in the area. A major outcome of this work is to develop programmatic recommendations for problem-oriented research on attrition to aid in research planning. This report will serve to document the results of this review and to describe research recommendations.

Objectives of the Effort

As part of the project, we sought to meet the following objectives:

1. To examine the current picture of Navy and Marine attrition.
2. To critically review and evaluate ongoing and planned research on attrition.
3. To develop recommendations for problem-oriented research.
4. To feed back the results of the review and recommendations to decision-makers.

It should be pointed out that the thrust of this effort was not to provide definitive answers regarding the determinants or consequences of attrition; rather it was an attempt to more clearly delineate policy-capturing questions that need to be asked by researchers to gain a better understanding of attrition and the techniques that may be useful for managing the process.

Examining the Current Picture of Attrition

To develop a picture of the current attrition patterns in the Navy and Marines, we met with a number of officials in the Bureau of Naval Personnel and in Marine Headquarters who are responsible for monitoring attrition and its impact on the manpower system. In BuPers, discussions were held with staff members in Pers 12 (Retention), Pers 21 (Loss planning) and Pers 3c (ADP liaison). These meetings provided us with some available data on attrition and enabled us to begin to identify current definitions accorded the problem,and the nature and extent of the problem as seen by key administrators. In addition, these discussions provided us with perspectives on the fit between attrition data and the loss planning process, and an overview of the impact of attrition on the manpower system. Finally, our meeting with the ADP liaison provided knowledge about the derivation and development of the attrition data base (i.e. the loss files) and the data elements of the system.

A second set of meetings were held with Marine Corps administrators in the Manpower Planning and Budgeting Branch and the Manpower Management Information Systems Branch. The focus of these meetings was on deriving a picture of attrition patterns in the Marines that have developed since the initiation of AVF. In addition, these meetings served to further distill our understanding of definitions accorded the phenomenon of attrition.

Finally, we visited with the staff of the Manpower Research and Data Analysis Center (MARDAC) to obtain an overview of attrition across the services and to gain a better understanding of MARDAC's data base and analytic capabilities.

As part of developing a picture of Navy and Marine attrition, one of our major aims was to attempt to examine military attrition in light of related phenomena (e.g., labor force turnover, educational dropouts) taking place in the civilian sector. To bring to bear relevant civilian perspectives, we reviewed research and data on labor force participation and occupational mobility. These materials enabled us to derive a picture of inter-firm shifts and job mobility rates of young people in the civilian labor force.

In addition, we focused attention on the literature concerned with dropouts from higher educational institutions. Toward this end, we contacted the National Center for Educational Statistics and the American Association of Community and Junior Colleges to obtain data concerned with dropout rates in two-year and four-year colleges and universities.

Attrition as Depicted in Available Manpower Data

Composition of the data bases. The attrition data bases compiled by various military agencies appear to have a similar genesis. That is, all of the data bases (BuPers, Marines, MARDAC, etc.) are initially established using background data and test scores gathered from the individual as he enters the service at AFEES. This information is turned over to the individual services, where it is merged with service-specific information (e.g., school/assignment guarantees, occupational speciality, etc.) and entered onto the Enlisted Master Tape. This latter tape (each service has its own tape) is updated on a continuing basis with new information as to the individual's status,accomplishments and location.

When an individual attrites, information concerning the separation (e.g., administratively-designated reasons for loss, last duty station, etc.) is combined with background data and test scores from the Enlisted Master Tape to form an extract (i.e. 120 columns of information as compared with 2300 columns of data from the entire Enlisted Master Tape) that serves as the principal data source on attrition--the loss files.

Given the critical role that the loss files play in research on attrition, the accuracy of the data contained in these files is most critical to the inferential veridicality of studies using such data. Issues related to the validity of data contained in the loss files will be examined later in this report.

Given the time-dependent nature of the attrition phenomenon, the ideal methodology for displaying attrition data requires a cohort-sequential or longitudinal approach. Time-series methodology makes it possible to track cohorts of entering recruits over the course of an enlistment and thereby provides a progressive picture of losses occurring at different points in time and attributable to different reasons. This sort of approach allows the investigator to identify key points in the enlistment cycle that appear to have the highest or most problematic kind of attrition and therefore serves as a useful tool for pinpointing problem areas for intensive investigation or for administrative action.

Tables 1 and 2 illustrate the time-dependent nature of attrition patterns for two Navy cohorts, each representing an accession group entering the service during a six-month block of time. Table 1 shows the attrition pattern for a cohort that enlisted between July and December, 1970, while Table 2 depicts attrition for a group of recruits entering the Navy between January and June 1971. Entries in the tables show the proportionate losses from the original entering cohorts at different points in time and as a function of different reasons.

The data shown in these tables represent unofficial information compiled by MARDAC, which currently has the capability for generating similar longitudinal data tables for different entering cohorts across the four services. The individual services do not, at the time of this investigation, have full-scale longitudinal data-generating capabilities, although the Navy and Marines are currently attempting to upgrade their capacities in this area.

Examination of Tables 1 and 2 (in conjunction with additional data too voluminous to report here) suggests a number of important attributes of current attrition patterns in the Navy. These include the following:

- The largest proportion of non-EAOS attrition occurs during the first two years of service.
- The bulk of attrition is administratively attributed to unsuitable behavior.
- The overall attrition rate in the Navy has increased over the last few years and is now projected to be 33-35%.

Losses during the first two years. From the tables one can readily see that most attrition occurs during the first two years of a four-year enlistment in the Navy. Thus, of the 28% attrition (losses of 10,089 people) reported for July-December 1970 cohort, four-fifths occurred during the initial twenty-four months of service. As shown in Table 2, approximately five-sixths of reported losses occurred during the first two years

TABLE 1

Attrition Rates for Navy Enlisted Personnel Accessed July-December 1970*

(35,994 Accessions)

Losses Through 30 June 1974

Administratively Designated	Percent of Accessions Lost (Months of Service at Separation) 0-3	4-6	7-12	13-24	25-36	37-48	TOTAL
Medical Disqualification	.14	.29	.74	.99	.66	.36	3.18
Dependency or Hardship	.05	.08	.34	.53	.36	.23	1.59
Death	.02	.01	.04	.09	.09	.01	.26
Entry into Officer Program	.00	.00	.02	.07	.04	.02	.15
Unsuitable Behavior	3.73	1.26	3.67	6.59	2.81	.97	19.03
Other Separation or Discharges	2.70	.10	.23	.43	.29	.07	3.82
Cum. Losses	6.64	8.38	13.42	22.12	26.35	28.03	
Number (Cumulative)	2,390	3,016	4,830	7,962	9,492	10,089	

*MARDAC data.

TABLE 2

Attrition Rates for Navy Enlisted Personnel Accessed January-June 1971*

(37,484 Accessions)

Losses Through 30 June 1974

Administratively Designated	Percent of Accessions Lost (Months of Service at Separation)						
	0-3	4-6	7-12	13-24	25-36	37-48	TOTAL
Medical Disqualification	.22	.31	.75	1.06	.73	.13	3.20
Dependency or Hardship	.04	.10	.26	.37	.35	.07	1.19
Death	.01	.02	.08	.13	.06	.01	.31
Entry into Officer Programs	.00	.00	.03	.08	.02	.00	.13
Unsuitable Behavior	4.89	1.86	5.00	6.96	2.88	.42	22.01
Other Separation or Discharges	2.85	.10	.26	.40	.22	.02	3.85
Cum. Losses	8.01	10.40	16.78	25.78	30.04	30.69	
Number (cumulative)	3,002	3,898	6,290	9,663	11,260	11,504	

*MARDAC data

in the enlistment cycle of a cohort that entered between January and June 1971.

Further examination of the loss patterns in these two tables suggests that there is a first spate of attrition occurring during recruit training (the first three months of service), which then tapers off to a relatively constant rate through the end of the second year of service.

Losses attributed to unsuitable behavior. Perhaps the largest category of attrition falls under the rubric of "unsuitable behavior." There are multiple behaviors that may be administratively characterized in these terms (see BuPers Instruction 1900.2H, 3 September 1974) and these range from involvement in discreditable civilian activities to inaptitude and shirking of military duties. Generally, such characterizations of an individual's behavior imply a motivational basis--the individual does not appear to be motivated in directions deemed organizationally appropriate. Given the wide range of behaviors and activities that may be subsumed under the heading of "unsuitable behavior," it is not too surprising that a substantial proportion of attrition is ascribed to this administrative category. Figure 1 shows the proportion of attrition due to "unsuitable behavior" for cohorts entering the Navy during different time periods. Roughly, three-fourths of all separations prior to the end of the individual's obligated active duty-service appear to fall into the category of "unsuitable behavior."

Rising attrition rates. During the last few years, the overall rate of Navy attrition has increased appreciably. Thus, total attrition rate from John Plag's 1960 cohort of entering sailors was 27% while the attrition rate of sailors entering the Navy as recently as 1970 was 28%. More recent experience in the All-Volunteer environment, however, has led Navy administrators to project a current attrition rate of anywhere from 33% to 35%, a proportional increase of approximately 25% from earlier figures. This condition appears to be reflected in attrition that takes place early in the enlistment cycle, particularly that occurring during the first six months of service. As shown in Figure 2, for example, attrition rates for

Entering Cohort	Attrition Due to To Unsuitable Behavior
JULY – DECEMBER,1970	69%
JANUARY – JUNE,1971	73%
JULY – DECEMBER,1971	69%
JANUARY – JUNE,1972	74%
JULY – DECEMBER,1972	78%

Figure 1. Percentage of 2-year attrition attributed to unsuitable behavior.*

*Derived from MARDAC data

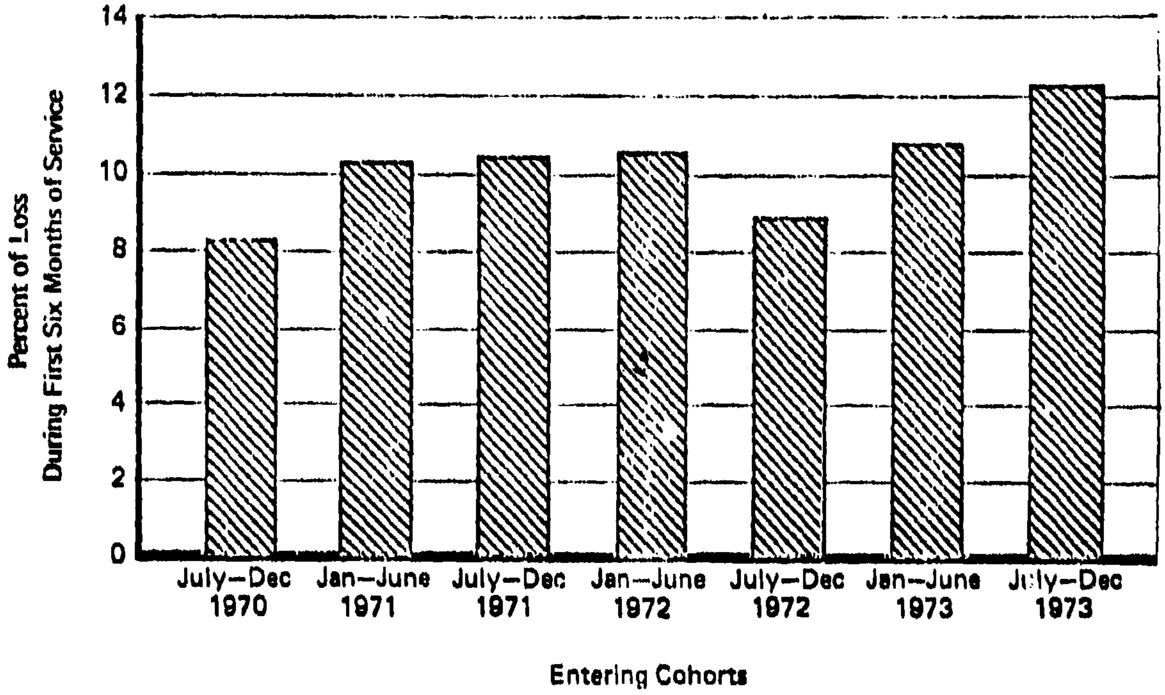

Figure 2. Rising Navy attrition.*

*Derived from MARDAC data

the first six months of Navy service rose from little more than 8% for a cohort entering in 1970 to just over 12% for a cohort that entered the Navy during the last half of 1973; an increase in the attrition rate of approximately one-half. Discussions with Marine Corps administrators suggest that a similar picture may be applied to early-service Marine losses, which have also increased over this period. These rising rates of attrition give impetus to research seeking a better understanding of the processes and conditions that induce attrition and have led to its recent increase. When we review current and planned research on attrition, we will examine the extent to which research illuminates the picture of these determinants and their changing impact.

Caveats regarding the validity of attrition data. Several notes of caution regarding the interpretation of attrition data (and the loss files in general) need to be considered. First, it must be recognized that the loss files were designed for administrative purposes and as such, may not meet the microanalytic needs of research that aims to find "causes" of attrition. Thus, the data that are found in the loss files, largely serve to document the occurrence of attrition in various subgroups and, as such, their primary utility lies in describing the general problem and perhaps calling attention to specific problem areas.

A second and related interpretative issue concerns an assumption built into the attrition data base--that the individual enlisted man is, himself, the primary cause of attrition. Little attention is given to organizational or policy conditions that may affect attrition. A schematic of the Navy's loss files shown in Figure 3 illustrates this point.

The current attrition data base contains characteristics of the individual at entry--his educational attainment, age, test scores, number of dependents, etc. It shows the attributes of separation--the designated administrative reasons for separation, the last permanent duty station, etc. Important to note is what the data base does not contain (see Figure 4). There is no data in the system concerning the organizational environment, leadership conditions, quality of working conditions, or the external socioeconomic environment. Consequently, the data that can be presented for policy decisions can only serve to perpetuate the belief

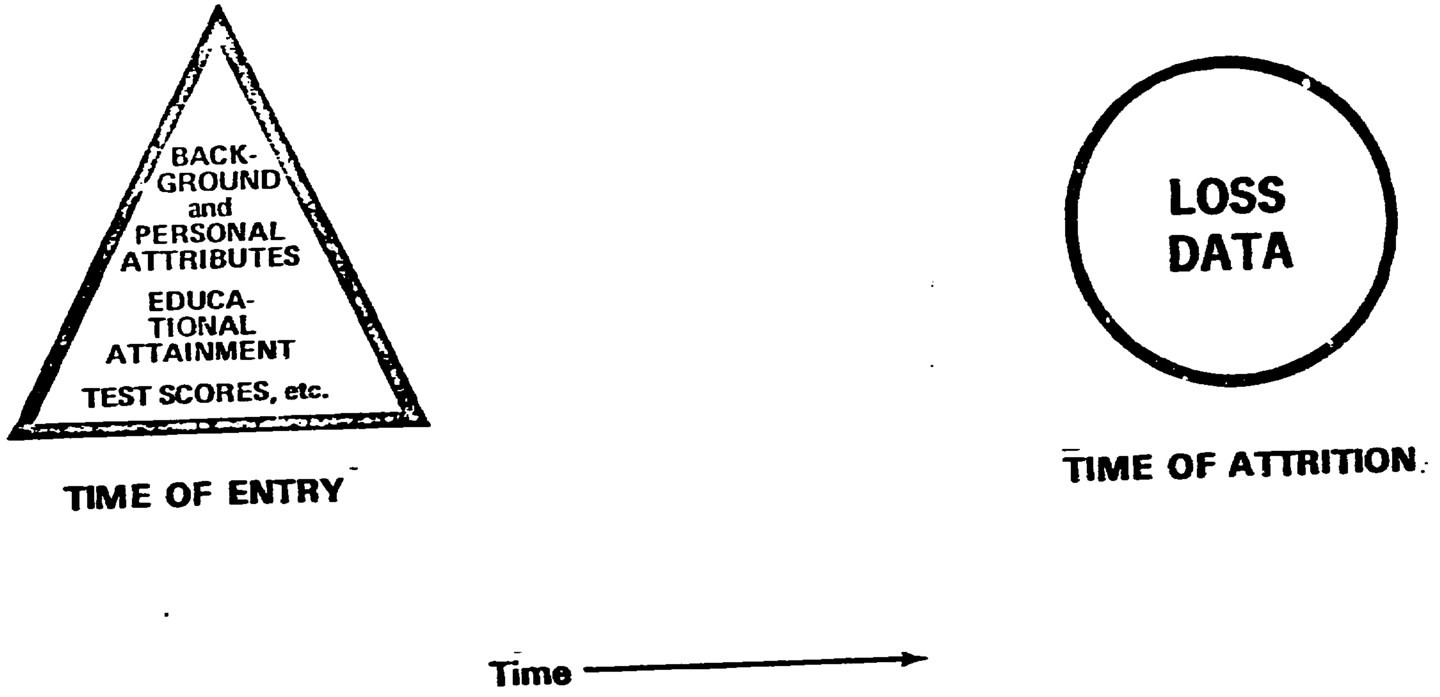
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Figure 3. Attrition models and data system

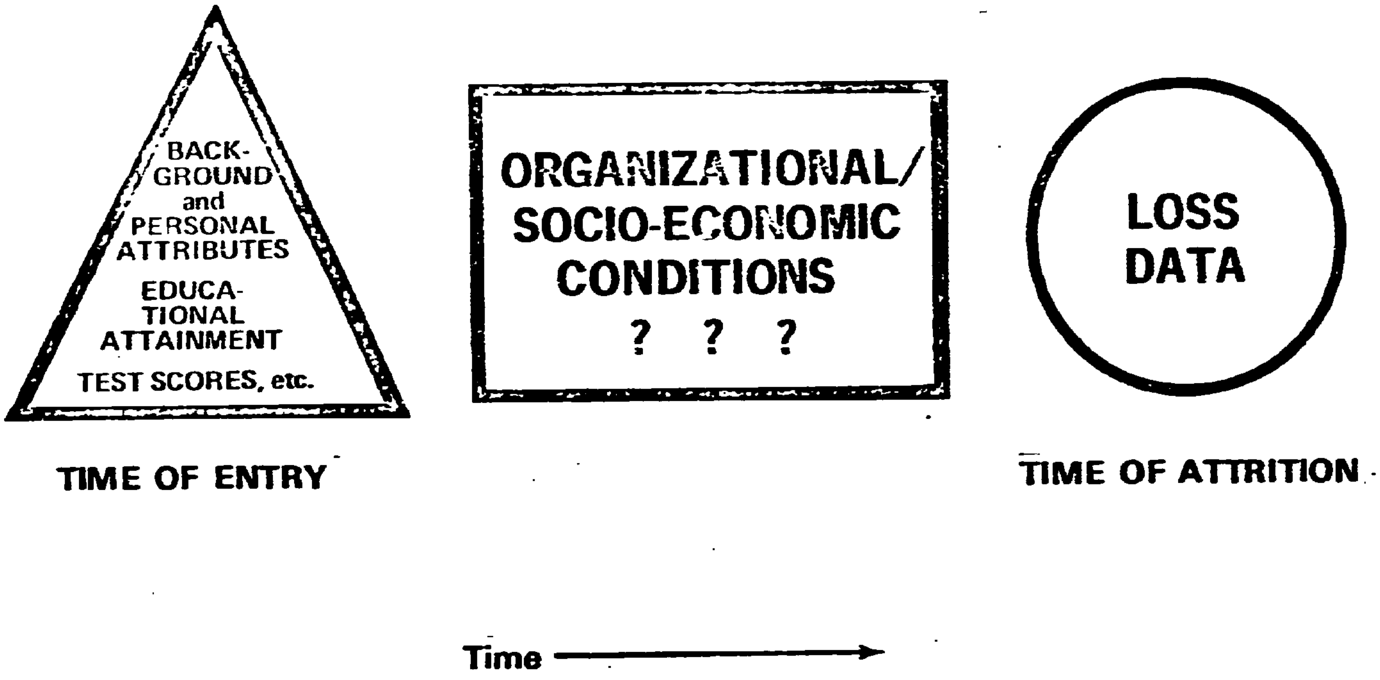
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Figure 4. Attrition models and data system.

that the cause (or blame) for attrition resides solely in the background and character of the enlisted man.

Because such restrictions are built into the data base, conceptual blinders are put on the search for determinants of attrition and the development of solutions for managing attrition phenomena. Furthermore, the nature of the available data imposes unrealistic limits upon revision of screening and accession policies, the most traditional means of managing attrition. In view of the nature of the data base, it is inevitable that one may only draw the conclusion that attrition is due to some screening error. Yet, the gaps in the data base do not permit us to evaluate alternative interpretations that rest upon effects of organizational policies and conditions or upon the outside socioeconomic environment (e.g., attrition may be increasing as a result of a reduction in societal sanctions associated with dishonorable discharges).

A third interpretative problem associated with loss file data relates to administratively designated reasons for attrition. It is evident that the administratively-defined reasons for separation may be interpreted and applied differently in different commands--perhaps they are even distorted to serve individual purposes. As evidence of this problem, we have been told (on an informal basis) that administrative reasons for separation appearing in loss files do not always coincide with summary descriptions presented in the same individual's personnel folder. This sort of interpretative variation suggests that a great deal of care needs to be exercised when analyzing and drawing inferences from loss data, since such data may not always provide a rigorous definition of the reasons underlying attrition.

In general, the validity and even the usefulness of the loss files as a source of research information leaves much to be desired, either in terms of providing a true picture of the attrition phenomenon or in terms of offering a capability for deriving determinants and solutions to the problem.

As part of developing a picture of attrition in the military, we also attempted to gauge the incidence of similar phenomena in the civilian sector, with particular emphasis on occupational mobility and on the propensity for individuals to drop out of institutions of higher education. Results from these efforts are presented below.

"Attrition" in the Civilian Sector

Like the military, civilian employers and institutions encounter losses in manpower. In molding a comparative perspective on attrition from the civilian sector, one needs to exercise some caution, since the mobility patterns of civilian workers and students are not strictly comparable to military separations. That is, the mobility of military personnel is constrained by enlistment contracts, while civilians operate in a free market where competition from outside institutions plays a significant role in inducing changes in employers and in shifts from school to work environments.

Occupational/Interfirm mobility of civilian workers. As part of a recent study conducted by the Bureau of Labor Statistics (U.S. Department of Labor), an attempt was made to examine the current patterns of occupational change (Byrne, 1975). As revealed by surveys undertaken in 1972 and again in 1973, a fairly large proportion of young persons (18-19, and 20-24) changed jobs over this one-year period. Thus, as shown in Table 3, over 38% of white males aged 18-19, and nearly 28% of comparably aged non-white males, changed jobs in a one year period.

Among white males aged 20-24, nearly 25% changed occupations, while nearly 26% of similarly-aged non-white males shifted occupations in the calendar year of 1972. It must be noted that these data reflect *occupational* or *job* changes, which does not necessarily mean that the individuals involved actually changed *employers*.

While BLS data point to a process of occupational exploration occurring among young people, more pertinent perspectives on interfirm movement are offered by Kohen & Parnes (1974) from a longitudinal investigation of labor force participation among young persons. These data were compiled over a three year period (1966-1969) and indicate that among white males and females aged 17-23, roughly two-thirds (66%) changed *employers* at least once. Data from a cohort of black workers aged 17-23, indicated that nearly four-fifths (79%) changed employers at least once during the three year period from 1966-1969.

These data need to be examined in light of Navy attrition patterns, which indicate that over a four-year period roughly one-third of the entering work force will attrite. Kohen and Parnes' data suggest that in the civilian

TABLE 3

Percent of Workers Who Changed Occupations in 1972, By Age, Sex and Race*

Age	White Men	White Women	Black and Other Races Men	Black and Other Races Women
18 and 19 years	38.3	36.2	27.9	----
20 to 24 years	24.9	19.4	25.6	12.4
25 to 34 years	12.4	10.3	12.3	8.0
35 to 44 years	6.2	6.6	6.4	4.1
45 to 54 years	3.6	3.4	3.2	2.8
55 to 64 years	2.6	2.2	2.8	4.0
65 years and over	1.7	2.8	1.5	----

*Taken from Kohen & Parnes (1974)

economy, more than two-thirds of the work force will change employers during a three year span. On the surface, at least, civilian attrition (if it can be meaningfully compared) is approximately twice that found in the Navy. The military, of course, imposes a number of constraints on mobility, in both occupational terms (i.e.,changing jobs within the service) and interorganizational terms (i.e.,between services and between the military and civilian sectors). Given these constraints it is difficult to draw a strict comparison. One might conjecture, however, that civilian data represent an upper-bound estimate of attrition that might be obtained were the military to remove some of the existing constraints to interorganizational mobility.

Dropout rates in higher educational institutions. As an alternative to immediate entrance into the labor market, a substantial proportion of youth enter higher educational institutions. Since not all persons who pursue higher education complete their program of study, examination of dropout rates characteristic of educational institutions provides additional perspectives on the phenomenon of attrition.

In this area, relevant data on four-year colleges and universities have been compiled by the National Center for Educational Statistics, while dropout rates for two year community and junior colleges were available through the American Association of Community and Junior Colleges.

For four-year institutions, attrition data have been developed by comparing the aggregate number of entering freshmen in a given year with the aggregate number of baccalauriate degrees conferred four or five years later. These data indicate that for students who entered colleges between 1958 and 1970, the dropout rate slowly increased from 49% to 54.9%. The nature of these data, however, are likely to overestimate the total dropout rate since a substantial number of individuals require more than four (or five) years to complete the requirements for a bachelor's degree, but for the purposes of these data were considered to be "dropouts." In general, these figures are consistent with the findings of Summerskill (1960) who indicated that since 1925 the college dropout rate has averaged 50%. Thus, taking into consideration the last 45 years of educational history, only one person in two who enters a college is likely to acquire a college degree.

A rather similar picture of dropout rates emerges for two year public and private colleges. That is, in public two-year institutions, the dropout rate for males was 56%, and for females it was 59% (as of 1972). Private two-year colleges experienced a male dropout rate of 54% and a female dropout rate of 45%.

Implications of civilian manpower and educational data. Data compiled in the civilian sector are rather consistent in indicating that a substantial proportion of young people change educational and occupational directions during the first few years after leaving high school. In reviewing their own occupational and interfirm mobility data, Kohen & Parnes (1974) characterize the early period of labor force participation as one of "experimentation" in which individuals "try out" a number of different employers and a number of occupational directions prior to stabilizing their career paths. Similar descriptions of this period have frequently been voiced by career choice theorists (cf. Super, 1957) who suggest that initial career and occupational decisions are not frozen and immutable, but tend to be altered in the course of experience in the world of work.

Given these perspectives, we might suggest that attrition in the military is "inevitable" and is a reflection of the same kinds of adult socialization processes that take place in the broader society. Thus, young people must be expected to try to "find themselves" in the world of work and this is as true in military institutions as it is in the civilian sector.

While attrition in the military is costly, it should also be recognized that attrition serves a valuable "correcting" function--"errors" are reduced when inadequate or unsuitable people are eliminated from the organization. Furthermore, as we will describe below, attrition provides a screening function that cannot be effectively carried out prior to the individual's entry into the organization.

Given that we cannot (and perhaps should not) totally eliminate attrition in military organizations, it is logical to assert that these processes can be better managed to minimize organizational and personal costs and maximize benefits to all parties.

REVIEW OF ONGOING AND PLANNED RESEARCH ON ATTRITION

In addition to developing an up-to-date picture of attrition in the Navy and Marines, a second major aim of this effort was to critically review ongoing and planned research on attrition on a DoD-wide basis. Toward this end, we visited or phoned researchers at the following laboratories and research centers:

Air Force Human Resources Laboratory, San Antonio, Texas;

Army Research Institute for the Behavioral and Social Sciences, Arlington, Virginia;

Center for Naval Analyses, Arlington, Virginia;

Law Enforcement and Corrections Division, Bureau of Naval Personnel, Washington, D.C.;

Naval Health Research Center, San Diego, California;

Navy Personnel Research and Development Center, San Diego, California.

Based upon discussions with staff at these centers and upon available reports and documents, it would appear that current and projected research on attrition and attrition-related issues may be broadly categorized under three major headings: 1) predictive research whose major aim it is to identify on the basis of background data which persons or categories of persons are likely to attrite (includes screening research, loss planning models, odds for effectiveness studies, etc.); 2) organizational studies which attempt to develop an understanding of organizational conditions and policics that may influence attrition; and 3) administrative experiments in which attempts are made to develop techniques to manage attrition.

Predictive Studies

The history of predictive studies of military attrition and attrition-related problems (e.g. delinquent behavior) dates back to Stouffer's (1949) pioneering work reported in The American Soldier. As part of that research, a number of correlates of AWOL behavior were identified including educational attainment, intelligence test scores,and age.

The initial finding that educational attainment is related to disciplinary problems in the military is one that has been repeatedly examined since Stouffer's early research. Thus, level of education has been shown to have a significant relationship to disciplinary records in the Army (cf. Klieger, Dubuisson, Adrian, & Sargent, 1962) in the Marines (cf. Berry & Nelson, 1966), as well as in the Navy (cf.Knapp,1963). Despite the consistency of these findings, it is clear that the predictive efficiency of level of education remains quite limited, since educational background information can account for little of the variance associated with disciplinary infractions.

Measures of personality attributes have also been subjected to scrutiny to determine whether they might be useful for the early prediction of disciplinary problems. Among the instruments that have been examined for this purpose are Gordon's Survey of Interpersonal Values (cf. Knapp, 1963; Drucker & Schwartz, 1973; Shoemaker, Drucker, & Kriner, 1974; Larson & Kristiansen, 1969) as well as scales based upon Taylor-Johnson Temperament instruments (Frass & Fox, 1972; Bell, Bolin, Houston & Kristiansen, 1973). While the predictions obtained using these scales generally appear to be statistically significant, correlations between personality measures and disciplinary infractions generally fall in the range between .20 and .30 thereby restricting the operational significance and meaning attributable to such findings. Other methodological and conceptual problems have affected this body of research, as well as research focused on attrition,and such issues will be described below.

While research concerned with predicting disciplinary infractions represents an area closely allied to problems of attrition (in terms of methodology, conceptual framework, problems and even specific predictors), this work has not directly addressed the attrition phenomenon. Research on attrition itself, may be traced to a series of initial investigations conducted by John Plag (cf. Plag, 1971) concerned with developing probability statements regarding the likelihood that sailors of particular background characteristics (i.e. years of education, test scores, history of civilian arrests)will complete their period of obligated active duty and simultaneously be recommended for reenlistment. These probability statements are expressed in Odds-For-Effectiveness tables (OFE for short) and the probabilities contained therein have been updated as recently as 1968. The OFE tables generally appear to have greater utility as administrative tools than as screening and recruiting devices (Berry, 1975).

Similar demographic/background predictive models based on the OFE concept are currently being developed at the Center for Naval Analyses (Lockman, 1975). This work is being carried out using a cohort of Navy personnel who entered the service between January 1973 and August 1974. On the basis of education, age, number of dependents and AFQT test scores, preliminary results of this study indicate that using group data it is possible to account for 95% of the variance associated with attrition outcomes. It must be recognized, however, that screeing policies and discharge decisions are applied at the individual level. Unfortunately, the predictability of individual attrition outcomes is not very promising as the squared correlation coefficients are able to account for something less than 10% of the variance.

Attrition studies have focused nearly exclusive attention on males, but one screening investigation examining the attrition patterns of female recruits is currently underway at the Navy Personnel Research and Development Center (Pat Thomas). This study entails data collection from 1,000 women recruits, with follow-up exit questionnaires and the incorporation of administrative information on personnel effectiveness. Given the rather high rate of attrition among women, this investigation represents a necessary first step.

Recent attempts in the Navy to develop instruments for screening out potential attritees, like delinquency studies, have come to rely upon personality and characterological assessment devices. Among these are the Recruit Temperment Survey (RTS) and the Delinquent Behavior Inventory (DBI) currently being studied at the Navy Personnel Research and Development Center. The most up-to-date validation study of the DBI (Yellin, 1975) revealed a rather low (.25), but significant correlation with attrition through the end of recruit training. Current plans are to continue to follow the validation cohort through subsequent periods of Navy service to assess the predictive utility of the DBI using a more "mature" criterion group.

There is one more set of predictive studies currently underway in the Navy (at NPRDC). These projects are attempting to build models of attrition flow for estimating the loss of personnel from various occupational categories and from different entering cohorts. These studies have been contributing heavily to loss planning efforts underway in Pers-21 and have a focus that is rather different from attempts to develop screening devices. Given the administrative applications of the loss planning studies, these last studies are not subject to the general methodological and conceptual criticisms of predictive research presented below.

Methodological/conceptual criticism of predictive studies. A number of problems have afflicted predictive research on attrition and delinquency, posing difficult questions regarding the practicality and validity of such research. From a utilitarian perspective, efforts centered on screening and identifying personal characteristics associated with attrition have, at best, been able to account for about 10% of the predictive variance associated with attrition outcomes. Thus, correlations between personal attributes (e.g., test scores, background factors, personality measures, etc.) are rarely greater than .35.

There are several factors that may account for such low correlations. First, it is evident that in the post-draft era, the diversity of the military manpower pool has lessened, thereby restricting the range and imposing an inherent statistical limit to predictability.*

A second reason for limited predictability may lie in what appears to be several limitations to conceptual validity of screening research. Thus, a static conception of the person developed at entry cannot, realistically, be expected to account for such interactive phenomena as may eventuate in attrition. The cognitive variables most often chosen for predicting attrition include educational attainment and test score factors, but are far removed from the processes that actually characterize the multiple aspects of attrition at different points in the enlistment cycle. It is perhaps naive to assume that some measure of a man taken at entry is able to effectively characterize the individual's behavior in a work setting some two years or even two months later that is much different than most of these people have ever experienced before. It is widely recognized that individuals are changed through experience in different organizational environments, but screening and predictive research has not taken such notions into account.

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*An illustration of this problem may be found in Plag's earlier attrition prediction studies that predate the All-Volunteer Force. In one of those investigations he found multiple correlations ranging as high as .52, and accounting for 25% of the predictive variance. This may be contrasted with more recent findings accounting for no more than 10% of the variance using similar data.

Aside from issues of limited predictiveness, the existing body of findings from screening research is highly susceptible to what has been labeled "ecological fallacy." That is, simplistic interpretations may frequently be undermined due to the fact that the critical variables were not directly tied to the attrition-inducing activity. An obvious example is the consistently reported finding that non-high school graduates and those with lower test scores are likely candidates for attrition. Does this mean that those persons with less academic credentials have greater difficulty getting along in the service? Perhaps. But we can not ignore the possibility that findings may be exaggerated by the self-fulfilling prophecies built into disciplinary decision-making. Test scores and educational background information are included in the individual's personnel file. In the event of an occurrence of "unsuitable behavior" the natural course of events would be for the man's superiors to review his records. The man with less-than-average qualifications may be seen as potentially more of a problem--and so he becomes a problem.

Support for the existence of self-fulfilling prophecies in disciplinary decision-making is provided by a recent Army experiment (Bell, Kristiansen, & Houston, 1974) in which the identity of "potential" offenders was made known to supervisors. As a result, those persons presumed to be "high risk" cases were subsequently more often identified as engaging in disciplinary infractions.

Earlier we noted that the current data bases (i.e., the loss files) perpetuate the assumption that the primary "cause" of attrition resides in the background and characteristics of the individual separatee. The current body of screening and predictive research appears to share this assumption and,as a result, closes off other, more productive avenues of research, application,and development.

Given these limitations of the predictive research approach and the fact that after thirty years of effort, little impact has been realized, it would appear that the development of other research models is in order.* Alternative research approaches might involve organizational studies, as well as administrative experiments for managing attrition. Since there are a few such research endeavors that are currently underway or are in the planning stages, these will be reviewed below.

Organizational Studies

Across the Armed Services there are a small number of ongoing or recently completed investigations attempting to identify organizational conditions associated with attrition. It must be pointed out that the bulk of these studies are of a preliminary sort, with three studies approaching the development of large data bases. Without exception, these investigations have been initiated during the last year or so and at this writing, there are no technical reports available. Thus, our available information is restricted to that gleaned from informal discussions with the principal researchers themselves. Because the information we have regarding these efforts is limited, our critique of them will be correspondingly limited.

One of the more interesting and heuristically valuable studies currently underway is a small-scale investigation sponsored by the Army Research Institute concerned with the organizational and personal dynamics of attrition. As part of this study, individuals being separated as part of the Army's Trainee Discharge Program were interviewed as they left the service and then followed up by telephone interview two months later. Preliminary findings from the effort suggest that while much of the initiative (under the Trainee Discharge Program) is supposed to come from training cadre, perhaps one-half of all separations are self-initiated. Other preliminary results indicate that there is a good deal of variation across training installations in terms of attrition rates. This latter finding is consistent with recent work by Lockman (1975), showing that recruit attrition rates differ by training centers.

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*In a recent review of the last 15 years of Army research on military delinquency, Bell & Holz (1975) concluded that attempts to predict disciplinary infractions through the use of individual and personality measures should end, and that situational and structural research models are probably more appropriate. We are in agreement with those conclusions and suggest that similar principles be applied to attrition research.

Additional research being carried out by the Army Research Institute has entailed the development of a large longitudinal data base merged with attrition information culled from the Enlisted Master Tape. The core of the data base, was constructed by the present authors (Goodstadt, Frey & Glickman, 1975) to examine the process of organizational socialization in the Army. The files contain information regarding leadership and organization climate in the service, peer group climate, as well as pre-service expectations of enlisted personnel. Given the richness of the data base, we would anticipate that this source will soon provide much valuable information regarding the evaluation of attrition.

Through telephone conversations, we learned from one researcher (Nancy Guinn) at the Air Force Human Resources Laboratory that there are three attrition investigations currently underway. While our information is quite limited, we did learn that these studies are cross-sectional by design and are centered on attrition occurring during training. Among the factors being examined as correlates of attrition are trainee morale and satisfaction. Data are now being analyzed from these projects; but there are no reports available at this time.

Turning to the research picture in the Navy and in the Marines, we found that there are several pertinent organizational studies underway in the Navy. We were, however, unable to identify any organizational studies either underway or planned specifically concerned with Marine attrition.

In the Navy, there are two longitudinal investigations currently being carried out by staff members (Anne Hoiberg and Dick Booth) of the Naval Health Research Center. These two studies employ rather similar methodology and have focused needed attention on situational and organization determinants of attrition. Both investigations are now into their second year of tracking entering cohorts of enlisted medical service personnel. As predictors of effectiveness they have incorporated background measures, pre-service expectation data, personality scales, job satisfaction indices, as well as measures of the organizational work environment.

These studies represent useful research models for the sort of comprehensive and systematic longitudinal investigations that the Navy and Marines will require to fully comprehend the impact of organizational policies and practices on attrition. However, the populations being investigated by the Naval Health Research Center are restricted to personnel falling under the purview of BuMed--perhaps 10% of the Navy's enlisted manpower pool. Unfortunately, we were unable to find any comparable investigations, either underway or in the planning stages, that might be applied to the broader Navy community or to the Marines.

Aside from the two longitudinal research efforts described above, the only other ongoing organizational research in this area is a project at NPRDC (Kent Crawford and Ed Thomas) in which unit level criteria of personnel effectiveness are being examined in light of organizational conditions. This study is largely a data analysis effort within the Human Resource Management data base and is currently focused upon one particular criterion--unit rates of non-judicial punishment. No attempt has as yet been made to incorporate discharge or attrition data into these analyses, but the investigators hope to examine such criteria in the near future.

While that study is likely to yield some valuable insights into organizational correlates of delinquency and attrition-related phenomena, interpretations will be sorely constrained by the inherent limits of the Human Resource Management (HRM) data base. Thus, the available data are aggregated at the unit level and cannot be applied to examine individual behavior. As a result, findings are potentially susceptible to the kinds of "ecological fallacies" described earlier in this report. Second, the predictor indices were typically gathered at a single point in time. Since changes in command are relatively frequent, the data may not be relevant for predicting attrition that occurs under subsequent and perhaps different commands.

Administrative Experimentation

Recognizing that attrition cannot be eliminated altogether, Navy administrators and researchers must give consideration to developing the means of managing attrition for the benefit of all concerned. Along these lines, the Navy is now planning for an administrative experiment designed to evaluate the effects of a voluntary early-out mechanism. A group of recruits not eligible for school assignments will be given the option of leaving the Navy at any time during the first six months. The attrition history of this group will be compared with that obtained from a matching control group. The underlying hypothesis is that "early voluntary attrition" will considerably reduce net costs associated with the current pattern of Navy attrition that is extended over a two year period.

This experiment is being coordinated by CAPT George Lowry of the Law Enforcement and Criminal Justice Division of BuPers (Pers 83), with the evaluation being directed by Robert Guthrie of the Navy Personnel Research and Development Center.

At NPRDC this evaluation will be part of a larger effort, the Recruit Attrition Prediction Project (RECAP) which is concerned with developing mechanisms for organizing data bases and thereby enhancing access of information regarding attrition policies. Additional components of the RECAP program focus on analysis of how career expectations influence attrition outcomes (Cliff Stallings) and the development of a reading ability test as an aid in reducing attrition.

RESEARCH RECOMMENDATIONS

As an outcome of our review of available data and research programs, a tentative list of research recommendations has been drawn up. It was presented to interested Navy administrators and researchers during a seminar conducted under ONR auspices (October 16, 1975). The feedback obtained from that conference has been selectively assimilated in the recommendations below.

Our research recommendations fall into three major categories: 1) studies of organizational determinants of attrition, 2) research examining the organizational and personal costs of attrition, and 3) administrative experiments designed to improve attrition management. Each of these recommended categories of research addresses apparent gaps in current knowledge of attrition.

Studies of Organizational Factors in Attrition

Recent attention by top-level Navy administrators indicates a need to identify the policies that drive attrition in the Navy and in the Marines. Our awareness of existing research suggests that this need cannot be effectively addressed at this time because questions concerning organizational determinants are underrepresented in the current body of research.

For this reason, we recommend that the Navy support research that examines the underlying organizational factors and dynamics contributing to attrition. To avoid rediscovering ecological fallacies, such research efforts must move beyond current data bases and directly encounter the actual participants in the attrition role set--the individual enlisted man and his superiors.

On this basis, studies should be undertaken to: 1) identify factors influencing the attrition-related behaviors of individual enlisted personnel and 2) examine the factors influencing the separation decision-making of the individual's superiors--the gatekeepers in the system. While we may have to deal with the entire role set encompassing individuals and their supervisors, these concerns must, in some instances, be examined separately in order to achieve greater clarity.

Individual focus. From the perspective of the enlisted man, a number of organizational conditions may markedly influence attrition. At present there is little empirically-based knowledge concerning the sequence of actions and conditions that precede attrition outcomes. Furthermore, we do not know how much of a role the individual plays in initiating actions that lead to attrition and what sort of a role his supervisor plays in attrition-inducing or attrition-impeding activities. Where the sequence of actions is self-initiated, we need to find out what conditions "turn the man off." Where it is service-initiated, we need to find out what behaviors of the individual "turn off his supervisor."

Preliminary findings from an Army Research Institute investigation suggests that 50% of attrition is self-initiated; 50% is service or supervisor-initiated. Given the likelihood that either or both of these sequelae are operative, attention should be focused on self-initiated, as well as service-initiated attrition.

Beginning with the assumption that a substantial portion of attrition is self-initiated, research might examine the impact of a number of crucial organizational conditions and policies. Two different research strategies are appropriate for this purpose--cross-sectional studies and longitudinal research efforts.

First, cross-sectional investigations might be undertaken to identify the impact of unit level conditions on individual behavior and attrition inducing activities. At a gross level, one might attempt to examine a cross-section of operational units that have varying levels of attrition. Thus, high attrition and low attrition units might be compared in terms of operating characteristics and also in terms of the behaviors, attitudes and perceptions of personnel assigned to these units. This cross-sectional research would therefore attempt to pinpoint those policies, organizational conditions and climate factors (e.g., the nature and quality of working conditions, peer group climate, leadership climate) that might influence individual behavior in units having varying levels of attrition. While the focus of such efforts would be set in the context of unit differences, they should be explained through comparison of the individuals in units to reduce the possibility of ecological fallacy and to assess the impact of such unit conditions directly or indirectly upon individuals.

A second promising research strategy requires the use of longitudinal methodology. Since it is generally agreed that attrition is a time-dependent process, there is considerable latitude for the manifestation of lag effects. For example, the early impact of training and work experience may not appear immediately, but may reveal itself later during the individual's association with the organization. In the course of our earlier work on Navy career motivation (cf. Glickman, Goodstadt, Korman & Romanczuk, 1973) and Army organizational socialization (Goodstadt, Frey & Glickman, 1975) we found such lag effects represented by the early development of organizational expectations that were found to be inaccurate during the individual's later encounter with organizational reality.

Here, longitudinal methodology entails the tracking of a cohort of individuals from entry through some appropriate period of training and work experience. Since a substantial proportion of attrition occurs during the first six months of service (and this proportion has appreciably increased during the past few years), this timeframe would represent a useful focus of a longitudinal effort.

Focus on supervisory decision-making. It is realistic to begin with the assumption that supervisors play an important role in the occurrence of attrition, either in terms of their own initiation of attrition-inducing activity or in terms of delaying or encouraging an individual to attrite, where the initiative is taken by the individual. Unlike his civilian counterpart, a sailor or marine cannot simply walk out the door; he must first be passed through a set of "gatekeepers" (i.e., petty officers and officers) who determine whether, and under what circumstances, he may be permitted to leave the organization.

At the present time, we do not know how these gatekeepers assess the individual, either in terms of initiating separation or in terms of acquiescing to an individual's request for voluntary separation. It is not clear how gatekeepers arrive at their decisions, what elements of the individuals behavior they consider, what organizational conditions shape their decisions or what organizational and personal resources they have at their disposal. The critical importance of these influences is reflected in variation in attrition rates across different commands and units. Apart from such gross effects as differences resulting from time at sea, we do not know much that provides guidance in individual cases.

Within this framework a related issue that needs attention is the functioning of self-fulfilling prophecies in disciplinary decision-making--i.e., how self-fulfilling prophecies are generated among gatekeepers, and what mechanisms may be instituted to prevent dysfunctional consequences.

Our literature search reveals little work along these lines has been carried out in the military settings, with the exception of an investigation by Kipnis & Lane (1962) examining situational and personal factors influencing the choice of corrective actions by Navy chiefs. Similar work regarding the calculus of supervisory decision-making has also been undertaken in laboratory simulations (cf. Goodstadt & Kipnis, 1970; Goodstadt & Hjelle, 1973) and field studies of industrial supervisors (Kipnis & Cosentino, 1969). Insights and methodology from these sorts of investigations might be readily applied to problems of attrition decision-making in the Navy and Marines. For example, laboratory and field studies suggest that supervisors who have to operate under greater work-related stress are more likely to employ coercive techniques (such as firing) when dealing with poor performance among subordinates. Supervisors functioning in more relaxed environments are inclined to first attempt counseling and less coercive methods as a means of correcting (the same) inadequate performance. This raises a relevant research question--to what extent do stressful working conditions lead supervisors to initiate separation of individuals who, under less stressful circumstances, would remain with the organization?

Research on Organizational and Personal Costs of Attrition

In view of the rising rates of attrition in the services, we recommend that research attention should be focused on the costs, to the services, to the individuals who are separated from the military, and to those who they leave behind. It seems legitimate to ask whether the organization can afford the consequences of attrition or alternatively whether the costs of retention are worth the effort. There is an obvious need for a cost/benefit analysis of attrition and retention to provide decision-makers with broader perspectives on organizational and personal outcomes.

At present, the services currently consider replacement costs and the costs of administration actions when analyzing attrition, yet these analyses ignore the social and personal costs of attrition for the individuals involved. As noted in Congressional press releases, such costs should not be overlooked and are now becoming more apparent as the rates of "bad" discharges rise. The Navy cannot be insensitive to the potential impacts upon its operations as public sensitivities plant the seeds of change in public policy induced by actions of the courts, the Congress and the Executive.

From the individual's perspective, personal costs of attrition might be assessed in terms of lost job opportunities, educational and training opportunities and wasted investments of time. From the organizational perspective, costs include lost productivity, training, recruiting investments, and added burdens of administrative, legal and correctional processes. It is clear that each of these personal and organizational costs will be affected in different ways by a retention or an attrition decision, and that these will also be influenced by the length of time that the individual has spent in the service. For instance, it may be that retention saves training and recruiting investments, but reduces productivity in the long run. Offsetting costs may be incurred through failure to induct better motivated, more productive personnel as replacements. Alternatively, attrition may increase productivity, while expending additional recruiting and training monies. Such analyses are complex, but unless they are carried out, the net effects remain unknown.

Another major question in this area that might also be addressed concerns the costs of attrition as perceived by those who have been separated early. Using survey procedures, a sample of separatees might be contacted and queried as to difficulties they are experiencing or benefits they may be accruing as a consequence of having left the service early. An interesting comparison might be made with a group of persons who completed their enlistment contract and have since returned to civilian life.

Administrative Experiments

Our final recommendation deals with how the Navy might attempt to manage attrition. To provide a realistic basis for developing management approaches, we suggest that the Navy sponsor a series of administrative experiments in which different problem-solving approaches are tried out in operational settings, evaluated, and then applied more generally. A good example of such an experiment is the voluntary-out program (BuPers & NPRDC) now programmed for initiation in January, 1976.

No doubt, there are other means of managing attrition besides voluntary-out programs. It is likely that a program of attrition research will identify many potential candidates for administrative experimentation. In the absence of empirical data, we might speculate regarding one such experiment.

If one assumes that attrition is an inevitable process occurring among young people who are trying to fit their interests and talents into the world of work,then an in-out decision with respect to the Navy or Marines may not be as useful as greater mobility within the services. Each service has a variety of jobs to perform, requiring a diversity of talents. Perhaps, if policies were developed to permit greater occupational mobility across skill areas, or even greater mobility between the services, more individuals would find it easier to establish a permanent niche in the service and loss to the civilian sector would be lessened. Such policies could be also evaluated in the context of administrative experiments prior to across-the-board implementation.

In general, our feeling is that there is much policy-relevant research that can and should be undertaken in the area of attrition. There has been much concern voiced regarding military attrition in recent months, but many of the underlying policy assumptions and attributions are unproven. For research to make a meaningful contribution in this area, it must come to grips with many of these assumptions, subject them to test,and provide appropriate feedback to concerned policymakers.

We have been able to offer only a few illustrations of the directions research and evaluation might take. The ramifications are many. A comprehensive rationale and prioritizing system needs to be developed to launch and guide a systematic and economic plan of attack. It is hoped that this report will contribute to that important first step.

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