ACTIVE AND RESERVE FORCE ATTRITION AND RETENTION: A SELECTED REVIEW OF RESEARCH AND METHODS

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INTRODUCTION

Research on the motivation and morale of military personnel--the subject of this conference--should consider the kinds of personnel attracted to the armed forces and the current and future experience composition of the forces. In the U.S. military, some dramatic changes have taken place since the transition to the All-Volunteer Force (AFV) and, perhaps more importantly, will continue over the next decade. This should change the emphasis of research directed toward increasing motivation and improving morale.

Since the subject of motivation and morale is broad, a brief perspective on our somewhat narrow orientation is required. We assume that increasing motivation and improving morale are important, insofar as they contribute to higher retention and readiness. We further assume--at least in the context of personnel readiness--that readiness is linked to job performance, and that, other things being equal, more experienced personnel perform better.

Motivation, morale and job performance can be improved either by changing the type of individual in a job or by changing the environment or job once the individual is there. Our emphasis here is on aggregate policies affecting the type of individuals in military jobs. We assume that the types of individuals filling military jobs are the subject of policy choice. For instance, raising military pay and benefit levels would change the type of individuals filling military jobs. Changing the individual performing a military job can directly affect average motivation, morale and job performance in the service, and has the secondary effect of requiring changes in the research and policies designed to retain and motivate the individual.

Given the assumption of choice in the type of individuals filling military jobs, the question becomes how to set aggregate parameters to make the best policy choices. As always, limited resources are available, and generally the choices involve tradeoffs. One tradeoff is between providing higher compensation and retaining more productive individuals, and lower compensation but less productive individuals. Theoretically, this choice is made by establishing job performance standards and setting compensation high enough to attract sufficient personnel to meet them. In practice, this intricate balancing requires that job performance requirements and standards be established and that pay levels be set so that sufficient personnel meeting performance standards are enlisted and retained. If indeed these performance standards are set accurately, then retention and enlistment rates could be direct indicators of average job performance, i.e., failure to meet a certain required enlistment or retention rate for a military skill would indicate a degradation in military mission performance. (In reality, standards are somewhat flexible, and enlistment and retention of marginal personnel is allowed if the alternatives are vacancies.)

One research objective is to determine the connection between the job performance of individuals who are attracted at different wage levels. Another research objective has been to assess the effectiveness of current policies through an examination of the types of individuals who separate from the military, both prior to and at the ends of enlistment contracts. If the result of these separations is to improve the performance profile of the force, the policies can be assumed to be successful. If not, they should be changed. Presumably, research can inform the direction of desired changes.

In this paper, we restrict our focus to a selected review of research findings and methods for studying the dual issues of attrition and retention. Attrition, in this context, is defined as separation prior to the completion of agreed upon terms of military service. First-term attrition is a particular focus of concern in countries dependent on voluntary versus conscriptive manpower. Retention is defined as voluntary decisions on the part of individuals to remain in the military for additional terms of service. We limit our review to the enlisted force only.

In the United States to date, two basic approaches have been used in analyzing retention and attrition: aggregate (or macro-level) and individual (or micro-level). Each has been used for somewhat different purposes. Most research on attrition/retention behavior uses aggregate data, the primary purpose being to forecast future attrition/retention patterns. The relatively few aggregate-level variables in these (macro) models make them expedient for forecasting group attrition/retention rates. Aggregate variables, generally drawn from routinely collected administrative personnel and economic data are, however, inadequate for studying the determinants of individual enlistment behavior and subsequent outcomes. Thus, aggregate (or macro) models provide only limited insights into how military policy might influence attrition or retention decisions. To study determinants, data on the individuals themselves are most appropriate. Ideally, in the long run, the results of microanalysis should complement and improve macro-level studies.

The microanalysis of attrition/retention has been handicapped historically by a lack of data collected specifically for studying the determinants of behavior. In the past several years, however, systematic collection and analysis of individual survey data, often combined with administrative personnel data and field experiments, have led to new policy insights in these two arenas. As an important by-product of the findings, a methodology for collecting individual data in the military environment is emerging.

In this discussion, we will first provide the context for both past and future research, by describing the changing composition of United States military personnel. Then, both for the Active and Reserve Components, the research in the attrition and retention areas will be summarized. This will be followed by discussion of different methodological issues. Finally, the implications for future research, both in the United States and in NATO countries are discussed.

The Context for Research--The Changing Composition of U.S. Military Personnel

Associated with the transition of the United States Armed Forces to a volunteer, rather than conscriptive system was a marked change in the mix of military personnel during the first ten years (between FY73 and FY83). The mix will continue to change in dramatic ways during the second ten years. These shifts set the context for research on attrition, retention, and job performance. During the first decade (see Tables 1 and 2), the shifts have been characterized as changes towards a more heterogeneous mix of enlistees by race and sex and somewhat lower aptitude scores in both the Active and Reserve Components. Lower educational attainment in the Reserves, but somewhat higher in the Active Force are apparent; the latter probably results from both

Table 1

CHARACTERISTICS OF U.S. ACTIVE FORCE ENLISTED PERSONNEL

	FY73	FY82
Personnel		
N	1,920,122	1,804,261
Percentage		
Female	2.2	9.1
Black	14.0	22.0
AFQT		
Category I	5.6	4.1
Category II	34.3	31.2
Category III	45.7	45.5
Category IV	14.3	19.1
Education		
Nonhigh school graduate	13.5	9.2
High school graduate	86.6	90.8

SOURCES: Selected Manpower Statistics--Fiscal Year 1982, Directorate for Information Operations and Reports, the Pentagon, Washington, D.C.

recruiting emphasis on high school graduates and the in-service programs which emphasize and facilitate high school equivalency diplomas (GEDs).

This change has occurred partly as a result of the replacement of draftees and draft motivated youth--who had, on average, higher aptitudes and educational attainment--with volunteer enlistees. Beginning in FY73, these changes have occurred in both the Active and Reserve Components. The volunteer cohorts are now progressing through

Table 2

CHARACTERISTICS OF U.S. SELECTED RESERVE ENLISTED PERSONNEL

	FY76	FY83
Personnel		
N	716,610	861,507
Percentage		
Female	4.7	9.7
Black	11.3	18.5
AFQT		
Category I	11.2	7.0
Category II	36.4	32.4
Category III	44.6	52.0
Category IV-V	7.8	8.6
Education		
Nonhigh school graduate	14.7	23.2
High school graduate	54.6	61.9
2 years college +	30.6	14.9
Age		
17-20	9.2	15.9
21-25	34.4	25.2
26-30	28.9	16.4
31-40	17.1	28.3
40+	10.4	14.2

SOURCE: Official Guard and Reserve Manpower Strength Statistics, May 1976-September 1983.

the career force, and it will take at least 20 years to complete the shift to a completely volunteer military. As of FY84, these first cohorts have reached their eleventh year of service. Over the next nine years they will change the demographic composition of the senior enlisted career force. The composition has also been strongly affected by higher base pay levels, increased bonus payments and high levels of unemployment.

The decision to move to a volunteer system and the increased pay and high unemployment also triggered another dramatic shift, one whose effect will be felt primarily during the 1980s. This is a shift towards a more senior mix of personnel. Again, the effect is occurring in both the Active and Reserve Components (see Tables 3 and 4). Current and future Active and Reserve Forces will have a greater percentage of their enlisted personnel in the career force. This older and more experienced force results primarily because volunteer enlistees reenlist at much higher rates at the end of the first term than a force largely drafted or draft motivated. The result has been a longer average length of

Table 3

EXPERIENCE DISTRIBUTION OF
ACTIVE FORCE ENLISTED PERSONNEL
(In percentages)

Years of Service	FY72	FY76	FY82	FY90*
1-3	50.2	50.0	46.0	41.7
4-10	25.8	29.7	34.5	31.1
10+	24.0	20.3	19.5	27.3

SOURCE: Unpublished data--Defense Manpower Data Center.
*Projections in [30].

Table 4

EXPERIENCE DISTRIBUTION OF SELECTED RESERVE FORCE ENLISTED PERSONNEL
(In percentages)

Years of Service	FY76	FY82	FY90*
1-5	52.0	46.0	36.0
6-10	32.0	25.0	25.0
10+	12.0	29.0	40.0

SOURCE: Official Guard and Reserve Manpower Strength and Statistics, May 1976 - September 1982.
*Projections in [1].

service under the current system. This is illustrated by data in Table 5 which shows the proportion of personnel who entered in FY71-72 remaining in service as of the end of FY81. The percentage remaining of those with high lottery numbers (volunteers) is much higher than those with low lottery numbers (draft motivated) or those drafted. This effect is gradually changing the experience mix of the force. The primary effect, to date, is to increase the proportion of personnel with between 4-10 years of service. Between FY83-FY90 the proportion of senior enlisted careerists (10+ years of service) will increase dramatically.

The shift to a more experienced force will mean that a greater proportion of enlisted members will be married and have dependents. This will mean a greater demand for housing, medical services, military schools, day care, and other family-oriented services. It will also mean that personnel pay budgets will rise even under a constant force size. To retain personnel, more attention will have to be paid to personnel rotation issues, both due to the presence of more married members as well as the greater numbers of working wives with an

Table 5

PERCENTAGE OF FY71-72 ENLISTED ACCESSION COHORTS REMAINING AFTER 8 YEARS

Years Since Accession	Percent Still Serving		
	Draftees	Low Lottery 1-90	High Lottery 271-366
1	88.0	86.9	84.5
2	33.9	72.1	70.5
3	6.5	56.5	55.3
4	4.1	30.3	34.8
5	3.7	17.1	22.3
6	3.3	15.3	20.1
7	3.1	13.2	17.6
8	2.7	11.0	14.9

SOURCE: Unpublished data--Defense Manpower Data Center.

attendant reluctance to move frequently. Retention issues will increasingly focus on family concerns and the concerns of older members. Quality of life issues will require emphasis in addition to the normal issues of military pay levels.

The quality of first term personnel will change as the effect of increased number of retained personnel lowers accession requirements allowing the services to be increasingly more selective in choosing enlistees. Recent projections show that the quality of enlistments between FY83 and FY90 should actually match or exceed those of FY82--the best recruiting year in the last 12 years.[30]* This increase in quality will likely occur despite declining unemployment and a decline in the number of young people of military age. Thus, the average enlisted member will not only be older and more experienced, but also will probably have increasingly more years of education and a higher aptitude category at enlistment.

*References appear, numbered in alphabetical order, at the end of this paper.

All of these changes imply that it is important to examine the current focus of research, and the methodologies used, to see if they are appropriate to the new force structure and the issues that will arise. While the traditional emphasis measuring the effects of pay changes and designing an efficient compensation system will continue to be important, new emphasis will be required to include issues associated with quality of life. To anticipate our conclusions, it is clear that current research is limited and that changes in emphases will be required.

SELECTED RESEARCH FINDINGS IN ATTRITION/RETENTION

The literature on Active Force attrition and retention is voluminous, and we will not attempt to review it here. (Reviews are contained in 15, 17, 28, 40, 43.) Rather, we attempt to highlight the more recent work that seems most applicable to addressing the emerging issues.

For the Reserve Components the research is scant, and summaries of recent and ongoing work will provide an accurate picture of what is known. The U.S. Reserves referred to here are the Selected Reserves--those individuals who train regularly as part of units and are paid for training. The typical reserve member trains for two days a month and for a two-week period during the summer. For this training the average enlisted reservist receives around $1500-2000 annually. There are approximately 850,000 enlisted personnel and 150,000 officers in the Selected Reserves compared to 1.8 million Active Force enlisted personnel and 300,000 officers in U.S. Active Armed Forces.

In examining both Active and Reserve Components research, we have further limited our attention to enlisted personnel, both because its supply traditionally has been more limited and because the dynamics of attrition and retention are different between officers and enlisted personnel.

Active Force Attrition

The term "attrition" refers to the separation of an individual from the military before the end of their first term of service. In the United States, the length of the first term for enlisted personnel varies between two and six years of service. The majority of Active Force enlistees enter with three or four year terms of service (see Table 6), and a significant number leave before finishing their term. Shorter terms of enlistment are more characteristic in services and in occupational specialties in which personnel is more difficult to obtain. Thus, only the Army offers two year terms--and then only for hard to fill low skilled jobs. The Navy offers a combination of three, four, and six year terms, reserving the latter for highly popular high skill jobs where training is long and civilian transferability is greatest. The Air Force--the most popular service--offers four and six year terms, using a rationale similar to that of the Navy for six year terms. Finally, the Marine Corps--needing the smallest number of enlistees--is able to attract them by offering three and four year terms, even though most jobs require lower skills jobs and have little civilian transferability.

In spite of extensive interviewing and screening prior to enlistment, including physical and aptitude examinations and background personal history investigations, the match between new entrants and the military is less than perfect. In general, the military can decide that termination of the contract is in its best interest. Since initial training is expensive, and advanced training more so, evaluation takes place during the early months of enlistment contracts.

In practice, the individual also has some flexibility to initiate contract termination--either directly or indirectly. There are some direct legitimate reasons for termination, e.g., family hardship or injury. However, the individual can also terminate indirectly by failing to perform in training. Thus, the initial enlistment period is also a time of assessment for the individual as to whether or not their enlistment was an error. Currently, we have no way of disentangling institutional vs. individual attrition decisions, so they are treated as inseparable and the focus is on the simple probability of attrition.

Table 6

TERM OF SERVICE DISTRIBUTION OF
ACTIVE DUTY ENLISTMENTS--FY83

Length of Term (yrs)	Army		Navy		Marine Corps		Air Force		DoD	
	N (000)	%	N (000)	%	N (000)	%	N (000)	%	N (000)	%
2	9.1	6.9	0.0	0.0	0.0	0.0	0.0	0.0	9.1	3.2
3	77.2	54.5	0.1	0.2	6.9	19.4	0.0	0.0	84.3	29.4
4	45.7	34.6	60.3	98.7	28.2	79.2	51.3	88.7	185.5	64.8
6	0.0	0.0	0.6	1.0	0.5	1.4	6.5	11.3	7.6	2.6
Total	132.0	100.0	61.1	100.0	35.6	100.0	37.8	100.0	286.5	100.0

SOURCE: Unpublished data--Defense Manpower Data Center.

Describing first term attrition requires tracking cohorts of individuals over time, and through computer matching of records determining the timing of each individual's separation. The traditional approach has been to take a cohort of individuals who entered in a given fiscal year, and to develop statistics--typically quarterly or monthly--describing the percentage remaining as a function of the time from enlistment (see Table 7). These statistics show that about 40 percent of the individuals who entered the military leave before the end of their term. The percentage can vary from one cohort to the next depending on several factors--its characteristics, size, and perhaps economic conditions during the period of enlistment.

Multivariate analysis of attrition data can both estimate the percentage of a cohort expected to attrite, as well as provide the characteristics of individuals who remain the longest. The typical analysis uses a microdata set of administrative records for a complete cohort which contain the personnel data collected at enlistment and separation--if it has occurred. This data contains an assortment of variables--aptitudes, demographic characteristics, skill and bonus information, assignments, and promotions. A multivariate model is developed, with the dependent variable taking on the value of one if an

Table 7

PERCENT RETAINED FROM FY74 NONPRIOR SERVICE
ACTIVE DUTY ENLISTED ACCESSION COHORT*

	Army	Navy	Marine Corps	Air Force	DoD
Original Cohort					
N	176,272	88,771	43,572	72,690	381,305
Survival Rate					
1 Year	77.9	81.3	85.3	84.7	80.8
2 Years	62.8	68.2	71.3	72.6	66.9
3 Years	45.8	52.6	48.0	63.7	51.1
4 Years	20.5	39.8	34.4	50.3	32.3
5 Years	16.5	19.7	13.9	33.6	20.2
6 Years	14.7	17.5	12.6	29.3	17.9
7 Years	12.6	13.9	10.6	24.4	14.9
8 Years	11.5	12.8	9.5	21.6	13.5
In Selected Reserve					
N	5,282	1,676	834	1,849	9,641
% of Original Cohort	3.0	1.9	1.9	2.5	2.5

SOURCE: Unpublished data--Defense Manpower Data Center.
*Status as of 30 September 1982.

individual has separated and zero if still present. Since the variable is dichotomous and measures the probability of attrition, the logit function is usually chosen as the function to fit. This function asymptotically approaches zero or one, so the values for the probability of attrition never go outside their natural bound. (Methods have been developed for estimating logit functions with dichotomous variables through use of Ordinary Least Squares (OLS) coefficients.[25] These methods avoid the more expensive and less available maximum likelihood estimates.)

The results of analyses of this type have been fairly consistent in determining what matters in attrition.[2, 3, 17, 40, 45] The variable with the highest statistical significance, and the largest effect on attrition, is usually the educational attainment of the individual. Other things equal, attrition increases inversely with educational attainment. Most enlistees have greater than 8 years of education, but less than 14, and attrition declines with each additional year of education. A common result is that those graduating from high school have one-half the attrition rate of non-high school graduates. Conformity and adaptation to school requirements seem to also allow adaptation to the military environment. Other variables also affect the probability of attrition, but usually in a less pronounced way. Other things equal, those with higher aptitude scores have lower attrition than those with lower scores. Among demographic variables, women have higher attrition than men and whites have higher attrition than nonwhites. Other things equal, both older enlistees (over age 20) and younger enlistees (age 17) have higher attrition than those 18 or 19. Enlistees who are married have lower attrition than those who are not. Other things equal, longer terms of service seem to be associated with higher attrition than shorter terms.

Some recent work has combined personnel records and survey data to study attrition.[3] This analysis was able to include a richer set of preenlistment characteristics to determine their influence on attrition. The results show that aspects of the preenlistment work history affects attrition. In general, unemployment during the year before enlistment, frequent job changes and multiple employers are associated with high rates of early attrition in the military. On the other hand, various indicators of satisfaction with the military jobs available and the job chosen did not show much effect on early attrition.

Recently, attrition data has been analyzed to include several cohorts of data simultaneously. This analysis can reveal temporal effects such as economic cycles, low scale hostilities or cohort size. Since each cohort travels a unique path in time through the force, this kind of analysis can control for quality differences in cohort and pick up these additional temporal effects. Although a complete analysis of this type has not been undertaken, Table 8 shows attrition data during

Table 8

ATTRITION RATES FOR ACTIVE DUTY ENLISTED PERSONNEL

Year of Service	Cohort FY77	FY78	FY79	FY80	FY81
0-1	13.7	13.4	13.3	13.7	11.9
1-2	11.7	11.5	10.4	11.9	12.9
Total	25.4	24.9	23.7	24.6	24.8

SOURCE: Unpublished data--Defense Manpower Data Center.

the first and second year of service for several cohorts. The data show a surprisingly stable attrition pattern during the first two years of service. During this time period, the quality and quantity of enlistment cohorts changed and the economy went through at least one complete cycle. Multivariate analysis could determine if some of these factors were compensating for each other in order to keep the pattern so stable.

The thrust of this type of research is to suggest that selection procedures should be more stringent in excluding those individuals who are "high risks." An underlying assumption is that attrition rates will fall as the "quality" of cohorts improve. However, the data imply that attrition is also strongly influenced by institutional policy. Although the quality of enlistees has risen dramatically between FY79 and FY82, attrition rates have stayed relatively stationary. This suggests that institutional policies are directed toward "creaming" any incoming cohort regardless of quality--and this area represents a direction for future research.

It is clear that the next phase in studying attrition will be to both broaden the types of variables considered, e.g., include more information about previous labor market experience, high school

performance and activities, to focus more directly on the enlistment-decision process, and to study institutional prerogatives. The kinds of data which will be required for making advances in this research area, and methods for their collection, will be discussed in later sections of this paper.

Active Force Retention

Several recent studies[18, 28, 42, 43, 44] and reviews[15] conclude that retention depends on compensation, a commonly accepted view. The evidence shows that retention rates are sensitive both to the present and expected future value of compensation. The strongest evidence for this sensitivity is the increase in retention rates as individuals approach the 20-year retirement point. Traditionally, the increase is explained as the result of simple principles of individual maximization of discounted, long-term income. Retirement eligibility is vested only after 20 years and the present value of retirement income rises substantially as vesting approaches. Thus, after 10-12 years of service, remaining in the military is almost always preferable to accepting civilian opportunities.

Other studies measure the effect of income differentials[15, 28, 42, 43] on retention rates at the end of both the first and second term. These differentials are caused by differences in pay over time, or between the pay of individuals due to promotion, skill, or performance. These results also indicate a consistently high sensitivity of the retention rate to present or future income--although an unambiguous interpretation of the results is often difficult. This ambiguity is due to the fact that nearly every form of differential pay among individuals is nonrandom; i.e., is made for reasons other than simply measuring the effect of a pay differential. Bonus payments to alleviate shortages are an example of nonrandom payments. Measuring their effects is confounded by the reasons which caused the shortage in the first place. Although extensive research efforts go into attempts to separate the effects of these confounded variables, the results lack the simple transparency which random experiments would satisfy. These methodological measurement difficulties lead to a fairly wide range in the reported pay elasticities. First term pay elasticities range from 1.5 to 4.0, while

measured second term elasticities are somewhat lower in value. The precise value of these elasticities is still in dispute. However, the question of the high sensitivity of retention to pay is not argued, since even low values in the range provide evidence of this sensitivity.

The acknowledged sensitivity of retention to pay leaves several important questions unanswered. The primary one is the cost effectiveness of additional pay as opposed to other types of benefit changes or noncompensatory changes (e.g., term length, housing quality) in retaining personnel over the short or long term. A second question is the effectiveness of pay incentives in retaining higher quality people in the military. A third issue is whether too much institutional dependence on pay will erode the presence of other desirable individual characteristics such as institutional and unit loyalty and cohesion. Unfortunately, these issues are more difficult to resolve and tend to get crowded out of the research agendas by more easily answered questions.

The focus on pay research is partly understandable. The cost of military compensation is quite visible; therefore measurements as to its effectiveness are constantly in demand. Pay is also easily observed and frequently adjusted to meet short term manpower goals. Data to track these pay changes and associated retention decisions are very good and easily accessible. No special data collection is required. It thus presents an excellent opportunity for measurement of effects. However, the estimations of such effects are complex, mainly due to the lack of randomized statistical design. This results in different approaches to estimation, and finally to a wide range of estimation results.

Critics of this pay research tend to overlook the fact that pay must be included in any other explanations of retention. Any expanded general framework must partly build on this research while exploring new methodologies, so that a broader set of questions can be answered. Expansion is difficult because it is likely to be multi-disciplinary which involves learning the language and paradigms of other disciplines. Nevertheless, progress in this direction is occurring, using both administrative personnel data and specifically collected survey data. Since administrative data are limited, the survey data allow testing nonpecuniary explanations by including a wider set of variables. For

example, additional behavioral variables such as sea-shore rotation and family separation[6, 42] as well as attitudinal variables[6] have been included in explaining retention rates, in addition to pay and the standard demographic variables. Another variant of these new studies utilizes responses to questions asking for future reenlistment intentions, revolving on a series of hypothetical circumstances.

The results of this research are still fragmentary. For example, one result[42] shows that the percentage of time spent at sea duty strongly affects Navy first term retention rates. Another study[6] using Army data showed only small effects when overseas rotation and family separation were included in first term retention estimates. Finally, data collected on reenlistment intentions under various hypothetical circumstances showed a great sensitivity to the term of reenlistment, the choice of location, stabilized tours as well as reenlistment bonus payments. This work[28] also showed greater sensitivity at the second term to nonpecuniary factors than at the first term.

Progress in retention research could be more rapid if experiments would be undertaken. Several Active Force enlistment experiments have been undertaken aimed at measuring the effects of educational benefits,[16, 26, 37] terms of service,[26] and enlistment bonus payments.[38] It is unfortunate that retention experiments have not been conducted since they have the potential to effect large savings, can be easily done, would be relatively unobtrusive and should provide easily interpretable results.

In conducting enlistment experiments, the unit of observation is a geographical region; in a retention experiment the unit of observation is the individual. This difference alone allows for methodological and logistical simplification, as compared to enlistment experiments. Several different reenlistment incentives could be tested with relatively small sample sizes (500-1500 individuals) and yield statistically reliable estimates. With a random design, the results would not suffer from several of the statistical colinearity problems that plague historical measures. Tested options could include pay, guaranteed location, tour length, term of service, and job retraining, among others. It would also be feasible to test a specific option but

at different reenlistment points. Obviously, other defensible designs are possible. The problem of equity during retention experiments would need addressing. It could be muted by offering additional benefits or incentives above existing levels, and not testing benefit reductions.

Selected Reserve Attrition

Reserve enlistees without prior military service sign enlistment contracts for six-year terms. This enlistee receives full time training for at least three months and then serves with a "home town" unit for the remainder of the six-year term. About one-half of all reserve enlistments are nonprior service; the remainder are individuals who have served in the Active Force and enter the reserves directly or from civilian life. The discussion here will be concerned with nonprior service reserve attrition.

In studying reserve attrition, a distinction is made between attrition during the full time training period and attrition after rejoining the home town unit. Since both reserve and active enlistees train together, it would be expected that training attrition rates would be somewhat similar. And indeed, research results which focus on training attrition[20] show similarity in the impact of various variables on attrition. However, major differences appear in both attrition theory and empirical results after the training period.

Studying reserve attrition, in comparison to active attrition, requires a different perspective. It requires an understanding of both the special nature of the reserve participation, as well as the influences affecting the decision to enlist and later separate from the reserve.

Underlying the differences between the behavior of active and reserve personnel is the nature of the two jobs. Whereas the active duty job is full time the reserve job for almost all reservists is a "moonlighting" job. Recent survey data shows that 93 percent of reservists also hold full time jobs.[4] This indicates that individuals usually do not combine school and reserve participation, nor do people look to the reserves for providing solely part-time jobs. Rather, reserve participation is assumed in addition to another full time job. The dynamics of reserve attrition and retention are partly shaped by this dual job holding.

Other major differences between the two jobs are the stability of reserve unit locations and the relationship between the reserves and the member's household. Enlistment in the Active Force involves permanent relocation to other parts of the United States and, for most personnel, substantial time spent outside of the United States. A reserve job, however, has geographical limitations. Although both initial and annual training take place outside of the reservist's home town, subsequent participation is at fixed locations. In fact, regulations often govern the distance that a member can live from a unit, before either required separation or transfer to another unit. In addition, the responsibility assumed by the Armed Forces for a member's household, including benefits, vary between the two. The reserves do not relocate households, provide more limited immediate benefits to them, and do not provide the range of services available to Active Force member households.

At the time of enlistment a balance must exist in both the family life and civilian job of the reservist; a change can mandate separation. This balance can be negatively shifted by several intervening events common to the entry age group: changes in marital status, full-time employer or geographical area of the home. Since the typical reserve enlistee is 19-20 years of age at enlistment, and 25-26 at the end of the first term, we will focus on the probability of the major intervening events which can cause reserve separation.

Approximately one in two individuals will marry between age 19 and 25.[9] By age 19, only 7.1 percent of males and 22.4 percent of females have married. By age 25, 54.1 percent of males and 71.4 percent of females have married. Conflicts with spouses and civilian employers have been shown to be the two leading reasons for reservists leaving at their end of term.[4] The birth of children undoubtedly is also a factor in participation. One would expect these tensions to be present during the first term of enlistment, as well as at the end.

Migration data[8] show that among persons of age 23, approximately 4 in 10 move annually. While only 36 percent of these moves are outside the original county of residence, even intracounty moves may considerably lengthen the travel time to reserve units.* Migration

*Survey data show the average one way travel time to reserve units to be 31 minutes.

data[7] over longer time periods show that, for 23-year-olds, 71.2 percent move over a four year period with 30.4 percent moving to a different county. Moving outside the home area of a reserve unit does not automatically mean separation. Transfer to another unit in the new place of residence is possible. However, the new unit will often have a different mission and not require the same military skill, making retraining necessary. Also the new area may not have units in the same reserve component.

Employer changes are also frequent during this period and new employers may have different attitudes towards reserve participation or require different work schedules. Negative employer attitudes toward reserve participation may mean difficulties in receiving time off for annual training or new work schedules may interfere with normal reserve drill schedules. Data show that annual full time job turnover rates are 36.4 percent for the 18-24 year old group.[24]

If these intervening events are a major cause of reserve attrition, one might expect to see a similarity between the pattern of attrition and the pattern of the intervening events. Indeed, recent attrition results seem to indicate this pattern.[20] For instance, between the ages of 19-25 women and whites are much more likely to marry and migrate than their opposite, so attrition should be higher for women and whites. Also, the probability of migration, marriage and employer change is much higher between 24-28 than between 18-24. This means that older reserve enlistees should have higher attrition. Other things equal, enlistees who enter married should have lower attrition than those not married. Work is currently underway to test these hypotheses.

Selected Reserve Retention

To provide a context for Selected Reserve retention research, it is necessary to expand on the previous discussion of the difference between the nature of active duty and reserve participation. As indicated earlier, the reserve job is a secondary, or "moonlighting" job, for most participants.

It would be convenient if reservists were like the ordinary moonlighters, since studies[39] have been done to identify the motivation of moonlighters, their responses to higher moonlighting job

wages, and the other factors important in their decision to moonlight. These studies generally show moonlighters as individuals with constraints on primary job earnings, but also with strong consumption pressure from housing payments, large family size or other factors. Earning extra income is the primary motivation to work a moonlighting job. The tradeoff in the choice of moonlighting is between the additional income and perhaps satisfaction of working the job, and the forgone leisure time which could be used with family, oneself or on the primary job.

In 1973 Rostker and Shishko[39] developed a theory of moonlighting, or secondary labor market participation, to explain the behavior of Air Force reservists. This theory portrayed the decision to moonlight as a trade-off between additional leisure time and income. The theory identified several important economic variables in a civilian moonlighting decision, including primary job hourly wages, primary job hours, and secondary job hourly wages. Empirical estimation on civilian moonlighting decisions confirmed the direction and importance of these variables. Moonlighting was less frequent among those having primary jobs with higher hourly wages and longer hours. The elasticity for these two variables was about 1.0, i.e., a 10 percent decrease in primary working hours or wages would increase the probability of moonlighting by 10 percent. The most important finding with implications for reserve compensation policy was that a 10 percent increase in secondary wages would result in a 9 percent increase in the probability of moonlighting.

An opportunity arose in 1978 to test these moonlighting hypotheses through an experiment. At that time reserve manpower strength had fallen to a historical 30 year low point, and many blamed the transition to an all volunteer system for the problem. Selected Reserve strength fell from 987,000 to 788,000 between FY70 and FY78. The presence of a draft had motivated many to join the Reserve Components, since they were a substitute for active service. Once the draft was terminated, many thought the reserve forces could not attract sufficient personnel through strictly monetary incentives, and the decline in strength seemed to support this viewpoint. An experiment was needed to measure reservist response to pay and learn more about the motivation of reservists to serve.

The experiment consisted of offering reenlistment bonus payments to Army reservists and Army National Guardsmen reaching the end of their first or second term of service.[22, 23] The amount of the bonus was $900 for a three year commitment or $1800 for a six year commitment. This amount of bonus effectively raised annual reserve pay by between 30-40 percent. Thus, if reservists behaved like civilian moonlighters, reenlistment rates should increase by 30-40 percent. Approximately 15,300 individual reservists participated in the test with somewhat less than one-half being offered bonus payments. The results (see Table 9) showed that the presence of bonus payments raised retention rates from 38.4 to 40.6 percent--a 5 percent increase. This was much smaller than the anticipated 30-40 percent effect, and supported the hypothesis that reservists did not behave like the ordinary civilian moonlighter.

On the other hand, the bonus definitely encouraged longer terms of commitment. Among reservists who reenlisted, 82 percent chose 3-year or 6-year terms, while only 12 percent of those in control regions did so. The average term of commitment amounted to 4.4 years for the test region and 1.3 years for the control region. Analyses of actual participation as of December 3, 1979, one year after the completion of the test

Table 9

REENLISTMENT RATES FOR BONUS AND CONTROL GROUPS IN 1978 SELECTED RESERVE REENLISTMENT EXPERIMENT

	Bonus Group		Control Group	
	Number	Percent	Number	Percent
Reenlisted	2390	40.6	3201	38.4
Separated	3496	59.4	5134	61.6
Total	5886	100.0	8335	100.0

SOURCE: See [23].

indicated that the bonus group declined from 40.6 to 37.3 percent of the original sample while the control group dropped from 38.4 to 30.4 percent. Of those who originally chose to stay in the reserve, 91.9 percent of the bonus group and 79.2 percent of the control group remained until December 31, 1979. Thus, by lengthening the term of commitment and postponing subsequent separation decisions, the bonus tended to reduce overall separation from the bonus group.

Further support for this difference came from survey data collected from the individuals in the test. The survey data included the primary civilian job wages, working hours, and a number of other characteristics hypothesized to be related to reserve reenlistment. Analysis of this data[4] showed much weaker responses not only to reserve compensation, but also to the effects of longer civilian job working hours and higher civilian wages. Instead of elasticities around one, all variables, although statistically significant, had elasticities in the .1-.3 range.

A different picture of reservists emerges from this data. Basically he/she was less motivated by monetary concerns than the average moonlighter, and seemed to have strong taste for the reserve job itself. Separation seemed to be a decision caused primarily by conflicts or events happening in family or civilian work life, and not by events or circumstances in the reserve job. This basic taste for reserve participation may be similar to that found in various voluntary organizations. There, association is not based on monetary, but leisure time needs. The reserve job seems to be somewhere between this kind of "voluntary" participation and the typical monetary induced moonlighter. A closer examination of the requirements of the reserve job and typical moonlighting job tends to reinforce this view.

Reserve participation has several features different from civilian moonlighting jobs which could make the secondary wage moonlighting elasticity and military reserve elasticity quite different. First, work hours are quite different. A reservist averages only 4 hours per week--usually on weekends--whereas the median for a civilian moonlighter is 13 hours.[33] Since average hourly civilian moonlighting pay and reserve pay are roughly equal, annual income from reserve participation is much lower than that from typical moonlighting jobs. This may imply that taste plays an important role in reserve decisions.

Second, reservists must legally commit themselves for up to 6 years of service, and they can be mobilized during periods of threat to the national security or, in the case of the National Guard, to assist in peacetime civil emergencies. This term of commitment creates certain opportunity costs for reservists not present in civilian moonlighting jobs.

Third, reservists receive health, education, life insurance, tax, and pension benefits. For certain reservists, these benefits--all of which are usually not present for civilian moonlighting jobs--substantially boost reserve income. Reservists can, for instance, qualify for a pension payable at age 60 after 20 years of satisfactory service. These types of benefits are usually not available in civilian moonlighting jobs, and their presence would tend to lower responsiveness to direct changes in base pay.

Fourth, unlike most civilian moonlighting jobs, reserve duty time and primary job time can directly conflict. The work schedule for reservists calls for a two week period of full time work during annual training requiring absence from civilian work. While employers are legally bound to provide military leave, evidence suggests that the requirement for annual training often creates conflict between the reservist and employer. Also, reservists must have full-time military training to qualify for reserve entrance and certain types of promotion. On entry, reservists must undergo at least 12 weeks of full-time training, and special training is often required for advancement. Again, for reservists employed full time, training interrupts the primary job. Consequently, individual decisions to join the reserve cannot be considered independently of the type of primary job held and the attitude of the employer toward reserve participation.

Finally, the reserve job offers certain nonpecuniary rewards. The work itself often offers opportunities for training and the use of unique equipment. The social environment seems to create a sense of camaraderie and cohesion. These rewards may play an important role in reserve participation and can lead to a model of participation which includes consideration like those present in voluntary associations. In this view, reserve participation primarily can satisfy leisure, patriotic

or avocational needs, and the income potential is secondary. If these needs are the prime reason for participation, one would expect small pay elasticities. One explanation of the relatively weak response to increases to current compensation, therefore, is that reserve participation decisions might be dominated by taste variables or nonmonetary rewards more associated with decisions to join voluntary groups (i.e., volunteer fire departments). Another explanation is that the effects of reserve retirement benefits which require 20 years of participation might exert strong influence even for first term decisions.

METHODOLOGICAL CONSIDERATIONS

The research results in the attrition/retention area, as well as in other military manpower areas, depend on the specific questions posed, the type of data utilized, and the statistical techniques used in the analyses. The problems and the issues continue to change, both with personnel management considerations and with unanticipated historical events. Some of the anticipated issues have already been discussed. Here, we review the types of data available in the United States and their strengths and weaknesses. Most of the discussion applies to both Active and Reserve Components. Differences in the data, and special applications and issues in each context, will be indicated.

Administrative Data

By administrative data we mean personnel-related information collected from individuals and/or maintained about them, primarily for record-keeping purposes. Such information determines eligibility for various forms of military compensation, health benefits, and performance assessments. For both the Active and Reserve Components, these data are largely automated and available for policy research purposes. At present, each of the military Services maintains and continuously updates administrative data on its personnel. These records are more detailed than those at the Department of Defense (DoD) (or "headquarters") level, where the data is used for policy formulation and assessment rather than for detailed personnel management. For example, a Service administrative record may indicate the precise date on which

the individual will be transferred to a new location; the DoD file carries only a current location with no reference to a future move or date of assignment.

The primary administrative data source, at the Department of Defense level, for Active Force personnel are the Enlisted/Officer Master Files maintained for the Office of the Assistant Secretary (Manpower, Installations and Logistics) by the Defense Manpower Data Center (DMDC). These files go back to 30 June 1971 and are updated on a quarterly basis. Also maintained by DMDC, for the Office of the Assistant Secretary (Reserve Affairs) is the Reserve Components Common Personnel Data System (RCCPDS), the primarily administrative data source for reserve personnel. This system was established in March, 1973, and became the official source of inventory figures for the Reserve Components in July, 1974.

As a research data source, administrative data have both unique aspects and some limitations. Obviously, the same information is available for the total active or reserve population. The researcher can utilize total data and generally not encounter any sample size limits when dealing with population subgroups.

The limitations of administrative data relate primarily to their narrowness of scope and lack of depth. The number of data elements maintained is limited to the basic requirements of personnel management, and further restricted by considerations of invasion of privacy, perishability of information and updating costs. For example, while most military administrative files indicate number of dependents, there is no information about ages or relationships to the member outside of some specific, recently constructed, special purpose files. Examination of the major data elements available on either the Active Force administrative file (Appendix, Tables A and B) or the Reserve Components file (Appendix, Table C) shows that they are restricted to personal characteristics and current military information.

With associated files regularly reporting accessions, reenlistments and separations, the major administrative systems enable us to conduct a wide range of studies. They allow us to study attrition/retention in the whole system at given points in time (i.e., cross-section), or across time (i.e., time series). Using individual identifiers, we can

construct cohort files, for the longitudinal study of attrition, retention, promotions and other movements of individuals within a specific service, across service lines, and in and out of the military. (A cohort is generally defined as all individuals who are accessions [gains] during a fiscal year.) For the Active Components, cohort files have been constructed for each fiscal year since 1971. For the Reserve Components, the cohort files begin with 1975, although 1975 and 1976 are somewhat incomplete for various technical reasons. (The survival rate data presented in Table 7 above is a prime example of the use of a longitudinal cohort file).

In addition, the Reserve Components records can be matched with the Active Force files so that complete longitudinal histories on military participation can be constructed. If, for example, a former reservist joins an Active Component, his enlistment record can be added to the reserve cohort file. Since reservists generally enlist for three-, four- or six-year terms, with the majority being six years, we are just beginning to have complete longitudinal profiles with which to study both attrition and retention for the earlier cohorts. For the Active Force, since the average term is four years, cohort files are available for nonprior service accessions who enlisted during Fiscal Years 1971 through 1979. These files provide data for attrition research on a population of over two million.

Survey Data

Survey data includes social characteristics, descriptive economic, demographic, and behavioral information, as well as data about tastes, preferences, experiences, and projected behaviors. Survey data is currently collected from samples of individuals, using a range of methodologies. Data is collected through personal and telephone interviews (both standard and computer-assisted) and through self-administered questionnaires distributed and collected individually or in group settings. In the past several years, significant progress has been made in the development of both Service-specific and DoD-wide survey data bases that can support policy formulation and research on defense manpower problems. Particularly if collected periodically, these data will serve as a basis for assessing the response of military

personnel to policy changes and for identifying areas for future policy action.

Several years ago, the life cycle shown in Figure 1 was proposed as an appropriate conceptual framework for organizing DoD's survey research program.[14] From the perspective of military manpower policy, let us assume (for simplicity) that individuals can be characterized as being in one of the major categories shown in Figure 1 and that clear transition junctures can be identified as they move from one category to another. For example, someone can be in the Active Force, the Reserve Forces, or the civilian labor force, or may be in transition between any two. Although the Figure describes individuals, given the importance of military personnel policies on members' households they are shown and will be discussed later. It should also be kept in mind that studying the military life cycle requires information not only about military personnel, but also about the civilian population eligible for military service, the civilian lives of reservists and the veteran population.

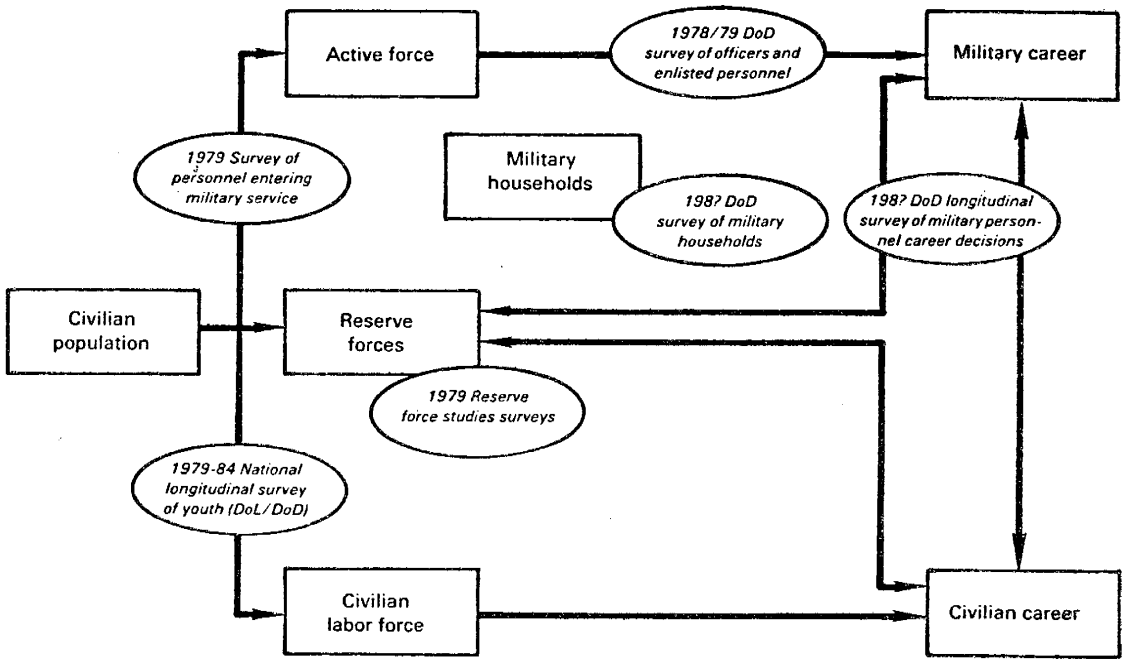

Fig. 1 -- Conceptual framework: Life-cycle model of military participation

Against this framework, it is possible to examine the major military personnel surveys conducted in the past several years, as well as those surveys which have included personnel at different transition junctures between military and civilian life. The discussion will be restricted to techniques, methodologies, and problems of attrition/retention survey efforts, with a secondary focus on surveys which deal with initial accession into the Armed Forces.

Pre-Military and Entry Surveys. The microanalysis of the enlistment-decision process has been generally studied with data collected from individuals immediately after they enlisted or at training locations. These data have included information about the individual such as socioeconomic background, labor force experience and earnings, exposure to military recruiters and various forms of advertisements, reasons for entry, etc. These data are limited, however, for several reasons. The population being studied includes only those who have decided to enlist, and thus is not very informative about those who do not, i.e., there is no comparison group. Also, the data is static, i.e., provides a view of the individual only at a specific point in time. Finally, questions can be raised about the reliability and validity of information collected about the enlistment decision by the "employer."

As a start towards addressing these problems, several past and ongoing studies have been conducted with somewhat improved designs. Often, data bases have been combined in innovative fashions to provide additional analytic insights. First, DoD participates in the ongoing *National Longitudinal Survey of Youth Labor Force Behavior,* started in 1979 (1979 NLS)[5] in cooperation with the U.S. Department of Labor. The study began with a national stratified sample of approximately 12,000 young men and women aged 14 to 22, and a supplemental sample of young men and women, 17 to 22 and serving in the military in 1979. The whole sample is personally reinterviewed annually, thus creating a longitudinal data base. Questions pertaining to military life are asked of both civilians and military members. For example, sample members who are civilians in one interviewing cycle and have enlisted before the

next are asked about the reasons for enlistment. Conversely, reasons for reenlistment/separation are addressed to those who leave the military between interviewing cycles. Aside from analyzing the individual's own perceptions of decisions, a comparison of their particular circumstances, e.g., educational or employment status, before and after decisions are made provides additional insights.[31]

Second, several past surveys were conducted which sample individuals prior to enlistment. The samples were selected from individuals who took the required written tests for entrance into the military.[35] The surveys involved telephone interviews of three types of respondents: (a) applicants who had *not* enlisted; (b) applicants who *had* enlisted and who were in the Delayed Entry Program (DEP) waiting to go on active duty; and (c) applicants who had enlisted and were on duty at basic training. The economic, educational, and demographic factors that distinguish applicants who enlist from those who do not can be analyzed within a consistent data set.

Third, several current U.S. national youth surveys ask about the likelihood that respondents will enter military service.[41] These surveys allow for the study of enlistment motivations of various groups in different broad geographical areas. This research has been largely based on the assumption that, indeed, a direct relationship exists between enlistment intention and actual enlistment. This assumption is discussed in Section 3.2.2 below.

Fourth, data from two different survey samples have been pooled to form a "choice-based" sample of enlistees and nonenlistees. Data on enlistees come from a DoD-wide survey, the *1979 DoD Survey of Personnel Entering Military Service*.[11] Data for nonenlistees come from the previously discussed 1979 NLS. This special sample, known as the AFEES-NLS, contains data on individuals identified as having made or not made a choice to enlist, under similar circumstances, in the same period of time. This pooling makes the sample available for studying the enlistment decision substantially larger than if the analysis had been limited to the 1979 NLS alone. The information provided by enlistees can be analyzed against an appropriate comparison group, i.e., similar individuals who had not enlisted.[29]

Longitudinal surveys are, by definition, reinterviews conducted with the same group, or panel, of individuals. Thus, the 1979 NLS described above is a true longitudinal survey; in fact, the first wave of interviewing took place in spring, 1979, and the sixth has just been completed. Unfortunately, longitudinal surveys are extremely costly, as a result of the complexities of sample maintenance. However, through linkages of survey data with administrative data, it is possible to create "mixed" longitudinal files that have substantial analytic utility. For example, in the *1979 DoD Survey of Personnel Entering Military Service*, actual follow-up of respondents became logistically and economically unfeasible. However, the data base has been updated by linking individual records to the Enlisted/Officer Master Files described above. Since, by 1984, most of the sample has either attrited, completed the initial enlistment term and separated, or reenlisted, an analysis of its behavior and progression through military careers is possible in conjunction with the original survey data.

Survey data, cross-sectional or longitudinal, can also be enriched by the addition of aggregate data to individual records. Several studies have added geographically based data to provide a way of measuring the environment of enlistment-decisions. For example, in creating the pooled AFEES-NLS data base[29], information was added about employment conditions and number of recruiters in a respondent's geographic area at the time of interview.

In-Service Surveys. To date, two basic survey designs have been used to collect data for studying attrition/retention issues in both Active and Reserve Components. First, either as special studies or as parts of multi-topic surveys, cross-sections of military personnel have been asked to indicate their reenlistment/career intentions. On the whole, samples have not been stratified on the basis of distance from various obligatory decision-points. Second, special surveys have been conducted with individuals who are leaving the military, i.e., are at the transition juncture from military to civilian lives. The latter have been restricted almost entirely to Active Force personnel, and pose special methodological problems, as will be discussed below.

At present we do not have consistent or definitive survey information with which to disaggregate the various factors that "push" the individual out of military life, or to assess whether the factors that "pull" an individual into civilian life are realized. As discussed earlier, understanding the push factors is critical if we are to manage the force more effectively; understanding the pull factors may become critical in developing policies with which to retain service personnel and to increase prior service enlistments. An ideal survey for this purpose would collect data at reenlistment or separation points, and conduct follow up studies as individuals remain in the military or resume civilian lives. While methodologies are developed to collect such longitudinal data, survey researchers have implemented several alternatives which obtain data from cross-sectional population surveys.

The most effective current approach is systematically to survey individuals about their reenlistment *intentions*, at various times prior to the actual decision. Such surveys are described below. *If* the survey measuring intentions also contains information about possible reasons for the decision--either for or against reenlistment--and *if* we can relate intentions and behavior with some assurance, policy-relevant analysis can be conducted. In fact, several efforts undertaken over the past several years suggest that statements of enlistment and reenlistment intentions provide good predictions of both actions.

As noted earlier, several current U.S. youth surveys ask about the likelihood of respondents entering military service. Some of the surveys ask about propensity for military service in general, others about intentions to join a specific service. This information is used in a variety of ways, such as to assess the effectiveness of various advertising efforts, to forecast possible future changes in enlistment rates, and to study enlistment motivations. Until recently, no systematic work evaluated the validity of the assumption of a direct relationship between enlistment intention and the likelihood that individuals will actually enlist. Recently, systematic research to explore that relationship was undertaken, using data from ten semiannual waves of the *Youth Attitude Tracking Study (YATS)*, covering spring 1976 to fall 1980.[36] The results suggest that the enlistment intention

measures discriminate the respondents' true probabilities of enlistment. For example, the overall results indicate that 33 percent of those who indicate that they definitely will enlist actually do so. In addition, the individual has no way to assess, except in a general way, his ability to qualify for military service, nor to forecast the military's ability to meet specific interests. In other words, both enlistment standards and personnel requirements are unknown to the respondent.

In another context, more directly related to issues of separation and retention, surveys of Active Force members have included questions about the respondents' probability of reenlisting. The response categories were presented in terms of probabilities (0 in 10; 1 in 10; . . . 10 in 10), with verbal cues to guide the answers (e.g., 9 in 10 = almost sure). Respondents were also asked for reenlistment probabilities under several hypothetical options, e.g., assuming that a reenlistment bonus would be offered, assuming that they would be given a choice of service location, etc.

Recently, a researcher reviewed the results from several surveys in which it was possible to link survey data with administrative records and assess actual behavior.[28] In the two major studies reviewed, it was shown that statements of reenlistment intentions on surveys provide good predictions of behavior when adjusted for *underestimation*; i.e., respondents tend to underestimate their reenlistment probability. He also suggests, based on data provided in a DoD-wide study[6], that the ratio of the probability of actual reenlistment to the probability of intended reenlistment is 1.09. The author then concludes that ". . . intentions data appear to be closely and systematically related to the actual reenlistment behavior and may be used in analyzing reenlistment factors." Much still needs to be done to validate the estimated parameters from such models.

In conducting this analysis, Hiller used data collected in the *1978/79 DoD Survey of Officers and Enlisted Personnel*[10], a worldwide survey of more than 54,000 men and women on active duty in the four Services. Many of the instrumentation techniques developed in that survey, especially those pertaining to reenlistment intentions, are scheduled for replication in the next year.

The implications of using intentions data for understanding the motivations for reenlistment decisions are self-evident. The administrative records currently include the results of reenlistment decisions, provide some of the demographic and military characteristics of individuals, and contain much information on rotation and location. More can be done using the latter information to analyze the effects of rotation and location on retention. However, some of the key factors behind those decisions can only be measured with surveys. An example is spouse income.

1985 DoD Surveys of Officers, Enlisted Personnel and Spouses. The major military surveys have tended to collect household and spouse information from the service member; i.e., have excluded surveying family members. (The exceptions have been assessments of family programs and services or studies which have collected psychological measures from fairly small samples.) In collecting and using these family data, it is assumed that the service member can accurately report objective data about the household, e.g., spouse employment, and has a good understanding of the family's orientations towards and opinions about the military as well. At least the latter assumption may be faulty.

In the past two years, the Department of Defense has concluded that reliable systematic, cross service information about the characteristics, experiences, educational and occupational plans, attitudes towards the military, and preferences of household members needs to be collected. The concern for families stems from two somewhat different motivations. First, retention decisions seems to be affected by family preferences. Second, there is new concern for the way in which Defense policies and programs affect these members and their families. As a result, DoD is currently planning a major study of military families. The study will, in fact, consist of two surveys: a world-wide survey of a sample of approximately 190,000 military members on active duty, and a companion census of all spouses of those members, i.e., approximately 100,000.

These surveys will provide a unique opportunity for studying reenlistment decisions. By asking both members and spouses to provide motivational information and reenlistment intentions, we can better understand the interplay between military factors and strictly "family" factors in ultimate decisions. The survey data base for the members will be structured so that subsequent follow-up using administrative records will be possible. The study design also includes the potential for several methodological studies, in addition to the substantive data collection. For example, we can get better estimates of the reliability of information collected from the member about the spouse, by asking some identical questions of both.

Separation Surveys. In the past few years, several services have attempted systematic surveys as part of the routine out-processing of members from the military, i.e., "exit" surveys. These efforts have had problems: some are readily correctable, some are unavoidable and suggest the need to develop alternative methodologies. Several of the questionnaires, for example, have been restricted to an assessment of "push" factors, without consideration of civilian "pull." Thus, the results may overstate some military-related factors because data for a more balanced view is unavailable. These problems can be corrected, if some of the results from the attrition/retention research summarized above are used in questionnaire construction.

Also serious, however, are the low response rates. Nonreceipt of questionnaires by respondents and nonresponse contribute to overall response rates ranging from 7 percent to 40 percent of an eligible survey population, with most being at the lower end. Since nonreceipt and nonresponse cannot be separated, solutions become more difficult. As will be discussed in a later section, sample identification and location cause further complications.

The 1979 Reserve Forces Studies Surveys. These surveys have been the major work, to date, especially focused on the reserves. They are described in some detail, because their design merits consideration for replication in the United States and in NATO countries. These surveys were designed to meet several specific objectives: provide data for analyzing differences in Reserve Force unit manning and readiness

levels, obtain descriptive statistics from a representative sample of reservists beyond that available from the computerized Reserve administrative records, collect data on factors influencing enlistment and reenlistment decisions, and provide a baseline data set for a Reserve Force population sample which can be monitored in the future to study attrition. The data was collected from the two Army components: the Army National Guard and Army Reserve. (Complete descriptions are available in [12, 13, 21, and 27].)

The final design called for the administration of four questionnaires: forms for junior enlisted personnel (E1-E4), senior enlisted personnel (E5-E9), the unit commanders, and a form to collect general information about each unit. Enlisted personnel were queried about their own enlistment/reenlistment motivations, as well as about various aspects of unit membership; the unit commander provided personal data as well as assessed the unit's strengths and capabilities. The general form provided environmental (contextual) information and, in addition, requested both objective and subjective information about the unit's most recent attrition case. When combined with administrative data such as size authorizations and aggregated economic data for the area surrounding each unit, the data base provides a multi-faceted view of the unit.

To meet the survey's objectives it was decided that it would be most effective to draw two separate samples--one, a random sample of units stratified by unit size; the other, a "case study sample" which focused on sets of units of similar types which had a range of manning levels (from full strength to far below strength).

The design called for a census of all personnel in the selected units on a specified weekend with some allowance for surveying absentees at a later date. The completion rate for the Unit (general) and Commander questionnaires exceeded 80 percent. In spite of intensive follow-up activities among enlisted personnel, the completion rate ranged from 44 to 67 percent, depending on the pay grade and the component (Reserve or National Guard).

Data from the *1979 Reserve Force Studies Surveys* can be used to study the enlistment and reenlistment decisions and the attrition of Army Reservists and Army National Guardsmen. These data may be used,

for example, to extend the 1978 Rand study of reenlistment decisions, discussed in Section 2.4, of nonprior service reservists who served from 3 to 8 years. Data from the 1979 surveys can be used to study personnel with prior service and to all personnel with between 3 and 20 years of service. The extension to personnel with prior service will be important because they constitute approximately one-half of reserve accessions and their reenlistment behavior is known to be characterized by one-year extensions and breaks in service. Models of both prior- and nonprior-service personnel will allow improved determination of the optimal accession mix for the two groups, as determined by the long-term costs and reenlistment behavior of each group.

The new Reserve data will enable the modeling of multiyear reenlistment behavior for all reservists, since the surveys collected complete individual histories (up to 20 years) on participation in either Active or Reserve Components. One might hypothesize that previous breaks in reserve service would be important predictors of future service. Thus, the information on past history can be included in the reenlistment model. The information can also be used to explore the delay between separation from the Active Force and enlistment in the Reserve Forces. Prior service reservists often do not join a reserve unit until several years after Active Force separation. Closing this gap can be important to reserve strength levels, but little is known about the length of or reasons for the delay. Knowledge of this kind will help determine how long the large Vietnam-era pool of prior service personnel will be available to the reserves. It will also suggest policies to attract a larger share of the pool when the decline occurs.

The extension of reenlistment modeling to include more senior reservists will also help evaluate the importance of reserve retirement benefits in reenlistment decisions. The effects of reducing benefits may be predicted from such models.

These surveys also collected reenlistment intentions based on a ten-point probability scale. By linking the survey data to administrative files, actual reenlistment behavior can be ascertained and compared with the intentions data. A weaker relationship between the intentions and behavior of reservists might be hypothesized, due to a weaker attachment (full versus part-time) to the military job, greater uncertainty in

civilian job demands, and less positive family attitudes. A finding similar to that for the Active Force would allow improved forecasting of reserve reenlistment behavior.

The 1979 survey data will also allow a more complete analysis of reserve attrition behavior. The new data provide information on the civilian labor force status, characteristics of the civilian job, civilian wage levels, family and marital status, and employer attitudes towards the reserve. In addition, they include many variables describing the unit environment, including training and equipment characteristics, morale, and manning levels. By linking survey and administrative files to determine which of the survey participants have left, fairly comprehensive attrition models can be developed.

As indicated above, the unit survey contains descriptive data on a recent nonprior-service attrition decision. These data, provided by the unit commander or technician, allow an evaluation of the individual who left and the reason for his leaving. We now do not know how much attrition is the normal winnowing of undesirable personnel initiated by unit commanders and how much is the loss of desirable personnel.

In addition, the Unit Commander survey can be used to characterize reserve unit commanders and analyze their assessments of reserve problem areas for different kinds of reserve units. Such assessments were obtained for personnel, equipment, and training resources. Many believe that the experience, management skills, and dedication of unit commanders explain much of the variance in unit readiness and manning levels. Data from this instrument can be combined with unit data to test this hypothesis.

Experimental Data

The discussion has referred to linkages of routinely collected administrative and survey data, to provide follow-up information on surveyed members, either in lieu of, or as complementary to additional surveys. A more direct link exists in military compensation experiments in which specifically structured administrative data and survey data have been used for evaluation purposes. Surveys conducted in conjunction with experiments are among the most recent developments in the military environment.

The 1978 Selected Reserve Reenlistment Bonus Test. In 1977, Congress authorized $5 million to evaluate the effect of a bonus on reenlistment in the Army National Guard and Army Selected Reserve. Bonuses of $1800 were offered for a 6-year reenlistment and $900 for a 3-year reenlistment, one half ($900 or $450) to be paid at the time of reenlistment and the remaining in $150 installments at the completion of each year of obligated service. Reservists extending their commitment for fewer than 3 years were not eligible. The bonus program sought to lengthen the term of commitment, as well as to increase the reenlistment rate.

So that the effect of the bonus could be evaluated, the test was experimentally designed to include bonus and control regions.[23] Approximately 15,300 individuals, in bonus and control regions, met the test eligibility criteria and constituted the experimental sample. The reenlistment decision of each member of the experimental sample, in both bonus and control regions, was monitored. Test specific administrative data were combined with demographic and military background information collected from the administrative personnel files (RCCPDS) to evaluate bonus effects by a statistical comparison of behavior in bonus and control areas. The information from the personnel files was used to control for small differences in the composition of the bonus and control groups. As a by-product of the analysis, the effects of certain demographic and military background variables on retention were measured.

During the design of the test, the scope was broadened to include the development of a model of the reserve reenlistment decision from which a reserve pay elasticity could be derived. Data to develop the model could be gathered through a survey administered during the test. Ideally, data from a survey, which would contain more detailed demographic and military background variables than contained in the personnel files, as well as information on reserve compensation, civilian labor force participation, and employer characteristics, could also be combined with the administrative results and the effects of these variables obtained simultaneously with the bonus effect.

The survey was administered at some time during the 3 months preceding the end of the reservist's term of service (ETS). As part of the processing related to reenlistment or separation, questionnaires suitable for self-administration were provided to units for each individual in both bonus and control areas.

Unfortunately, survey responses were received from less than one-half of the sample, and those returning surveys were not representative of the entire sample. As a result, survey results could not be used except in a very limited fashion. Specifically, survey data from a subset of test participants was found to be unbiased and was used to estimate a model of reserve retention behavior.[4]

It became clear, upon examination, that the test design made survey administration exceedingly difficult. Reservists in the experiment were located in over 1500 units throughout the United States. Some units had only a single member eligible. Resources were not available for administrative control of this dispersed sample through a system of monitoring individual units.

Survey nonresponse occurred because reservists either did not receive or did not return surveys. Nonreceipt occurred at both the unit and individual levels. Some National Guard units initially may not have received survey packets, since all packets were sent first to state offices and then forwarded to units. At the unit level, the surveys probably simply took lower administrative priority among other routine reports and personnel paperwork, so many were not given to reservists. Administrative turnover during the test accounted in part for the nonreceipt. Since surveys were distributed only at the beginning of the experiment, whereas individual end-of-term-service (ETS) dates were spread over one year, it is likely that as time went on more reservists failed to receive surveys.

Other response patterns probably reflect a combination of nonreceipt and nonreturn. Response rates among those who reenlisted were higher than for those separating. This is probably explained by the greater likelihood of absence (and not receiving a survey) from final drills for those separating, as well as less incentive to return surveys actually received.

Survey response patterns also differed in bonus and control areas among those separating, i.e., higher in control than in bonus areas. In bonus areas, response rates were low both for those separating and for those reenlisting for a single year. One possible explanation is that a backlash effect occurred in the survey response because of both the reenlistment decision and the bonus decision. Those rejecting a bonus or separating elected not to return surveys. Another explanation is simply that some administrative personnel in bonus areas associated the survey with the bonus, and gave questionnaires only to those reenlisting with a bonus.

The results of this experience have been instructive as subsequent surveys have been conducted as adjuncts of field experiments as discussed below, and in improving procedures for data collection among the Reserve Components, e.g., the 1979 *Reserve Force Studies Surveys*.

Enlistment Experiments. Subsequent to the *1978 Selected Reserve Reenlistment Test*, three enlistment tests have been conducted; a test of offering shorter terms of service in 1979-80[26], an educational benefits test in 1981[16] and, still on-going, is a 1983-84 test of enlistment bonuses. In the latter two cases, surveys have been conducted to assist in the test evaluation. Neither test, however, has attempted to administer questionnaires directly to individuals who either elected a specific educational package or who signed up for a specific bonus. Rather, a somewhat different, and more effective design was developed, as described here.

In 1981, the Department of Defense carried out a Congressionally mandated Educational Assistance Test Program to estimate the effectiveness of educational benefits in increasing high quality enlistments, and in filling selected occupational specialties in the military services. The test was begun in December 1980 and continued through September, 1981. The evaluation of the test, based on administrative records, compared the number of high quality enlistments in the areas of the United States that offered four benefit programs.[16, 37] The *1981 Survey of Applicants to Military Service* was designed to complement the test, by serving several purposes: first, to assess the implementation of the test programs, particularly the extent

to which recruiters in each test area used the benefits as enlistment incentives; second, to collect information about military applicants' awareness of and interest in educational benefits; finally, to study the economic, educational, and demographic factors that distinguish applicants who enlist from those who do not.

The survey was administered to a stratified random sample of about 4,600 nonprior service young men, testing for active-duty service, who took the written entrance test, the Armed Forces Vocational Aptitude Battery (ASVAB), in April, 1981. A 40-minute telephone interview of the applicants was conducted during May-June 1981. As indicated in the previous discussion of entry surveys, the sample consisted of three types of respondents: (a) applicants who had *not* enlisted; (b) applicants who *had* enlisted and were in the Delayed Entry Program (DEP) waiting to go on active duty; and (c) applicants who *had* enlisted and were on active duty (at basic training).

The design appears straightforward; however, implementation presented some methodological problems. The use of telephone interviewing was predicated on the assumption that it was important to capture information as close to the decision-making point as possible. A mailed, self-administered questionnaire would lengthen the time period between the respondents' interaction with the recruiting system and data collection. If response rates were low, as was the case of the reserve reenlistment experiment discussed above, it was likely that individuals who elected not to enlist would be under-represented, biasing the results and undercutting the purpose. Computer-assisted-telephone interviewing (CATI) was used because of the complexity of the questionnaire. Since the interviewer would not know, until the interview was begun, what decision the respondent had made, CATI allowed for complex skip instructions to accommodate all possible questionnaire permutations. (A self-administered questionnaire would have been almost impossible to design, for similar reasons.)

Telephone numbers, however, are not collected as part of the administrative information at the recruiting stations. Therefore, special procedures were developed whereupon applicants filled out a short form at the time they took the written test. The telephone information was subsequently manually matched with the sample's administrative record and provided to the survey subcontractor.

The effectiveness of the procedures used was reflected in the response rates. Telephone interviews attempted with 4009 civilians at home telephones (87 percent of the total sample) fell into two groups: (1) those who had not enlisted by the time of the interview (four to eight weeks after initial testing); and (2) those in DEP. Of these, 85 percent completed the interview, about 3 percent refused, and the rest were either unreachable or were not locatable. Telephone interviews with those who were at basic training were conducted as "call ins," at designated times. Of the 596 who were on active duty (13 percent), 72 percent completed the interview, 14 percent were scheduled to "call in" but failed to do so, and the remainder could not be reached. An additional 150 on active duty were never scheduled for interviewing, for a wide variety of reasons. The overall response rate (completed as a percentage of those selected) was 80.9 percent.

The methodology developed in the 1981 survey, with some modifications, was replicated in 1983. In 1982, the United States Army was authorized by Congress to carry out an enlistment bonus test program to compare three alternative cash bonus options and determine their success in helping fill critical occupational specialties. The experiment was begun in June 1982 and will extend through September 1984.[38] The *1983 Survey of Applicants to Military Service* was undertaken to complement the bonus test. The survey, like its predecessor, provides information on the implementation of the test programs, on applicants' awareness of cash enlistment bonuses and military educational benefits, on the factors that distinguish applicants who enlist from those who do not, and on the appeal of various enlistment options.

The major improvement in the procedures, as compared to 1981, was the automation of the telephone numbers collected from applicants. This made it possible to match telephone numbers to the sample data by computer, on an on-going basis, whereas in 1981 the forms filled out by applicants were manually filed, by social security identification number, and matched. As a result, the match rate was increased and the average time between the written (ASVAB) test and the survey interview was reduced from about six weeks to four weeks. This reduction

increased the response rate, since fewer applicants had to be contacted at basic training and the ability to locate respondents at civilian telephone numbers was greater. In this survey, telephone interviews were completed with 6870 applicants, or 91 percent of the total sample of non-enlistees or enlistees awaiting a basic training reporting date, 1 percent refused, and the rest were either unreachable or were not locatable. Of the 154 who were on active duty (2 percent of the total), 122 completed the scheduled "call in" interview, 15 percent failed to "call in," and the remainder were not interviewed for other reasons. The overall response rate (completed as a percentage of selected) was 91 percent.

In all three experiments, there was, or is, follow-up of the individuals involved. In the case of the *1978 Selected Reserve Reenlistment Bonus Test*, a study has been conducted showing the actual continuation rates of those who selected bonuses.[19] Follow-up has been restricted to monitoring the initial total sample through personnel records, with no further effort to utilize the survey data. The samples interviewed in the surveys of military applicants, however, are being followed up through the administrative personnel records. Obviously, we will be able to identify those applicants who did not enlist at the time of interview but did so subsequently, as well as track the military performance of all enlistees and, for example, link attrition to some of the background characteristics and attitudinal information collected in the survey.

Survey-Related Issues

Some general methodological problems inherent in survey data collection have been mentioned earlier. Here, we focus on specific issues: data collection, response rates, and the timeliness of data as input into the policy process.

Data Collection. Data collection methodologies currently available vary in both cost and efficiency; in the private sector, personal and telephone interviews (both standard and computer-assisted) are generally preferred to the less costly and inefficient self-administered methods. Concern about data collection costs and the requirement to minimize any interference with the military have handicapped military survey research.

In the Active Force, the most common mode is the use of self-administered questionnaires, with participation time at the individual's discretion. In the Reserve Components, self-administered questionnaires distributed and collected in a group setting predominate. To date, personal and telephone interviews have been restricted to special studies.

The reasons for the differences are both practical and legal. By definition, Active Force members are on duty on a full-time basis and participate in a wide variety of activities with different schedule demands. It is most efficient to provide questionnaires, authorize duty time for participation, but allow individual allocation of time. The use of sample selection lists allows the survey administrator, in some studies, to monitor response rates and participation.

Reserve drills, as noted above typically involve one weekend a month and two weeks active duty during the summers. Training time is at a premium and makes a scheduled group-administration for data collection difficult. Since these surveys are intended to provide information related to Armed Forces membership, they can be filled out during drills. In addition, federal regulations preclude distribution of questionnaires at drills with a request that the reservists fill them out on their own time. While it would be possible to conduct telephone interviews with reservists, or send them questionnaires to their civilian addresses, the required survey licensing process becomes more lengthy and cumbersome.

At the present time, statistical data collection activities at the federal level in the United States make only limited use of the telephone interview, and that use is primarily in combination with other methods, such as the mailed questionnaire or the personal interview. When used as the sole data collection method, it is most commonly used in one-time or occasional surveys, those with smaller than average sample sizes, and surveys which are conducted by contractors. Very few statistical surveys conducted directly by government agencies utilize more recently developed telephone survey methods, such as random digit dialing (RDD) and computer-assisted telephone interviewing (CATI). Recent estimates indicate that only 2 percent of about 2,000 surveys

reviewed listed telephone interviewing as the sole data collection method; and only 9 percent listed telephone interviewing used in association with other methods, such a self-administered questionnaire (4 percent) personal interviews (2 percent) or both (3 percent).[34]

Within the Department of Defense, the use of both standard telephone interviewing and CATI as a sole method has been primarily in studies of civilian populations, e.g., studies assessing interest in the military or studies of individuals who have made definite contact with the recruiting system.

Aside from cost, telephone interviewing of Active Force military personnel presents extraordinary logistical problems. In the civilian sector, respondents are typically contacted at their home telephone numbers. Military personnel, many of whom live in barracks or bachelor quarters, have no home telephone numbers as such. Telephone numbers for those who have home telephones are not readily available. Many of the benefits of telephone surveys would be lost, e.g., the timeliness of data collection, if a sample was selected and home telephone numbers had to be obtained for the members. Telephoning work locations may create disruptions of regular military operations. Finally, there is a reluctance to contact individuals off-duty, even if telephone numbers are available.

Most recently, the Army undertook two feasibility studies of using telephone methods for surveying active Army personnel. The studies relied on two methods for contacting respondents: appointment calls and "call ins." The former were set up through the chain-of-command; a contractor called and interviewed personnel at their work (unit) telephones. The latter involved accepting calls from pre-informed military members. For one study, the Army found that response rates were substantially improved through these telephone methods (63 percent compared to 30 to 40 percent in Army mail surveys with similar populations). In addition, the data collection period was considerably shortened and respondents' general response to the survey was extremely positive.[32]

Response Rates. Response rates tend to be driven downward by problems associated with sample frame identification, sample availability, and individual cooperation. Depending on the issue,

sample identification is either relatively straightforward or fraught with problems. Researchers have been fairly successful, in studying the determinants of enlistment, in identifying sample on the basis of their passage through a specific stage in the enlistment process, e.g., all individuals who take the military entrance examination in a given period of time. The sample availability issue was solved by efficient telephoning to homes and the "call in" method.

The study of individuals at the "exit" juncture is complicated by all of these issues. Sample frames, to a large extent, are dependent on self-identification. Certainly in studying first-term attrition, it is unlikely that timely, unbiased data can be collected, even if researchers had full cooperation in identifying and locating individuals prior to their leaving the military; where attempted, individual cooperation has been remarkably low. A major exception have been the military members in the national longitudinal panel described earlier (1979 NLS); many were interviewed, in person, following their attrition from the Armed Forces (a response rate of over 80 percent).

Service administrative records should indicate the intent to separate; i.e., in principle, sample frames can be identified. In fact, even at the service level, the exceptions are as common as the rule. Notification of intent to separate at the end of obligated service varies considerably; separation is not centrally processed until after it takes place, and discharges are not all processed through designated administrative offices. Even if sample identification was not a problem, locating selected members and gaining cooperation would continue to be. As indicated earlier, efforts to survey individuals at the separation transition juncture have produced data which has been somewhat informative at best and misleading at worst.

The concerns about costs and operational interference have also led to the strong support of data collection methodologies which utilize operational military personnel as data collectors. Thus, in the "exit" surveys, questionnaires designed for self-administration are routinely provided to administrative personnel at processing stations and they are requested to collect data in addition to their routine responsibilities. This request often is not transferred to new administrative personnel, creating yet further problems in data collection until the requirement

is "rediscovered." Since survey participation is time-consuming--as well as voluntary--for the respondent, and the administrative personnel are overworked and generally probably uninformed about the ultimate utility of the data being collected, it is not surprising that response rates have been very low.

There are several reasons for emphasizing response rates here: first, the implications of low response rates, i.e., biased and low quality data, have received insufficient attention in military survey research; and second, these problems are more serious in studying transitions in the military life cycle. The lack of attention is partially understandable. Researchers are reluctant to emphasize low response rates, especially in view of the other difficulties associated with conducting survey research in the military. The techniques both for checking response bias and making possible adjustments are time-consuming and complex; in many instances, it is clear that the data should be discarded. Conveying the implications of bias at the management level, often inadvertently implicating others for administrative failure, risks even less support for future data collection.

Low levels of respondents' cooperation at transition junctures result, to some extent, both from the normal pressures connected with any life style transition and especially from their inability to see survey utility. The difficulties of combining data collection with routine processing, noted above, is highlighted in a recent study of unreimbursed moving costs. Individuals were mailed forms upon relocation and asked to report costs associated with military relocation which were, on the basis of current regulations, unreimbursed. As individuals, they could not immediately fully profit from the data collection, although they could use their own costs in claiming tax deductions. Nevertheless many, especially those who intended to remain in the military, could envision a long-term gain if policies changed. The survey, however, has experienced response rates in the neighborhood of 37 percent.

Military surveys can be improved if well-defined procedures are established, especially for use with nonprofessional data collectors. These include advance notification through military channels, clear and

concise administrative procedures, a telephone "hot line" for use in administrative problem solving, sample rosters designed for local monitoring and unit level reporting to central survey monitors, and some follow-ups. The response rates to the annual Variable Housing Allowance Survey reflect the effectiveness of this approach. This data collection effort is used directly in calculating benefits; namely, to determine location specific increments to the basic housing allowances provided to personnel who do not live in military quarters. In the four years since this survey was initiated, overall unadjusted response rates have ranged from 70 percent to 73 percent. This year, information was available with which to more accurately estimate an adjusted rate, i.e., 81 percent.

Timeliness. High-quality survey research is both time-consuming and expensive. To properly administer surveys, they need to be designed, samples selected, questionnaires developed and pretested, and fieldwork activities implemented. To allow respondents every opportunity to participate, and improve response rates, extensive follow-up activities are required. Data cleaning, sample weighting and analysis are equally time-consuming and labor-intensive. Frequently, sound survey analyses are not available until after policy decisions have been made.

Analysts can avert some of these problems in several ways. Periodic surveys can be conducted which collect data on recurring issues. Thus, data will be available for addressing, at least partially, policy questions as they arise. Further effort should go into the utilization of existing data bases, especially if combined with administrative data and aggregate data. Most optimistically, feasibility studies on the utilization of the telephone with military populations should continue.

IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Researchers must foresee which questions, not being addressed by current work, will become important in the future. With this principle in mind, both (1) present trends in the United States military personnel structure, and (2) the policy environment in which personnel decisions are made, will be considered to define issues of future importance.

Possible research directions for the study of these issues will then be discussed.

Decisions involving the size and structure of the U.S. Armed Forces will be made in a policy environment of increasing fiscal austerity. The projected environment will develop from a decreased growth in the overall defense budget coupled with more competition within defense for personnel related funds which will accompany the monetary demands of weapons modernization. This will occur at a time when personnel related costs will be rising due to an increase in the more experienced force, with its correspondingly higher pay and retirement costs, and the associated increase in demands or services which are more heavily utilized by older personnel (housing, medical care, family services, etc.). Personnel costs will thus rise even if the force size stays constant. Furthermore, there will be pressure to increase overall force size to adequately operate and maintain the new weapons entering the inventory in the coming years. These factors will motivate an increased emphasis on efficiency in assessing both the required experience level and mix of personnel and the compensation package (this includes both pecuniary and nonpecuniary benefits).

The new emphasis on efficiency is already evident in questions of whether reserve forces--which have lower personnel costs--can shoulder a larger share of the defense mission. Recent Congressional actions have kept Active Force sizes constant, while increasing Reserve Components strength. Thus, reserve personnel questions will become relatively more important.

In both the Active and Reserve Components, the questions of efficiency will arise as the need to define the required experience mix of personnel becomes more critical. The present direction is to an increase in the proportion of more senior personnel, but the increased costs associated with a more senior force should not be allowed to outweigh its increased productivity. Decisions on how "senior" the force will become will be implemented through second and third term retention policy, thus exerting influence at the point where personnel essentially make career decisions. More personnel will be reaching the second and third term decisions, but the services will probably exert greater selectivity at this point. Thus, the development of equitable

selectivity criteria, and the determinants of second and third term retention will become important issues. Personnel at this point are sensitive to quality of life issues and influenced by family concerns, so understanding the relative influence of pay and other factors for second and third term retention should prove useful.

The search for a more efficient compensation system must address both the balance between present and deferred compensation as well as the "optimal" combination of pecuniary and nonpecuniary factors. The rising costs of benefits like housing, medical care, and family services, will force a re-examination of their role in military compensation.

Another implication of a trend to a more senior force will be to lower accession requirements, thereby easing the effects of negative supply shifts, such as the declining size of the youth cohort and unemployment rates. Fewer personnel will require training, which should lower its costs and the overhead connected with initial training. The quality of accessions will also remain high, suggesting less needed emphasis on traditional attrition research. Increased emphasis will be placed on enlistment standards and the institutional criteria used to judge individuals during the first term.

Changes in research directions also imply a re-examination of the research methodologies used for answering some of the difficult questions of the future. We believe that some of the methodologies reviewed in this paper can be powerful tools for future research, both in the United States and in NATO countries. We clearly have a strong bias in favor of combining administrative and survey data. Given the limitations in scope and depth of administrative data, well designed and implemented surveys can provide a wide range of variables for the microanalysis of decisionmaking among military personnel, prove valuable in evaluating experiments, and help assess a wide range of policy options. Some of the problems associated with survey data collection in the military environment identified earlier, including those of data collection and response rates, need resolution.

Several of the suggested survey research designs may have transferability to the European environment, e.g., the multi-faceted approach used in the design of the *1979 Reserve Force Studies Surveys*.

Some of the instrumentation techniques, e.g., asking current members for future intentions and specifying varying hypothetical situations, should also be repeated. The results of such comparative work might isolate the strengths and limitations of these techniques. Other suggestions, e.g., the use of standard or computer-assisted telephone interviewing, may have less transferability. Differences in scale between the armed forces of the United States and those of other countries may also lead to the conclusion that telephone techniques are not relevant. The implementation difficulties encountered in the United States, in addition to possible resource constraints, certainly suggest the need for close scrutiny before adaptation.

Until recently, almost all analytical efforts directed to measuring characteristics of the military manpower system could be easily classified into two types. The first was traditional analysis of historical data--usually administrative records--by time series, cross-sectional or pooled time series cross-sectional methods. The second method was analysis of periodic surveys given to military personnel. In the last 5 years, several new measurement methodologies have been added to this list. These methods include field experimentation, longitudinal survey data and choice based sampling. There also has been innovative combinations of these various methods such as field experimentation with surveys where the experimental sample is followed over a number of years.

The appearance of these methods has deepened our knowledge of the way military manpower systems operate and offers much promise for the future. However, it has also made the choices of what research to undertake more difficult. Use of some of these methods are expensive compared to more traditional methods and matching methods to policy problems requires longer range planning for research. There clearly are many experiments which could be undertaken--directed toward reenlistment, training and retirement issues. Longitudinal surveys would be useful in unravelling decision processes at critical junctures. Systematic matching of military and civilian surveys using choice based samples also offers a rich source of data for understanding decision junctures where individuals pass from military to civilian status--at enlistment and separation.

Making efficient use of these techniques will also require more emphasis on multidisciplinary research. Collecting data following the life cycle of military personnel will allow consideration of quality of life, attitudinal and organizational climate variables. Integrating the approaches from different disciplines in the design of critical research efforts will perhaps be the most formidable challenge.

APPENDIX

Table A

ENLISTED/OFFICER MASTER FILE

File Description:

1. The inventory of personnel on active duty (excluding those on active duty for training or those on active duty in support of the Guard or Reserve) at the end of each calendar quarter, based on submissions by the Active Components.

2. Data are stored for both enlisted and officer personnel starting 30 June 1971 and every six months thereafter until 30 June 1975, when data are stored quarterly. Each submission contains records on 1.7-2.3 million enlisted personnel and 270,000-370,000 officers.

Major Data Elements:

Personal	*Military Experience*
Social security number	Service
Sex	Months of service
Date of birth	Active duty entry (base) date
Age at entry	End of term of service (ETS) date
Race/ethnic group	Date of latest enlistment
Educational level	Pay grade
AFQT percentile score	Date of current pay grade
Marital status	Time in current pay grade
Number of dependents	Primary and duty occupations
Home (state) of record	

Table B

ENLISTED/OFFICER SEPARATION AND REENLISTMENT FILE

File Description: 1. Records of all individuals separating from the Active Components or reenlisting during a given period, based on monthly submissions for enlisted and quarterly for officers.

2. Data are stored on a Fiscal Year basis for previous years, or on a quarterly basis for the current Fiscal Year.

Major Data Elements:

Personal: Same as Enlisted/Officer Master File

Military Experience: In addition to data elements on the Master File, includes the following:

1. Age at separation
2. Time in grade at separation
3. Separation program designator
4. Eligibility/ineligibility for reenlistment

Table C

RESERVE COMPONENTS COMMON PERSONNEL DATA SYSTEM (RCCPDS)

File Description:

1. The inventory of personnel who are members of all Reserve Components, at the end of each calendar quarter, based on submissions by the Reserve Components.

2. Data are stored for both enlisted and officer personnel starting in 30 March 1973 every three months thereafter. Each submission contains records on 1.0 - 2.0 million enlisted personnel and 175,000 - 225,000 officers.

Major Data Elements:

Personal	*Military Experience*
Social security number	Service
Sex	Months of service
Date of birth	
Age at entry	End of term of service (ETS) date
Race/ethnic group	Date of latest enlistment
Educational level	Pay grade
AFQT percentile score	Date of current pay grade
Marital status	Time in current pay grade
Number of dependents	Primary and duty occupations

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