

0

AD-A282 293



A RAND NOTE

Reassessing Enlisted Reserve Attrition:  
A Total Force Perspective

Sheila Nataraj Kirby, David W. Grissmer

JUL 27 1994

DISTRIBUTION STATEMENT A  
Approved for public release  
Distribution Unlimited

94-23006



45PX

94 7 21 110

RAND

DTIC QUALITY INSPECTED 1

The research described in this report was sponsored by the Assistant Secretary of Defense (Reserve Affairs) under RAND's National Defense Research Institute, a federally funded research and development center supported by the Office of the Secretary of Defense and the Joint Staff, Contract No. MDA903-90-C-0004.

RAND is a nonprofit institution that seeks to improve public policy through research and analysis. Publications of RAND do not necessarily reflect the opinions or policies of the sponsors of RAND research.

Published 1993 by RAND  
1700 Main Street, P.O. Box 2138, Santa Monica CA 90407-2138  
To obtain information about RAND studies or to order documents,  
call Distribution Services, (310) 393-0411, extension 6686

**A RAND NOTE**

**N-3521-RA**

**Reassessing Enlisted Reserve Attrition:  
A Total Force Perspective**

**Sheila Notaraj Kirby, David W. Grissmer  
with Priscilla M. Schlegel**

**Prepared for the  
Assistant Secretary of Defense  
(Reserve Affairs)**

**RAND**

Approved for public release; distribution unlimited

### PREFACE

This research was sponsored by the Office of the Assistant Secretary of Defense (Reserve Affairs) under RAND's National Defense Research Institute, a federally funded research and development center supported by the Office of the Secretary of Defense and the Joint Staff. It was prepared within RAND's Defense Manpower Research Center.

The Note analyzes the attrition of Selected Reserve nonprior service enlistees, using data on the FY82-FY88 accession cohorts. It focuses on sorting out permanent losses to civilian life from those who leave and later rejoin the reserve or active components.

The Note should be of interest to those who recruit, retain, and manage personnel in the Selected Reserve Forces.

<b>Accession For</b>	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/Use _____	
Availability Codes	
Dist	Avail and/or Special
A-1	

## SUMMARY

The Selected Reserve components take in over 70,000 nonprior service recruits every year. A substantial training investment is required to teach these individuals basic military skills and military occupations. The longer the recruits stay in service (provided performance is satisfactory), the better the return on the training investment. However, our earlier analysis of attrition behavior has shown that the attrition rate for nonprior service recruits is extremely high—35–40 percent two years after entry. A recent General Accounting Office report stated that four out of five nonprior service enlistees fail to complete their six-year term of service and that although nonprior service enlistees constitute about 41 percent of all gains into the Selected Reserve, they accounted for over 60 percent of all losses.

This study extends previous work in several ways: We have data on more recent cohorts (FY82–FY88), we have longer time periods over which the entrants have been observed (ranging from one to six years), and because we have quarterly data, we are able to track returns and transfers to other components, whether reserve or active, in a more systematic fashion.

The main thesis of this Note is that attrition needs to be reassessed and redefined from a total force perspective. The traditional measure of attrition is all separations. However, a considerable number of reservists are eligible to return, and many do so, either returning to the Selected Reserve or transferring to the active force. Returns to any of the reserve components provide some return on the original training investment. Transfers to the active components may provide even greater returns on training investment than if the individual had remained in the reserve force. In fact, one could argue that the reserve is providing a valuable screening function for the actives and that, therefore, such transfers should not be regarded as a loss. In our framework, it is losses to civilian life that constitute a real loss—individuals who leave and do not return to military service provide no return on the money spent training them.

Major findings are outlined below.

The emphasis on reserve attrition as being too “high” seems to be misplaced. Although it is true that overall separations are a high proportion of entering cohorts (only between 40 and 70 percent of a cohort serves continuously for six years), losses to civilian life are only about one-third to one-half of all separations. About 25 percent join the active force; another one-quarter to one-half of reserve separations later rejoin reserve components. The proportion varies widely by component, with the two Guard components supplying their

counterpart reserve components and the other three reserve components acting as suppliers to their counterpart active components. These points are illustrated in Figure S.1, which shows cumulative five-year attrition rates for the FY82-83 cohorts combined for the various components. Notice that although overall attrition is between 50 and 60 percent in the two Army components, losses to civilian life—or permanent total force attrition—are only about 20-25 percent and account for only one-third to two-fifths of overall attrition. Similarly, for the two Air components, permanent total force attrition is about 15 percent, whereas overall attrition is much higher, 35-45 percent. Marine Corps attrition to civilian life is the highest, 35 percent, but still considerably lower than overall attrition (60 percent).

Contrary to general perception, reserve attrition compares favorably with active attrition both one year and four years after entry. Although several caveats must be placed on this finding, the rates of attrition to civilian life for similar high-quality cohorts in FY82-FY84 are considerably lower in the reserve.

Both overall attrition and attrition to civilian life appear to have been declining over time. For the Army National Guard and the Army Reserve, we find a 33 percent decline in the rate of attrition to civilian life after two years. This decline can be attributed only partly to the increasing quality of the cohorts. We hypothesize that the introduction of the G.I. Bill and the substantial resources invested by the reserves in improving equipment and training from 1984 onward may be important factors in bringing about this decline in attrition.

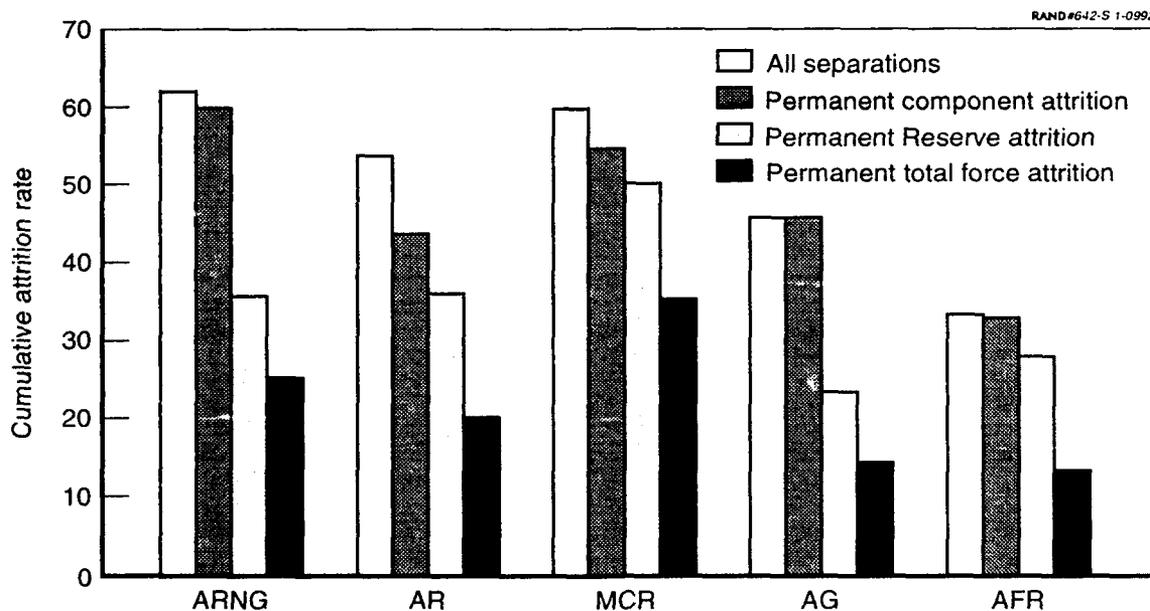


Figure S.1—Five-Year Snapshot of Attrition Rates, FY82-83 Cohorts

There are marked differences among components, with the two Air components having the lowest rates of overall attrition and attrition to civilian life. These differences are not completely explained by the differences in the demographic composition of the entering cohorts in the various components or by the different types and magnitudes of losses suffered by them. We believe that inherent, unmeasured characteristics of the components themselves or the types of individuals they attract are part of the answer.

In conclusion, we believe that it is not attrition to civilian life that is the real problem. The high rates of turbulence seem to be driven by self-selection and by promotion and mobility in the civilian job. One needs to "manage" these flows among components to minimize the inevitable decrement to unit readiness and to maximize overall total force readiness.

## ACKNOWLEDGMENTS

We would like to thank Roger Scheer, Deputy Assistant Secretary of Defense, Reserve Affairs (Manpower and Personnel), for his interest in the project. Our project monitor, Frank Rush, was extremely supportive and provided us with many helpful comments both during the analysis and during the course of several briefings to OSD staff. We are grateful to Ginger Bassett of the Defense Manpower Data Center for designing and creating the original cohort files on which the analysis is based and to Mike Dove, also of DMDC, for providing us with revised data in a timely fashion.

We are grateful to Peter Rydell, our RAND reviewer, for his very constructive review. The readability of the Note has been considerably improved because of his suggested revisions. We also thank Bernard Rostker, Program Director of the Defense Manpower Research Center, for his comments on an earlier draft, Robert Young for his invaluable programming assistance, Luetta Pope for her capable secretarial support, and Patricia Bedrosian for her careful editing.

CONTENTS

PREFACE .....	iii
SUMMARY .....	v
ACKNOWLEDGMENTS .....	ix
FIGURES .....	xiii
TABLES .....	xv
Section	
1. INTRODUCTION .....	1
Organization of the Note .....	1
Nonprior Service Accessions into the Selected Reserve .....	2
Previous Research .....	3
Current Study .....	4
2. DEFINITION OF ATTRITION AND METHODOLOGY .....	5
Defining Attrition .....	5
Methodology .....	7
3. DIFFERENCES IN ATTRITION RATES ACROSS COMPONENTS .....	8
Disaggregating Overall Attrition: Returns to the Reserve, Returns to the Active, and Nonreturnees .....	8
Kaplan-Meier Estimators of Overall Attrition .....	12
Causes of Differences in Attrition Among Components .....	13
Educational Attainment at Entry and the Likelihood of Attrition .....	13
Aptitude Scores and the Likelihood of Separation .....	14
4. ATTRITION RATES OVER TIME .....	18
Changes in Quality of Entering Cohorts .....	18
Two-Year Attrition Rates .....	19
Causes of the Decline in Attrition .....	23
5. A COMPARISON OF RESERVE AND ACTIVE ATTRITION RATES .....	27
6. CONCLUSIONS .....	31
REFERENCES .....	35

FIGURES

S.1. Five-Year Snapshot of Attrition Rates, FY82-83 Cohorts .....	vi
1.1. Nonprior Service Accessions into the Selected Reserve, FY91 .....	2
2.1. A Total Force Perspective on Attrition in the Reserve .....	6
3.1. All Component Separations, Five-Year Snapshot, FY82-83 Cohorts .....	9
3.2. Permanent Component Attrition, Five-Year Snapshot, FY82-83 Cohorts .....	9
3.3. Permanent Reserve Attrition, Five-Year Snapshot, FY82-83 Cohorts .....	10
3.4. Permanent Total Force Attrition, Five-Year Snapshot, FY82-83 Cohorts .....	11
3.5. Kaplan-Meier Estimators for Different Reserve Components, FY82-88 Cohorts .....	12
3.6. Educational Attainment of Recruits in the Reserve, FY82-88 Cohorts .....	14
3.7. Attrition Rates of Recruits by Educational Attainment, Army National Guard, FY82-88 Cohorts .....	15
3.8. Mental Aptitude Category of Recruits in the Reserve, FY82-88 Cohorts .....	16
3.9. Relationship Between Mental Aptitude and Attrition, Army National Guard, FY82-88 Cohorts .....	16
3.10. Five-Year Snapshot of Attrition Among High-Quality Groups, FY82-83 Cohorts .....	17
4.1. Proportion of Recruits with a High School Education, over Time .....	18
4.2. Proportion of Category I-II Recruits, over Time .....	19
4.3. Two-Year Attrition in the Army National Guard .....	20
4.4. Two-Year Attrition in the Army Reserve .....	21
4.5. Two-Year Attrition in the Marine Corps Reserve .....	21
4.6. Two-Year Attrition in the Air National Guard .....	22
4.7. Two-Year Attrition in the Air Force Reserve .....	22
4.8. Two-Year Attrition in the Army National Guard, High-Quality Cohorts .....	25
4.9. Two-Year Attrition in the Army Reserve, High-Quality Cohorts .....	25
5.1. First-Year Attrition in the Army Components Among High-Quality Young Males: Active Versus Reserve .....	28
5.2. Four-Year Attrition in the Army Components Among High-Quality Young Males: Active Versus Reserve .....	28
5.3. First-Year Attrition in the Air Components Among High-Quality Young Males: Active Versus Reserve .....	30
5.4. Four-Year Attrition in the Air Components Among High-Quality Young Males: Active Versus Reserve .....	30

**TABLES**

3.1. Disaggregation of Overall Losses into Returns and Losses to Civilian Life . . . . .	11
6.1. Separations and Returns over the First Five Years, FY82-FY83 Cohorts, by Component . . . . .	32

## 1. INTRODUCTION

It is difficult to predict what will happen to the size of the reserve forces in the future. The general thinking seems to be that active ground forces will be used for rapid response backed by certain reserve units that will be maintained at a high level of readiness to sustain and support the early-deploying units. A blend of active and reserve units will be used for longer warnings and larger contingencies. Whatever the final outcome, it is clear that reserve forces will continue to be an important component of the nation's military strategy, although missions may be changed to reflect the new thinking and the new fiscal reality. Thus, their level of personnel and training readiness will continue to be a crucial issue. The Assistant Secretary of Defense (Reserve Affairs), in a recent speech to the Reserve Officers Association in Phoenix, stated that the attrition of trained personnel from the Selected Reserve requires continuing attention because it is costly to replace selected reservists who leave before the end of their term. Our study provides a new look at this problem. Our main thesis is that we have been seeing only one-half of the picture. Attrition needs to be examined from the point of view of the total force, not merely as a unit or component problem. Our focus is nonprior service enlisted reservists and unprogrammed attrition, i.e., attrition before the expiration of the enlisted member's term of service (ETS). ETS losses are not included because we do not have a long enough history on all cohorts to allow us to observe them six years later, and because the components are generally more concerned about early attrition.

### ORGANIZATION OF THE NOTE

This Note is organized around several topics. The second half of this section briefly reviews previous research. This helps set the context for the current study and highlights what we see as its contributions. The next section defines attrition, a topic that is the crux of our analysis. We argue that the definition of attrition is extremely important and that the usual definition—"all separations from a component"—exaggerates the nature of the problem. We also briefly describe our methodology. The third section presents current findings from our analysis of the differences in attrition across the various Selected Reserve components and discusses the factors to which we can attribute such differences. The fourth section focuses on whether and how attrition has changed over time and whether one can attribute this solely to the changed quality of accessions. The fifth section compares active and reserve attrition rates for individuals of similar quality in certain selected cohorts,

FY82–FY84. The general perception that the reserve compares unfavorably with the active with respect to attrition seems not to be borne out by our analysis. We end with some conclusions and suggestions for future work.

### NONPRIOR SERVICE ACCESSIONS INTO THE SELECTED RESERVE

It might be useful to look at the relative size of the nonprior service accession cohorts in the different reserve components. In FY91, the total number of nonprior service accessions into the six Selected Reserve components (excluding Coast Guard Reserve) was a little over 79,000, or 43 percent of all gains (Figure 1.1). Unfortunately, the Navy has traditionally defined a nonprior service reserve accession as an enlistee with no prior military service in the Navy, rather than a recruit with no prior military service (either active or reserve). This causes the size of the nonprior service accession cohort in the Naval Reserve to be inflated relative to others and may also lead to the overall proportion of nonprior service accessions into DoD being higher than it should be. The Navy is in the process of changing its procedures to make its definition conform with that in the other services.

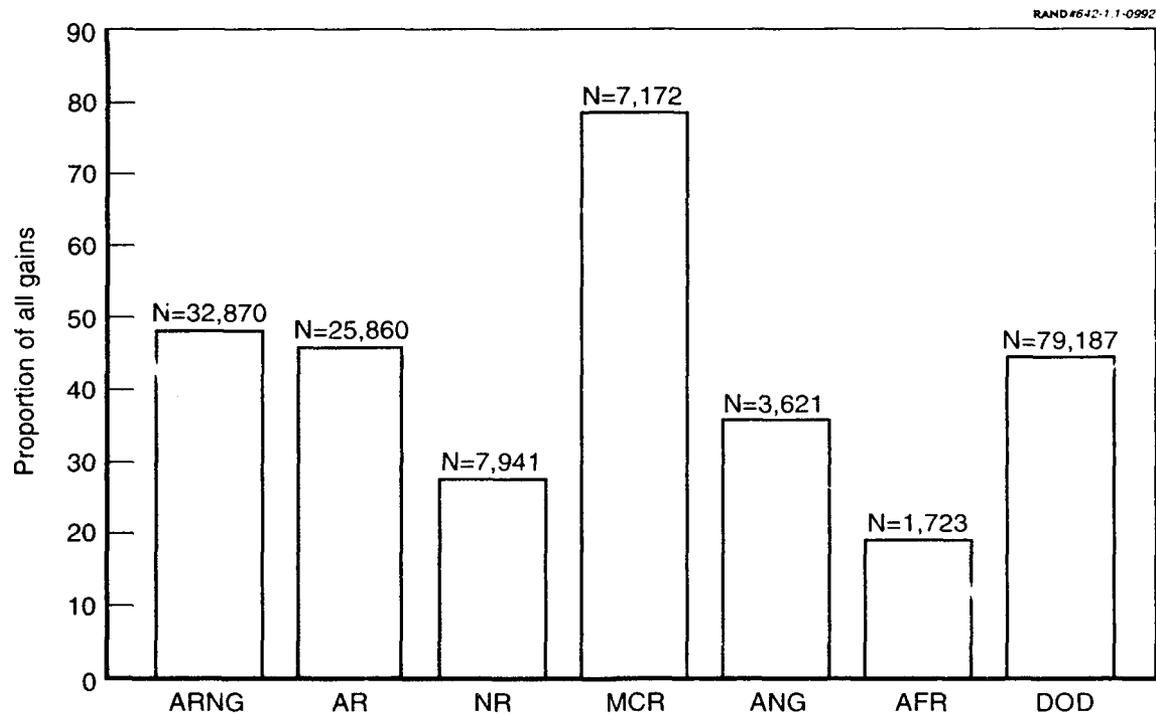


Figure 1.1—Nonprior Service Accessions into the Selected Reserve, FY91

The proportion of nonprior to prior service gains varies considerably across the different components, ranging from a high of 78 percent of gains into the Marine Corps Reserve to a low of 19 percent into the Air Force Reserve. Together, the Army National Guard and the Army Reserve take in about three-quarters of all nonprior service gains.

The absolute size of the nonprior service cohorts has been decreasing in most of the components, with the exception of the Marine Corps Reserve, which appears to have increased its intake substantially since FY84 (although it seems likely that some of the difference may be due to problems with the earlier data). The Army National Guard, for example, took in about 50,000 in FY82; in FY91, it took in a little over 32,000. The Air National Guard previously took in about 5,000; of late, the cohorts have been between 3,000 and 3,500.

#### PREVIOUS RESEARCH

Our previous work<sup>1</sup> examined the attrition patterns and behavior of three nonprior service accession cohorts—FY80, FY81, and FY82. Each cohort was followed for two years. Although the quality of each successive cohort went up markedly, we found that attrition rates, surprisingly, were actually higher for the later cohorts. Two-year attrition rates increased from 30.6 percent for the Guard in FY80 to 35.1 percent for the FY82 cohort and from 39.5 percent in the Army Reserve to 46.7 percent for the FY82 cohort. To understand the causes of such high levels of early attrition, we identified three types of attrition that must be treated separately. Some reservists leave to enter the active force, others leave and later return to the same component or join another Selected Reserve component. In either case, from DoD's perspective, none of these groups should be counted as a loss. There is some return to training investment in each case. Failure to distinguish among these types of attrition will, therefore, overstate the magnitude of the problem facing the reserves. When we examined losses to civilian life, that is, those who left and did not return to military service during the time period under study, we found that attrition rates were much lower but that the pattern of increasing attrition for the higher-quality cohorts held true.

We can offer several explanations for these findings. First, it is possible that, because of the easier recruiting environment, the services might be raising training standards or easing discharge policies. Second, if services "graded on the curve," then a fixed proportion of

---

<sup>1</sup>David W. Grissmer and Sheila Nataraj Kirby, with Priscilla M. Schlegel, *Changing Patterns of Nonprior Service Attrition in the Army National Guard and Army Reserve*, RAND, R-3626-RA, July 1988.

recruits would be separated, regardless of quality. Third, aggressive recruiting and new incentive programs might have attracted marginal recruits into the reserves who, despite their high quality, might have less taste for the military.

A recent GAO report<sup>2</sup> examined FY88 enlisted personnel losses from the Selected Reserve. Although their analysis is not exactly comparable to ours, they stated that four out of five nonprior service enlistees fail to complete their six-year enlistment term. They also pointed out that, although nonprior service accessions accounted for 42 percent of FY88 accessions, they constituted 61 percent of overall losses from the Selected Reserve. They did not attempt to distinguish among the different types of attrition or to account for returns.

### **CURRENT STUDY**

The current study extends the work in several ways. First of all, we have included all reserve components, although we subsequently dropped the Naval Reserve from our analysis primarily because of the difficulty in distinguishing a nonprior service from a prior service gain.<sup>3</sup> Because these files provide quarterly snapshots of the individual based on data from the quarterly master files, we can track attrition quarter by quarter rather than at the end of one or two years as previously. We can track transfers and returns into the active and reserve components, and examine the patterns of losses and returns over a much longer period of time. Our files contain data on seven accession cohorts and these are all followed through the end of FY88. Thus, the first accession cohort, FY82, has completed its full length of service, providing us with the first look at a longitudinal history of a cohort.

---

<sup>2</sup>General Accounting Office, *Reserve Components: Factors Related to Personnel Attrition in the Selected Reserve*, Washington, D.C., April 1991.

<sup>3</sup>We mentioned this point earlier. In examining the characteristics of those who were classified as nonprior service gains, we found several who were in paygrades E-4 and above. This is extremely unlikely among nonprior service reservists who supposedly are entering the military for the first time. Attempts to delineate nonprior service gains using arbitrary cutoffs (E-1 through E-3 and age) were not very successful and the results ran counter to what we found for the other services. As a result, we felt it was more prudent to omit the Naval Reserve altogether from this analysis.

## 2. DEFINITION OF ATTRITION AND METHODOLOGY

### DEFINING ATTRITION

In attempting to define attrition in the reserves, it seemed logical to use the same definition that we used when studying the active force. In the active force, all early or non-ETS separatees among first-term enlistees are generally individuals who are separated for reasons that make them ineligible to return to the military. As such, an early separatee is a loss to the force because these individuals do not subsequently serve anywhere else in the total force. However, the analogy does not translate well for the reserves. Many reservists who leave early are eligible to return as active participants<sup>1</sup> and many do so and serve honorably and long. Whether a separation is "good" or "bad" must be judged eventually from a total force perspective. We elaborate on this point below.

Attrition has traditionally been measured as all separations from a component; this provides the highest measure of losses. However, if the individual later returns to the same component, he should not be considered a loss from the component's point of view. After all, the returning reservist is providing some return on his training investment and bringing some much needed skills to the new unit.

Similarly, from the point of view of the Selected Reserve, no individual who returns to *any* reserve component should be regarded as a loss because he is still serving within the reserve and may be performing better at his new job than his old. On the downside, there may be a tendency to spread the low-quality and below-standard recruits among components rather than dismiss them altogether. In any case, without other evidence, it is fair to assume that these individuals provide some return to the military for their training.

Some individuals return to the active force and, certainly from a total force perspective, we cannot count them as losses. Indeed, we could argue that they may be providing an even greater return on the original training than if they had remained in the reserve. Indeed, we feel that these losses should not be counted against the Selected Reserve—after all, the reserve is providing a valuable screening function for the actives and acting as a recruiting mechanism for them. There is some recent evidence from the New

---

<sup>1</sup>The distinction we wish to make here is between serving the Selected Reserve and merely transferring to the Individual Ready Reserve (IRR). We do not count these latter as active participants but as losses to the total force.

Recruit Surveys to show that many recruits view the reserve in just this fashion—as a place to “try out” military service before committing to a full-time military career.

Thus, from a total force perspective, only losses to civilian life—individuals who leave and do not return to active participation in a reserve/active component—should be included in any measure of attrition.

Figure 2.1 illustrates these points. For the reserves, one can define several measures of attrition, depending on one’s perspective. All separations, the traditional measure of attrition, is the sum of all flows from the component (1+2+3+4). Permanent component attrition, however, includes only those who do not subsequently return to the same reserve component (2+3+4), whereas permanent attrition from the Selected Reserve includes only those who leave the active force and those who leave for civilian life (3+4). From a total force perspective, only attrition to civilian life would be counted as losses (4)—this is referred to above as permanent total force attrition. Because these flows are rather large (as we show below), the overall extent of real attrition from the reserve can be highly overstated if one uses the traditional measure.

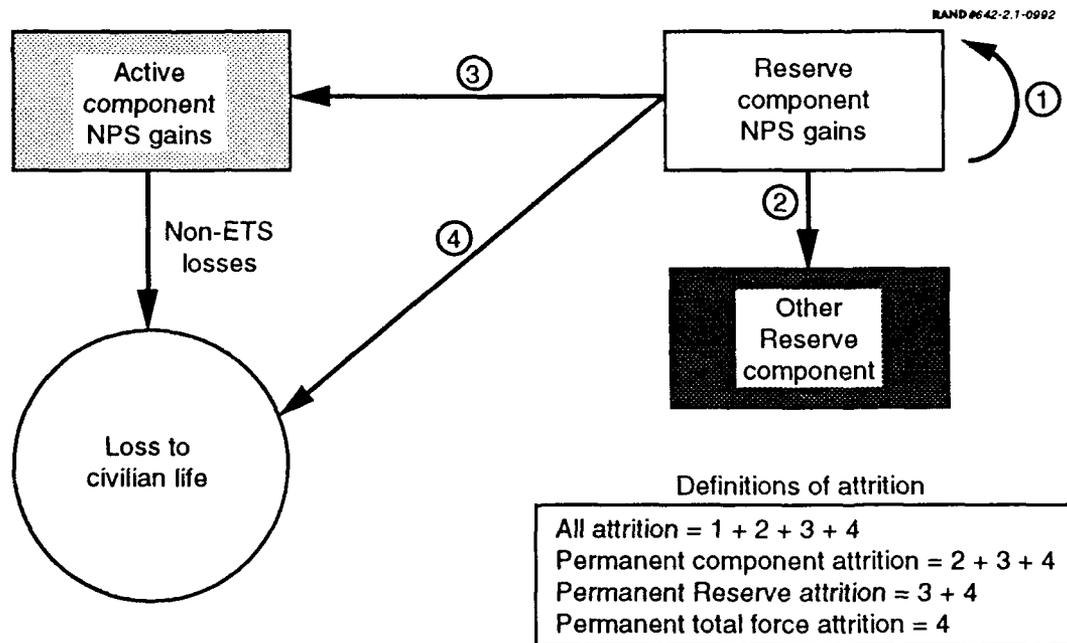


Figure 2.1—A Total Force Perspective on Attrition in the Reserve

Perhaps we should make clear that we are not claiming that turbulence does not have an effect on readiness. It certainly does, particularly if reservists have to be retrained in the new unit or new component. However, it seems to us that the real problem is not so much one of "attrition," in the sense we are losing all return to training investment, as much as one of management of transfers and returns in some optimal manner so as to maximize readiness.

#### **METHODOLOGY**

It might be helpful to describe briefly the methodology we use in this analysis. We have data on individuals who enter the reserve at different times. For all of them, however, the observation time ends as of September 1988, that is, the end of FY88. For those who separate during this time period, we know the actual time they spent in the reserve. However, for those who have not separated, we know only the amount of time that has elapsed from the quarter of entry to the end of FY88. These data are called "right-censored." Special techniques, generally referred to as survival analysis techniques, have been developed to handle censored data. Survival analysis uses a survival function, which is a plot that indicates how likely the individual is to survive in the reserve beyond the first quarter, the second quarter, and so on. At the beginning of the first quarter, 100 percent of the cohort is "alive;" the proportion remaining gradually declines as more and more individuals leave. We use two techniques to study when attrition occurs. The first, called the Kaplan-Meier estimator, is a descriptive technique that allows us to examine the distribution of attrition times and also how the timing of attrition varies across different subgroups of interest. The second is a multivariate model that allows us to estimate the net effect of a variable on attrition. This Note presents only the Kaplan-Meier estimators. Results of the full analysis will be reported in detail in a forthcoming report.

### 3. DIFFERENCES IN ATTRITION RATES ACROSS COMPONENTS

This section first disaggregates overall attrition into the different types described in the preceding section and discusses the differences across components. The second half of the section discusses some factors that may help explain the component differences that we observe.

#### **DISAGGREGATING OVERALL ATTRITION: RETURNS TO THE RESERVE, RETURNS TO THE ACTIVE, AND NONRETURNEES**

To do this, we select two cohorts, FY82 and FY83, for which we have five years of data, and present a snapshot of their five-year cumulative attrition rates. We first adopt the traditional measure of attrition as including all separations from the component and then disaggregate that measure to take account of returns and transfers. These returns and transfers are further classified according to whether they (a) separated and never returned to military service during this five-year time period or (b) returned to an active component, another reserve component, or the same reserve component.

#### **All Attrition**

Figure 3.1 shows the total five-year attrition rate for the various components: 62 percent for the Army Guard, 54 percent for the Army Reserve, 60 percent for the Marine Corps Reserve, 46 percent for the Air National Guard, and 34 percent for the Air Force Reserve.

#### **Permanent Component Attrition**

When we take into account returns to the same component over this five-year time period (Figure 3.2), we find that the attrition rate for the Army Reserve is considerably lower because about 10 percent of the cohort return to the reserve. In fact, its attrition rate is now comparable to that of the Air Guard.

#### **Permanent Selected Reserve Attrition**

If we disaggregate these losses still further to exclude returns to any Selected Reserve component during this time period (Figure 3.3), we find that the two Guard components appear to act as suppliers to other reserve components, primarily their own service counterparts. Between 22 and 25 percent of Guard cohorts transfer into other reserve components. This may be driven by promotion or mobility.

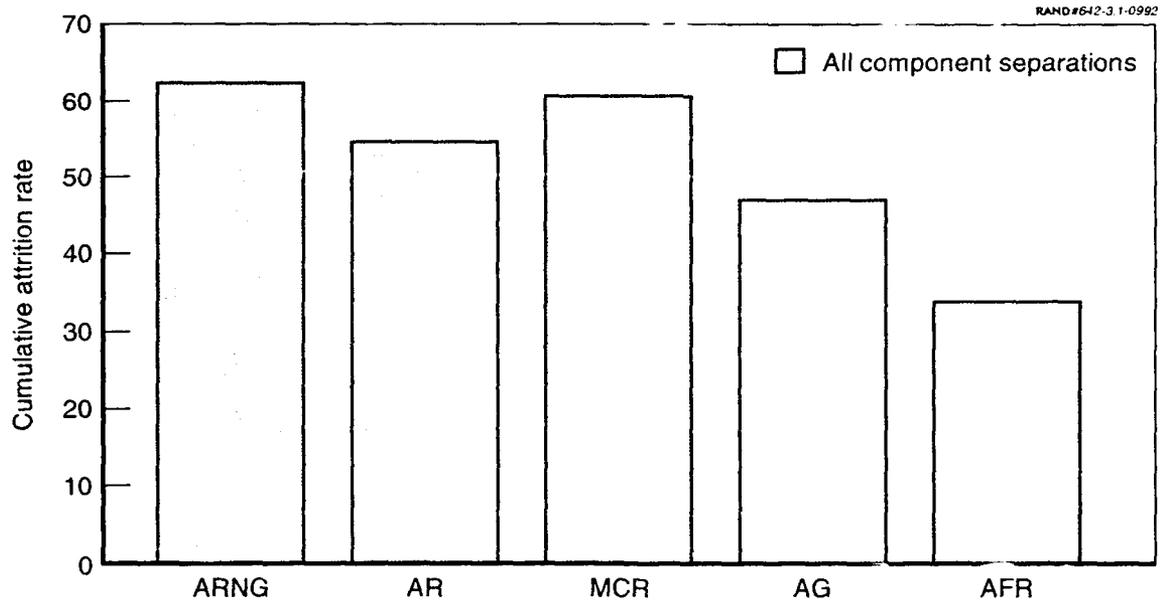


Figure 3.1—All Component Separations, Five-Year Snapshot, FY82-83 Cohorts

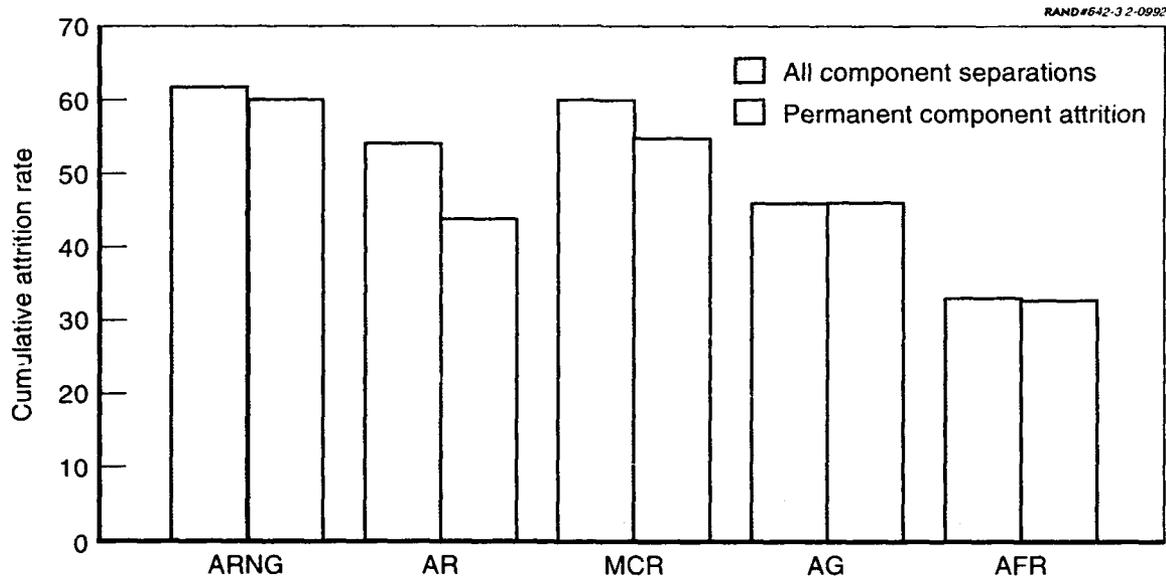


Figure 3.2—Permanent Component Attrition, Five-Year Snapshot, FY82-83 Cohorts

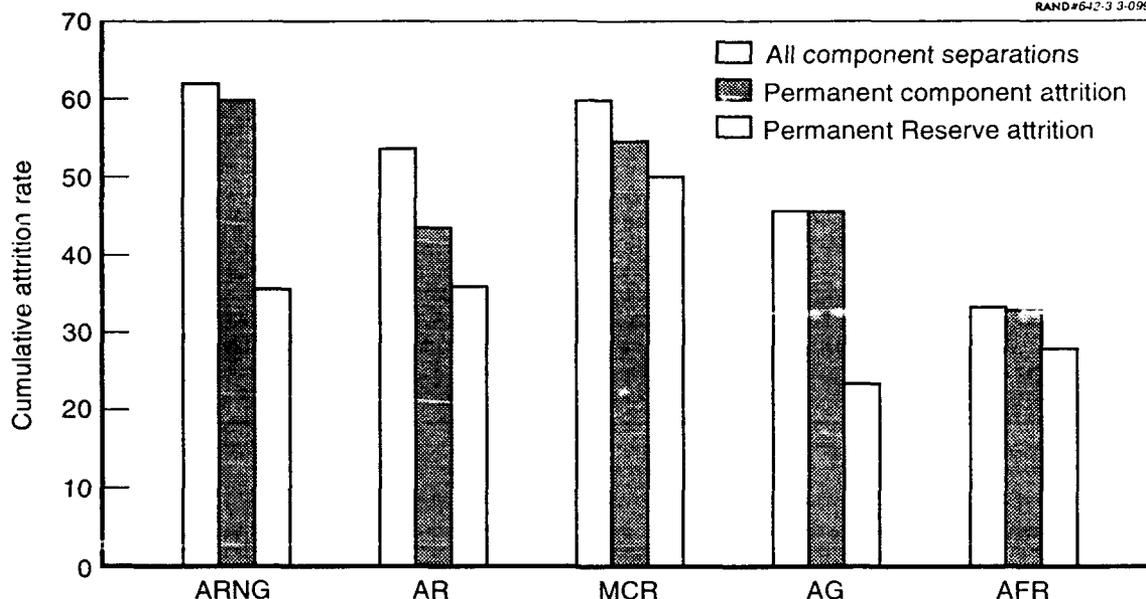


Figure 3.3—Permanent Reserve Attrition, Five-Year Snapshot, FY82-83 Cohorts

**Permanent Total Force Attrition**

Finally, if we examine permanent total force attrition or attrition to civilian life by subtracting returns or transfers to the active force, we find that such losses are a fairly small proportion of overall losses—40 percent for the Army Guard and the Air Force Reserve, 32 percent for the Army Reserve and the Air Guard, and 60 percent for the Marine Corps Reserve (Figure 3.4). Cumulative total force attrition at the five-year point varies from 20–25 percent for the two Army components to 12–15 percent for the two Air components. The Marine Corps Reserve has the highest rate, 35 percent.

Another way of disaggregating overall attrition and comparing the magnitude of the different types of losses is to examine the proportion of overall losses accounted for by each type of attrition. This is done in Table 3.1. Attrition to civilian life accounts for only two-fifths of all attrition in the Army Guard and Air Force Reserve, less than a third in the Army Reserve and Air National Guard, but almost three-fifths in the Marine Corps Reserve. Marine Corps reservists apparently either join the active, or rejoin the Corps, or, failing that, fail to return. Notice that between 40 and 48 percent of all losses from the Guard eventually rejoin another reserve component.

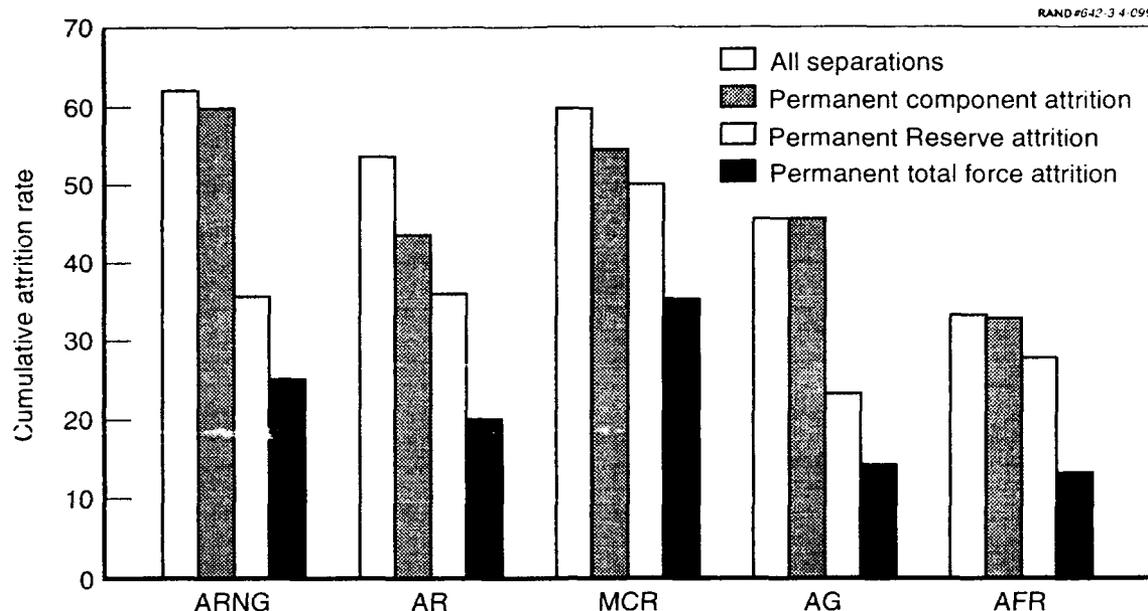


Figure 3.4—Permanent Total Force Attrition, Five-Year Snapshot, FY82-83 Cohorts

Table 3.1  
Disaggregation of Overall Losses into Returns  
and Losses to Civilian Life

	ARNG	AR	MCR	ANG	AFR
Returns to same reserve component	3.0	9.2	9.0	0.5	1.8
Returns to other reserve component	39.2	13.0	7.2	47.9	14.2
Returns to active force	16.4	30.2	24.2	19.9	43.9
Losses to civilian life	40.8	31.7	59.5	31.7	40.2
All losses	100.0	100.0	100.0	100.0	100.0

These statistics provide a very different picture than that painted by aggregate loss statistics. This disaggregation suggests one reason why overall attrition seems to be so high among the Army components—a far greater number of these cohorts seem to transfer to the active or to another reserve component, compared to the two Air components. Indeed, when one examines only rates of attrition to civilian life, the differences, although they exist, do not appear to be quite so pronounced.

The above discussion was based on a five-year snapshot of two cohorts. It is interesting and useful to examine the differences among components by looking at the

averaged experience of all the entering cohorts from FY82-FY88 and to examine the timing of the attrition decision. The Kaplan-Meier estimators of overall attrition allow us to do so.

### KAPLAN-MEIER ESTIMATORS OF OVERALL ATTRITION

Here we return to the traditional measure of attrition—all separations. Figure 3.5 presents the Kaplan-Meier estimators for the combined FY82-FY88 accession cohorts for the different reserve components. The horizontal axis shows the length of time in service from entry in quarters. The vertical axis presents the cumulative attrition rate. In other words, each point on the curve indicates the cumulative proportion of reservists in each component who will leave military service by that time—that is, we are analyzing the first continuous length of service. For example, after two years, 30 percent of the Guard and Reserve enlistees will leave, compared to between 19 and 20 percent of the enlistees in the Marine Corps Reserve and the two Air components: a difference of 33 percent. Except for the Guard, the attrition rates seem to level off after about four years, although there is an unexpected

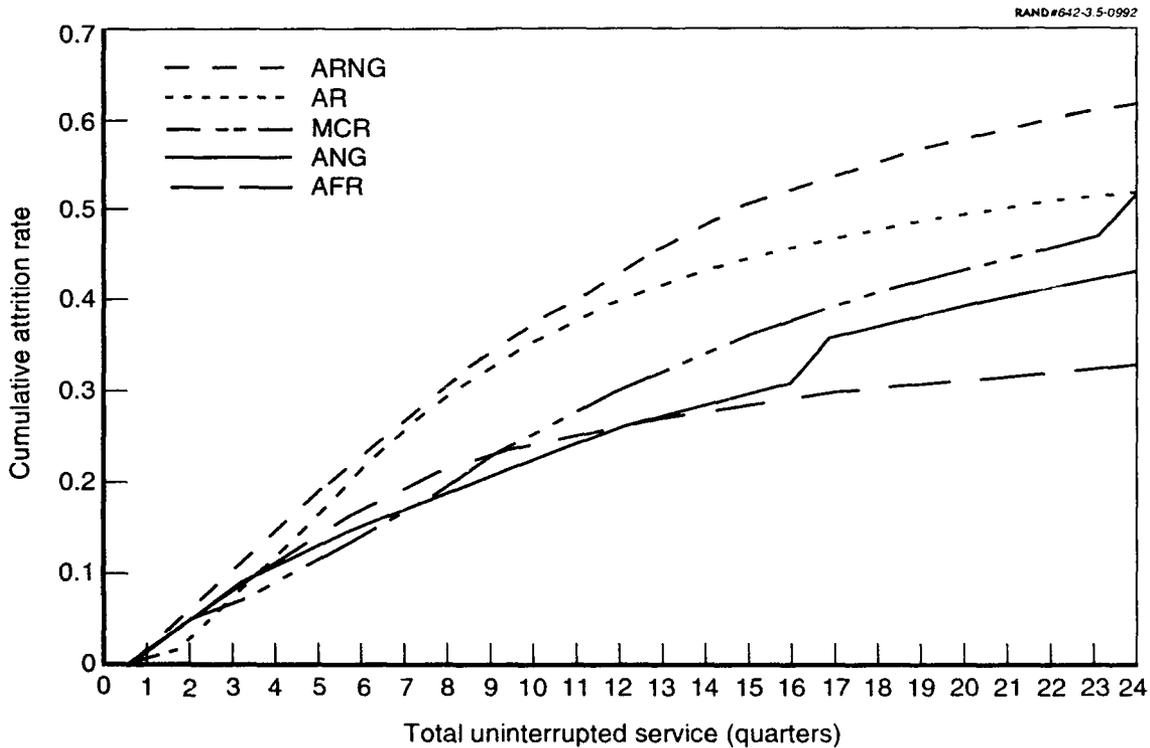


Figure 3.5—Kaplan-Meier Estimators for Different Reserve Components, FY82-88 Cohorts

increase in the Air Guard rate about that time.<sup>1</sup> Less than 40 percent of Army Guardsmen will complete their six-year term compared to 51 percent of Army and Marine Corps reservists. The Air Force Reserve has the highest completion rate, with over 70 percent staying until the end of term, although if the Air Guard had not experienced the kink at four years, its rate would have been very close to that of the Air Force Reserve. In any case, it is clear that there appear to be substantial differences among components with regard to the probability of leaving. The earlier analysis had shown that this difference is smaller but still significant when we examine only losses to civilian life.

### **CAUSES OF DIFFERENCES IN ATTRITION AMONG COMPONENTS**

We saw above one possible reason for the large differences among components: Army components lose substantial proportions of their incoming cohorts to the active force and to transfers among reserve components.

A second reason is the demographic differences in the accession cohorts of the components. If these demographic attributes are related to the likelihood of separation, then this may provide a possible explanation for the differences in the attrition rates of the various components. The next section analyzes this further. We focus on two attributes that appear to make the most difference—educational attainment at entry and mental aptitude as measured by the scores on the Armed Force Qualifying Test (AFQT)—and we use the Kaplan-Meier estimators of overall attrition to examine the relationship between these attributes and the likelihood of separation.

A third reason for the differences in attrition across components may be inherent, unmeasured characteristics of the components (their training environment or policies), or the types of individuals they attract. Such characteristics, if they are to be related to the probability of separation, may lead to the differences in attrition across components that we had seen above. This last-mentioned hypothesis, by its very nature, is difficult to refute or validate in what is essentially a descriptive analysis.

### **EDUCATIONAL ATTAINMENT AT ENTRY AND THE LIKELIHOOD OF ATTRITION**

The reserve components, on the whole, take in high-quality recruits. As can be seen from Figure 3.6, the proportion of those with at least a high school diploma (excluding the alternative certification graduates) varies from over 70 percent in the Guard to over 90 percent in the two Air components.

---

<sup>1</sup>We discovered later that this increase was almost entirely due to a large transfer of Air Guardsmen to the Air Force Reserve: a transfer that we suspect was promotion-motivated.

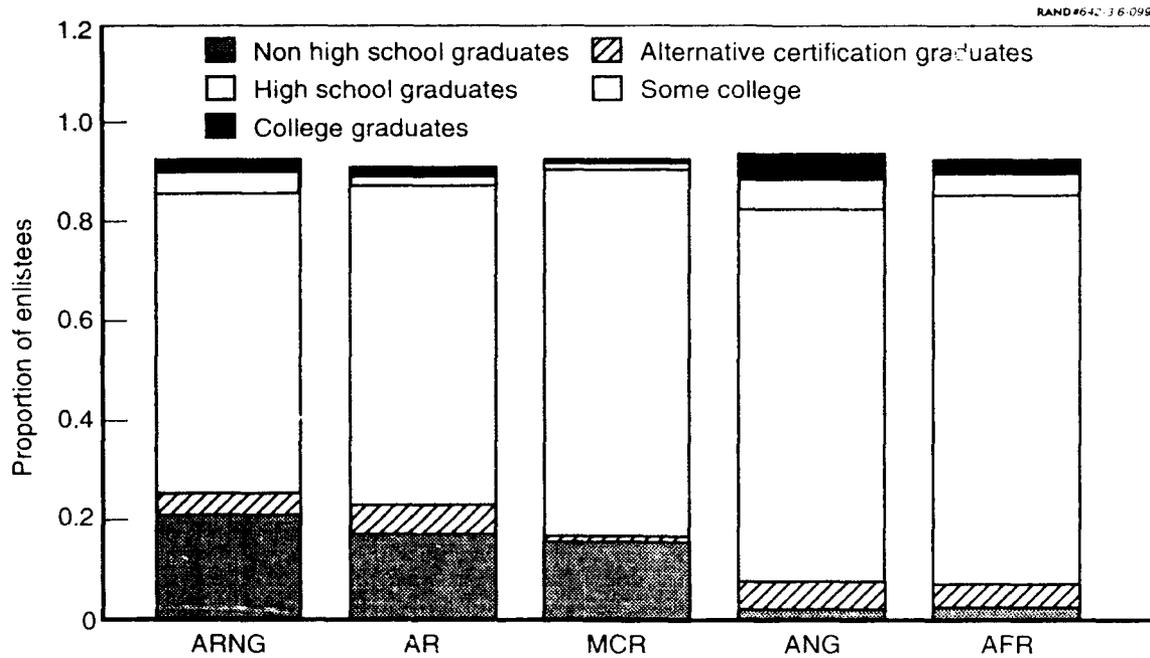


Figure 3.6—Educational Attainment of Recruits in the Reserve, FY82-88 Cohorts

Education has a significant effect on the likelihood of separation. Recruits with better educational attainment at the time of entry tend to stay in the reserve at much higher rates than those without a high school diploma. Rather than provide separate graphs for each component, we use the experience of the Army National Guard to illustrate the relationship between educational attainment and attrition. As seen in Figure 3.7, nonhigh school graduates and alternative certification graduates have attrition rates at the six-year point that are over 30 percent higher; those who have a college degree have attrition rates that are 16 percent lower than those of high school graduates. Differences of this magnitude are found in almost every component. Given that the Air components take in much higher proportions of better educated recruits, this certainly helps explain some of the differences in overall component attrition rates.

#### APTITUDE SCORES AND THE LIKELIHOOD OF SEPARATION

The high quality of recruits during FY82-88 is depicted in Figure 3.8, which shows the mental aptitude category of the recruits. Overall, there are very few Category IV recruits, almost zero in the non Army components. The proportion of Category Is and IIs varies from 30 percent in the Guard to almost half in the Air Guard.

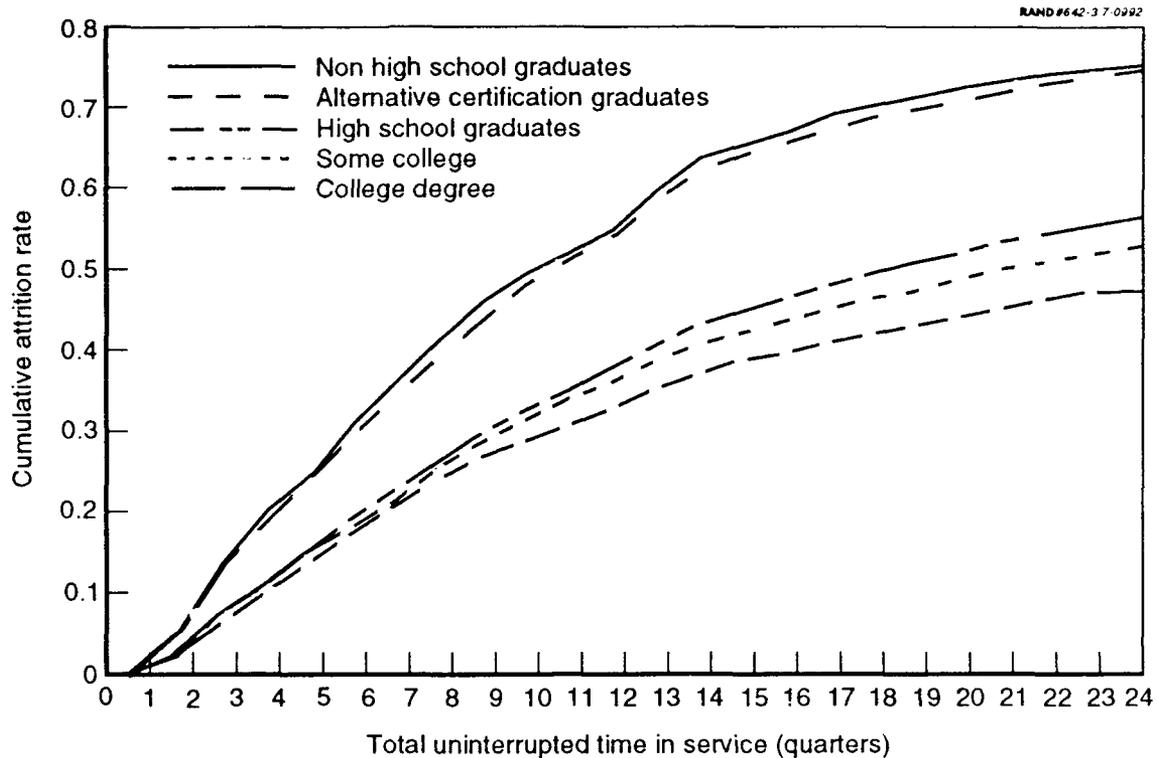


Figure 3.7—Attrition Rates of Recruits by Educational Attainment, Army National Guard, FY82–88 Cohorts

Figure 3.9 illustrates the relationship between mental aptitude and the likelihood of separation. Not surprisingly, recruits in the higher-aptitude categories have much lower attrition rates, 20–35 percent lower depending on whether one is measuring two- or six-year attrition rates. The surprise here is that Category III recruits behave like Category IV recruits—this is a problem with our data and our categorization because we are unable to distinguish between Category IIIA and Category IIIB recruits. These differences are mirrored by other components and, because the proportion of higher-aptitude recruits is higher in the Air components, may help explain some of the difference seen earlier.

One immediate question that arises is how much of the difference in attrition across components is due to differences in quality and how much to other factors. One way to answer this question in a descriptive analysis is to examine the pattern of flows and transfers among high-quality groups. If we find the same patterns of losses and transfers among high-quality recruits, this would suggest that something other than quality must explain the rankings we see among components in terms of attrition. Figure 3.10 presents

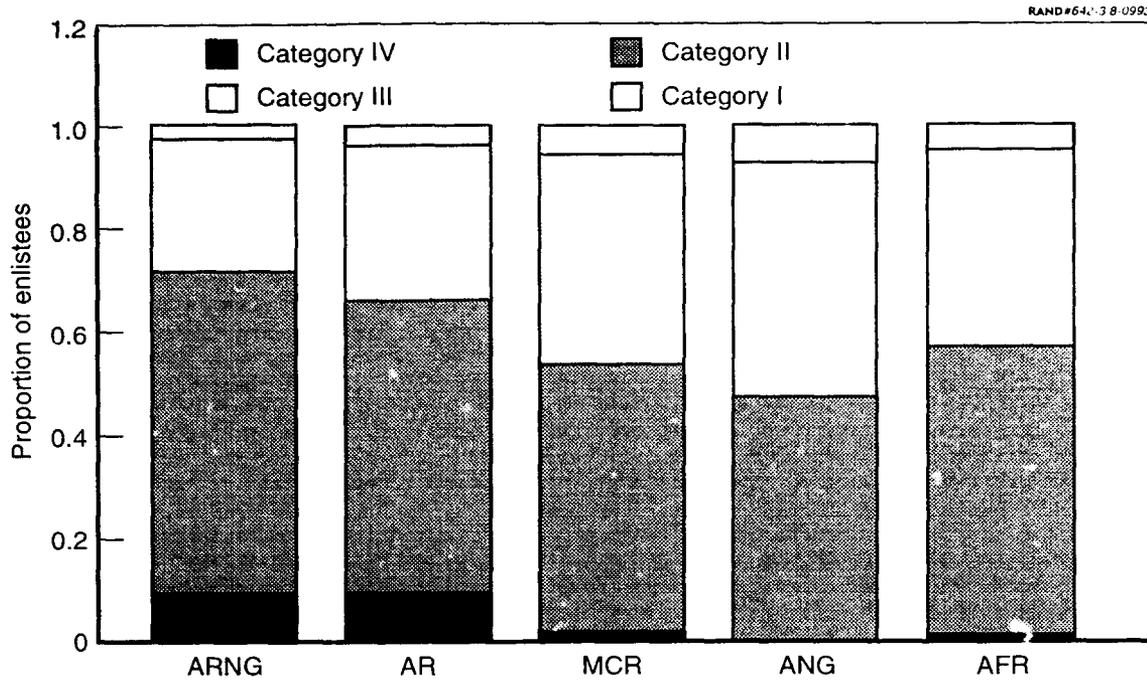


Figure 3.8—Mental Aptitude Category of Recruits in the Reserve, FY82-88 Cohorts

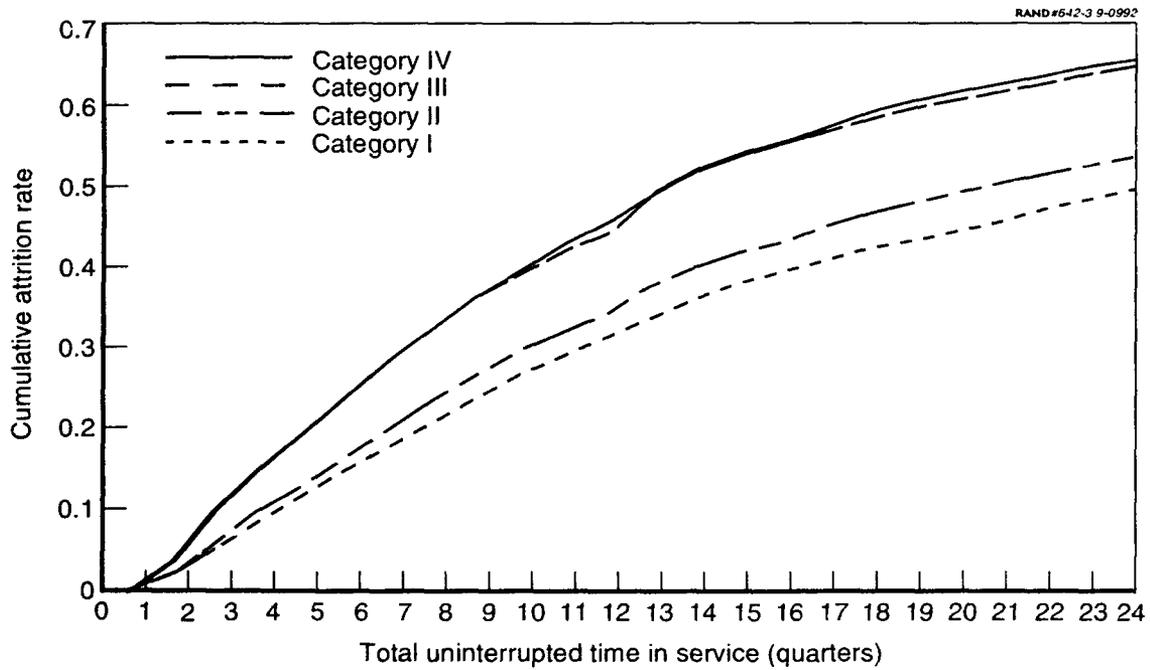


Figure 3.9—Relationship Between Mental Aptitude and Attrition, Army National Guard, FY82-88 Cohorts

the same breakdown for the FY82-83 cohorts for high-quality groups (seen earlier in Figure 3.4) defined as those who are Category I and II recruits, with (at least) a high school education. The pattern is not much different from what we had seen earlier, although because these are high quality, the cumulative attrition rates are much lower. Again, civilian attrition accounts for only a fairly small proportion of overall losses, between 22 and 50 percent. Thus, the full answer does not lie only in the demographic differences between accession cohorts.

Our conclusion is that all three reasons contribute to the differences in attrition rates across components: the demographic differences, the differences in types of losses, and, finally, unmeasured differences in the training environment or policies of the components themselves.

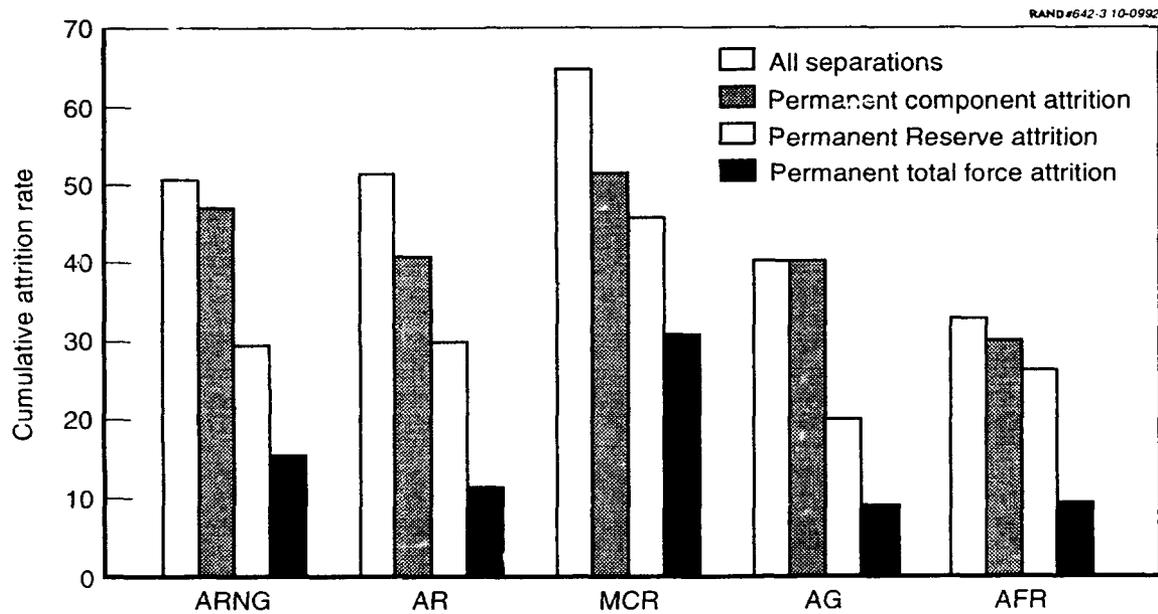


Figure 3.10—Five-Year Snapshot of Attrition Among High-Quality Groups, FY82-83 Cohorts

#### 4. ATTRITION RATES OVER TIME

Our next topic examines whether and how attrition rates have changed over time and what factors might help explain the patterns we see.

##### CHANGES IN QUALITY OF ENTERING COHORTS

It is useful to examine how the quality of entering cohorts has changed before examining the evidence on the temporal patterns in attrition. Figure 4.1 shows how the proportion of recruits with at least a high school education has changed over time. Because the two Air components appear to have started with and maintained the high quality of their reserves over time, we have omitted them from this figure. As is clear, all three components have substantially increased the proportion of those with at least a high school diploma over time. This is particularly marked in the case of the Army Reserve, which almost doubled the proportion of its high school graduate recruits, from a little under half to almost 95 percent.

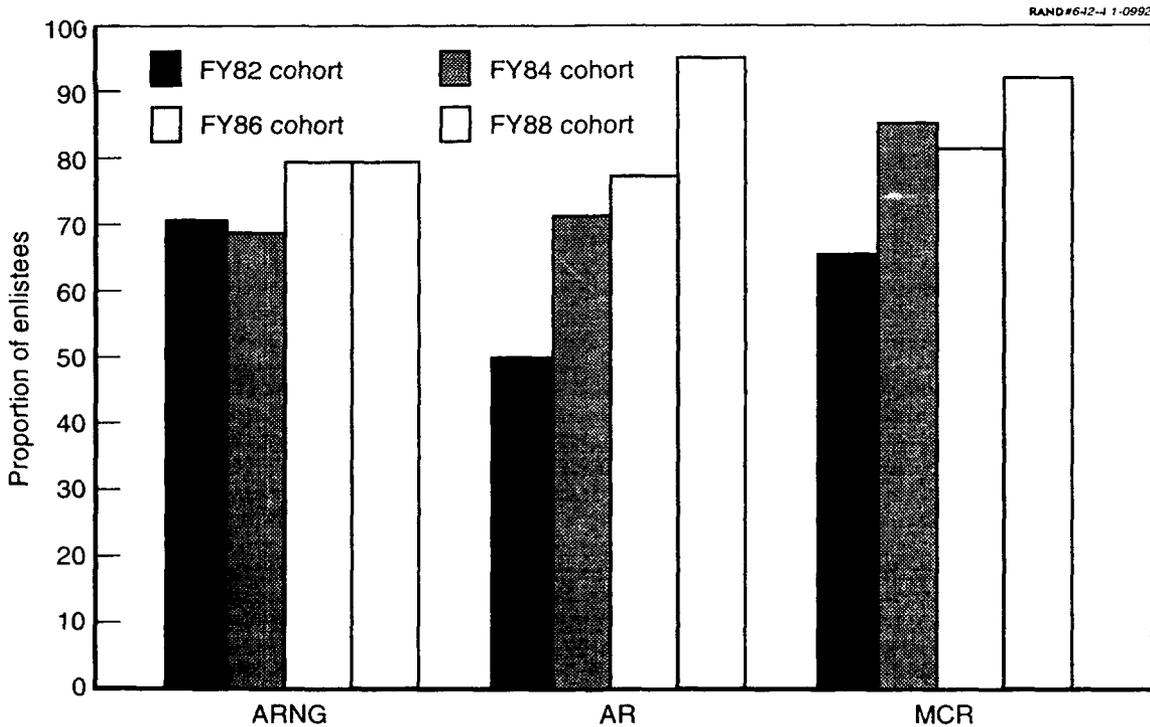


Figure 4.1—Proportion of Recruits with a High School Education, over Time

We see similar gains in the proportion of higher-aptitude category recruits (Figure 4.2). The proportion of Category I and II recruits has increased 28 percent in the Guard from FY82 to FY88, 26 percent in the Marine Corps Reserve, and 70 percent in the Army Reserve. By FY88, about a third of the Guard gains scored in the higher-aptitude categories as did over two-fifths of the Army Reserve recruits. Over half of the FY88 Marine Corps reservists were in this category.

### TWO-YEAR ATTRITION RATES

Because our primary interest here is in temporal changes, we wished to include the experience of the more recent cohorts, particularly those of FY85 and FY86. Unfortunately, we have observed each cohort over a different length of time; in particular, we have observed those entering in the last quarter of FY86 only for a full two years. As a result, we decided to use a two-year cutoff point for all earlier cohorts as well to make the comparison valid across time. Two-year attrition rates are, of course, considerably lower than five- or six-year attrition rates and, as such, the differences seem quite small. However, if the patterns we

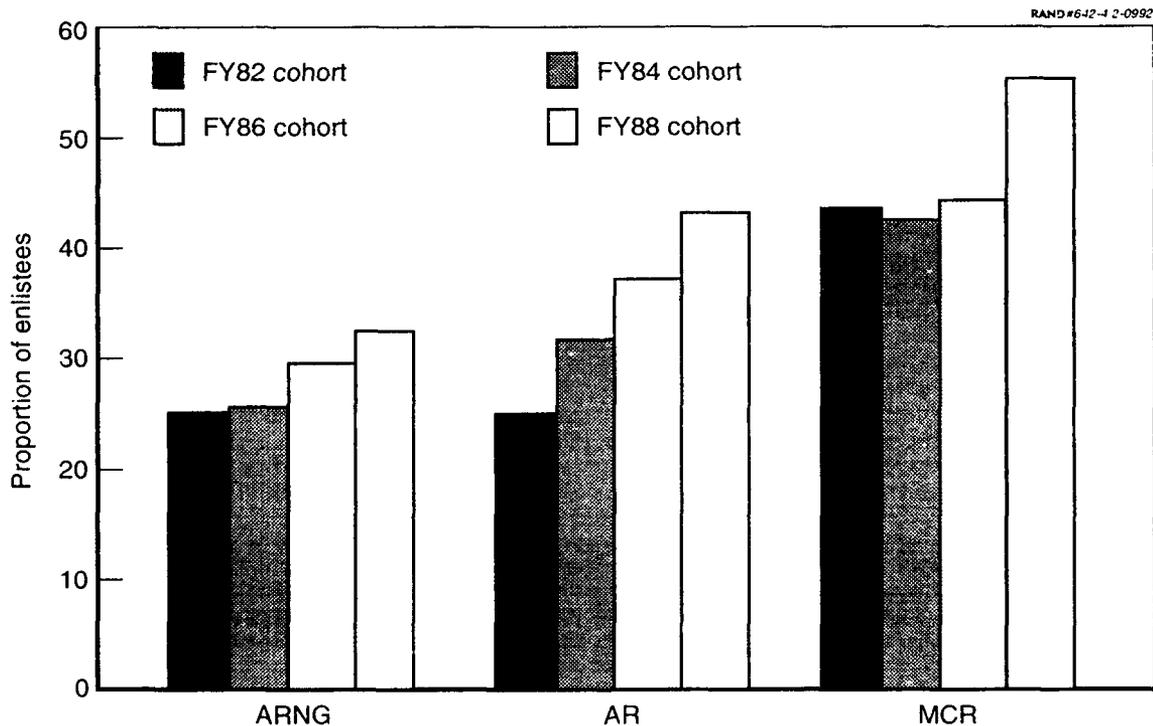


Figure 4.2—Proportion of Category I-II Recruits, over Time

see here hold, the decline in attrition over the six-year period would be quite substantial. In this analysis, we also combined returns to the same and other reserve components into one category—losses to the Selected Reserve—because our main focus here is on attrition to civilian life. Figures 4.3–4.7 present two-year attrition rates for the FY82–FY86 cohorts separately for each component.

Figure 4.3 presents the cumulative two-year attrition rate for the Army Guard over time and the message is clear. Total two-year attrition rates have been decreasing, from 37.3 percent to 33.3 percent, an 11 percent decline. However, the decrease in attrition to civilian life is more marked—from 27.7 to 18.5 percent for the FY86 cohort, a 33 percent decrease. The decline appears to have started in FY84 and this is true for most of the other components as well.

We see much the same pattern for the Army Reserve. Attrition to civilian life has declined by a third over this time period.

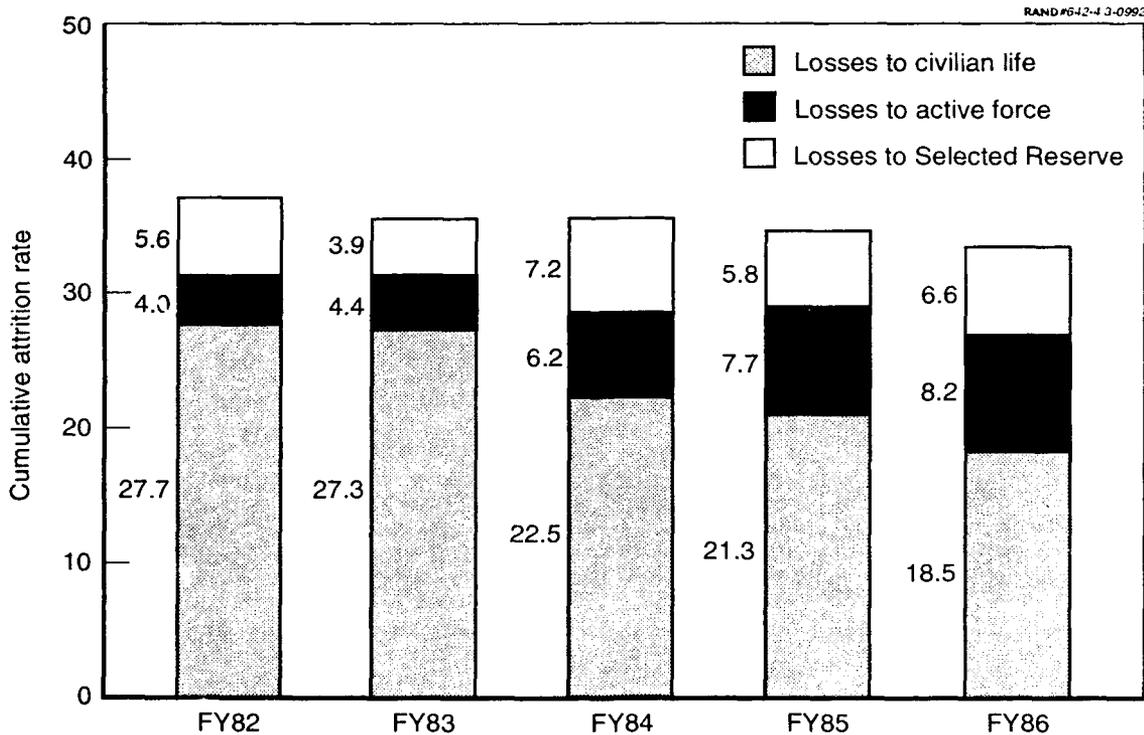


Figure 4.3—Two-Year Attrition in the Army National Guard

RAND#642-4.4-0992

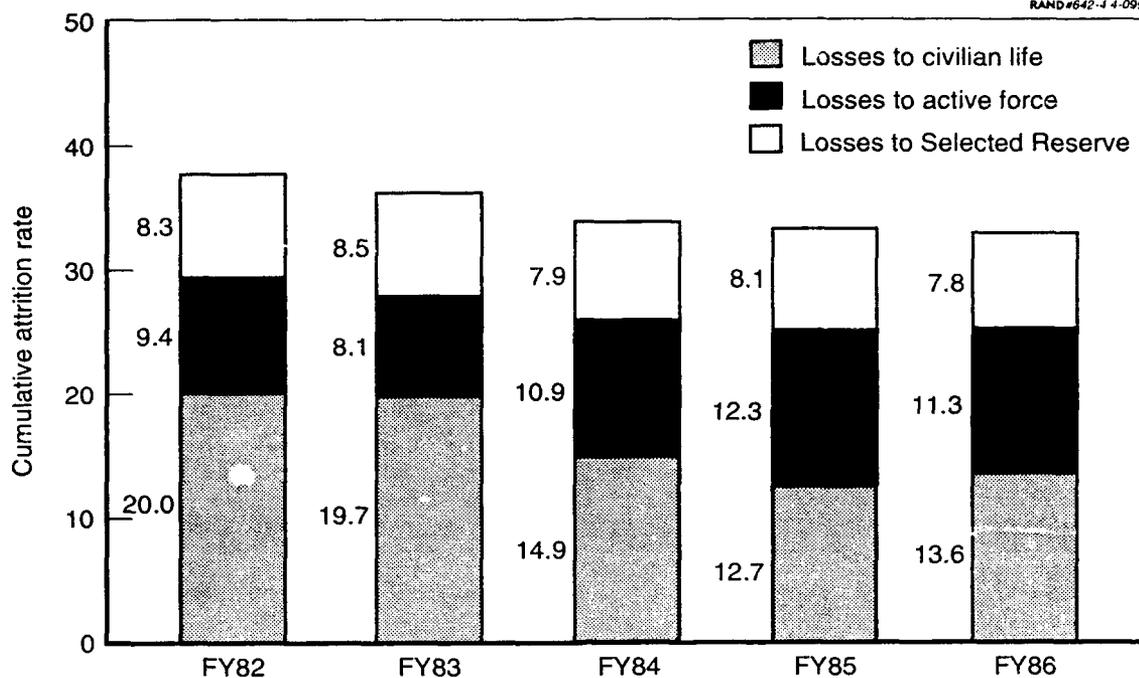


Figure 4.4—Two-Year Attrition in the Army Reserve

RAND#642-4.5-0992

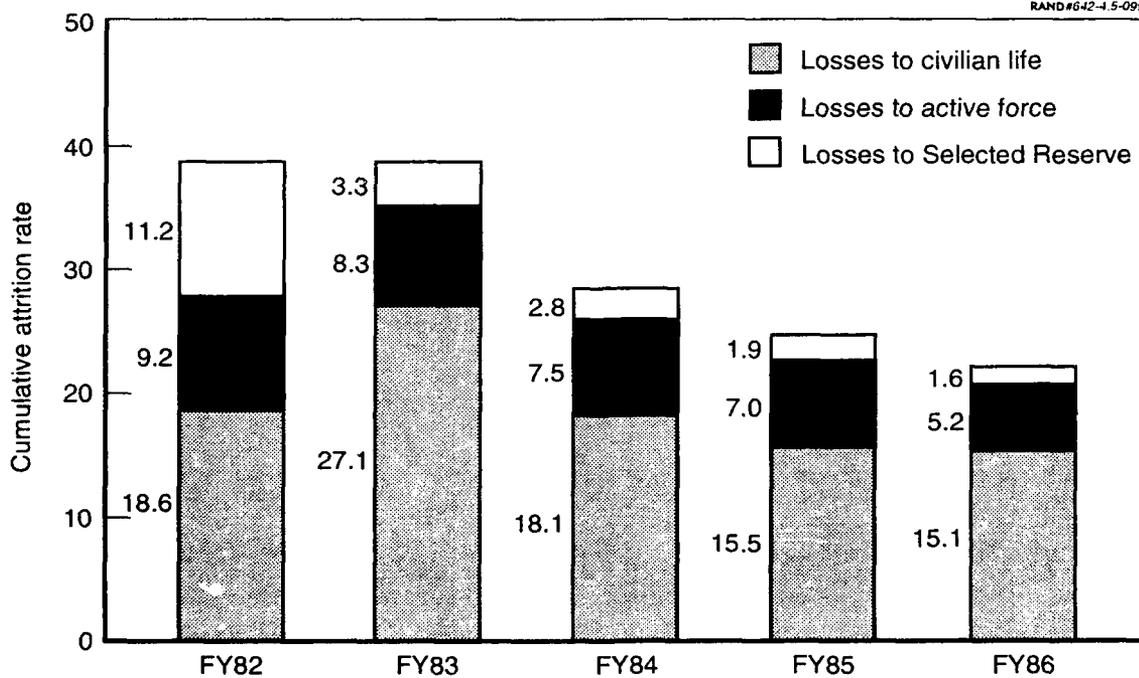


Figure 4.5—Two-Year Attrition in the Marine Corps Reserve

RAND#642-4 6-0992

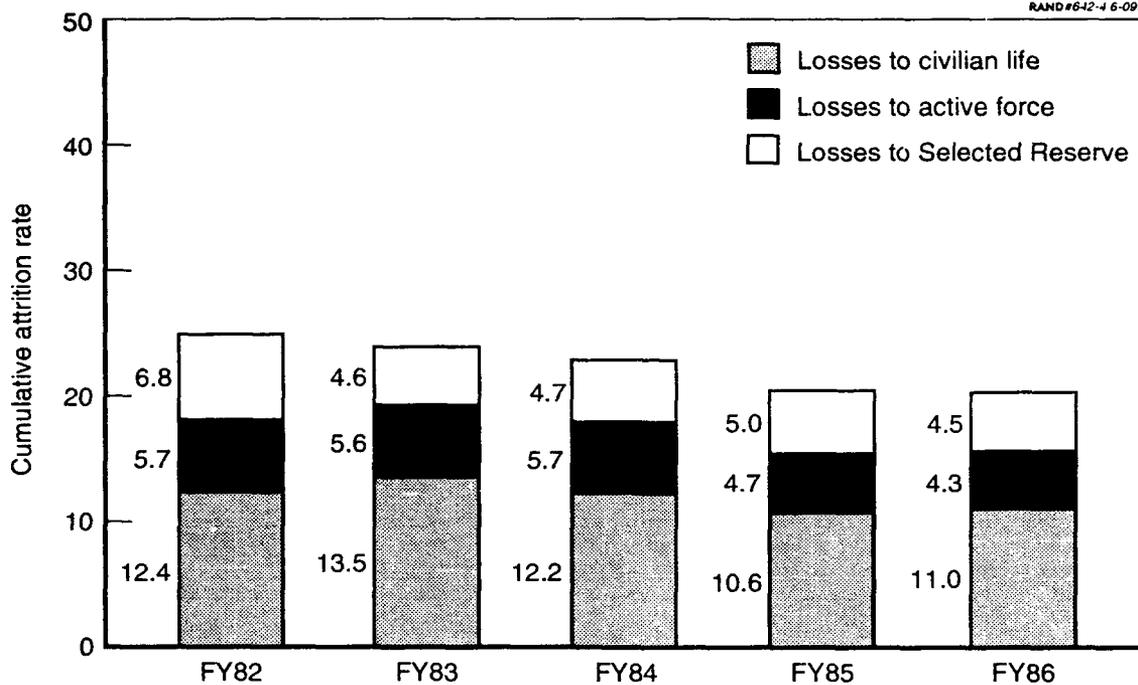


Figure 4.6—Two-Year Attrition in the Air National Guard

RAND#642-4 7-0992

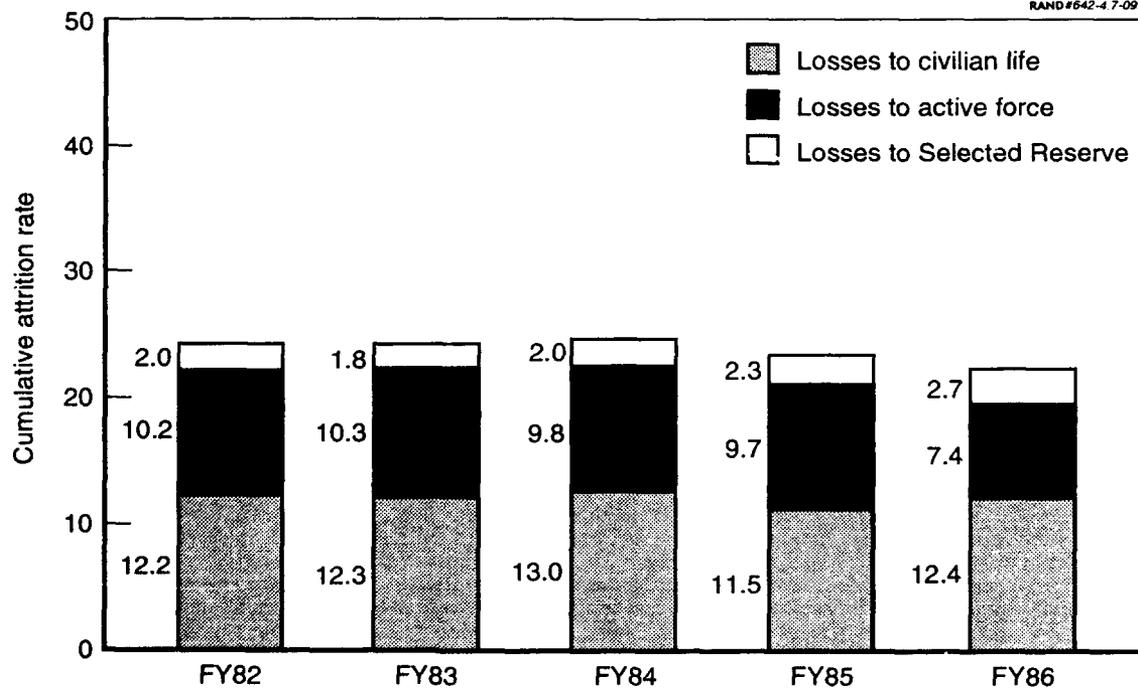


Figure 4.7—Two-Year Attrition in the Air Force Reserve

Overall attrition has declined by 40 percent over time in the Marine Corps Reserve. However, because the size of the Marine Corps Reserve has changed so drastically (from just over 1,000 accessions in FY82 to over 7,000 in FY88), there may be some unmeasured bias or error in the results. Even if we compare FY84 to FY86, it is clear that there has still been a decline—attrition to civilian life has declined about 16 percent and losses to the active force have also declined by 30 percent.

The same pattern of declining attrition can be seen for both the Air components, although it is not quite so marked. In the Guard, overall attrition declined by 20 percent and attrition to civilian life by about 11 percent. Unlike the Army components, the decline has not been in attrition to civilian life but in transfers to other components.

In the Air Force Reserve, attrition declined overall by about 8 percent but losses to the active force declined by over 25 percent. It seems likely that in these two components, attrition to civilian life may already be as low as it can go, given that participation in the reserve (characterized as it is by an inflexible schedule and unique demands on the individual) is almost inevitably bound to bring conflicts with family and the reservist's civilian job.

#### **CAUSES OF THE DECLINE IN ATTRITION**

Below we suggest some possible reasons for the decline in civilian and overall attrition shown above.

##### **Higher Quality of Later Cohorts**

Given that we have seen that later cohorts have higher proportions of better-quality recruits, and that characteristics do make a difference in attrition, this seems like the most plausible explanation. However, as the next section shows, this seems to be at best only a partial explanation.

##### **G.I. Bill**

Given that the downturn we saw started with the FY84 cohort, the introduction of the G.I. Bill, with its generous and extended educational benefits, may be an important factor in attracting and retaining nonprior service reservists.

##### **Better Equipment and Training**

Another factor is the emphasis that the reserves placed from FY84 onward on better equipment and training. Substantial resources were funneled into improving the readiness

of the units and in making training more meaningful, and from other work we have done we know that unit training and environment do play important roles in retaining reservists.<sup>1</sup>

### **Changes in the Economy**

The economy improved in 1984 and may have brought with it greater stability of jobs. This may have resulted in fewer people moving to find jobs or fewer entrants enlisting when they were unemployed and having to find full-time civilian jobs later (which may have led to employer conflict and subsequent attrition). Employers themselves may have been more willing to accommodate the demands of reserve participation, because of the competition for workers.

### **Changes in Service Policies**

If the services changed their attrition policies to make it more difficult for reservists to leave, then we would see a decline in attrition. However, there does not appear to be any evidence that this was the case during this time period.

These hypotheses are difficult to test in what is essentially a descriptive analysis. However, we can shed some light on the first one—that the decline in attrition rates is being driven by changes in the demographic composition of the cohorts. One way to test this hypothesis is to examine a group of high-quality recruits to see whether their attrition patterns have changed over time. If their attrition was flat, we could attribute most of the decline we just saw to the increased quality of the entering cohorts.

We selected high-quality males—Category I and II, with a high school education or better—who were 18–20 years old at the time of entry. Obviously, their attrition rates are much lower than that of the whole cohort but the general trends we saw earlier are evident for this group as well. Because the trends are the most marked for the two Army components, we present data for these two components only in Figures 4.8–4.9. Among the Army Guard high-quality recruits in FY82, 25 percent leave within two years; by FY86, this rate had declined to 22 percent, an 11 percent decline. The decline in attrition to civilian life is more marked—a 28 percent decrease. Some of this decline is negated by the higher rate of loss to the active force and to other components.

In the Army Reserve, overall attrition has actually not declined because of higher proportions who are entering the active force, but attrition to civilian life has indeed declined by 16 percent. The same pattern holds for the Marine Corps Reserve. For the two Air

---

<sup>1</sup>David W. Grissmer, Sheila Nataraj Kirby, and Man-bing Sze, *Factors Affecting Reenlistment of Reservists: Spouse and Employer Attitudes and Perceived Unit Environment*, R-4011-RA, RAND, 1992.

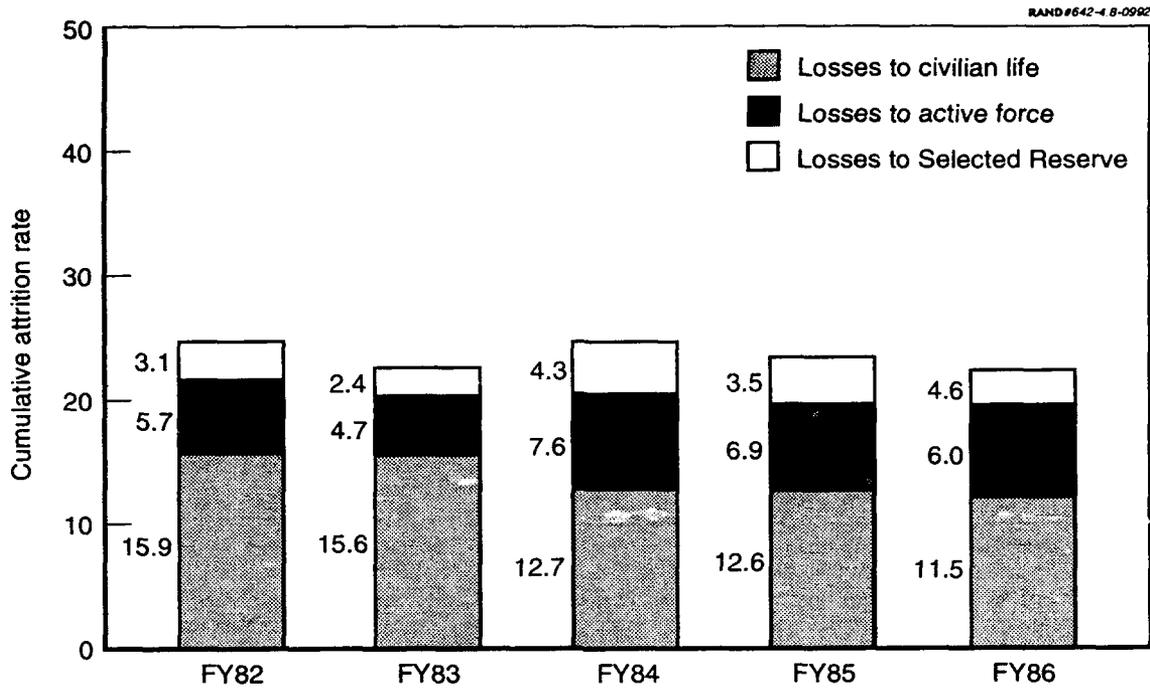


Figure 4.8—Two-Year Attrition in the Army National Guard, High-Quality Cohorts

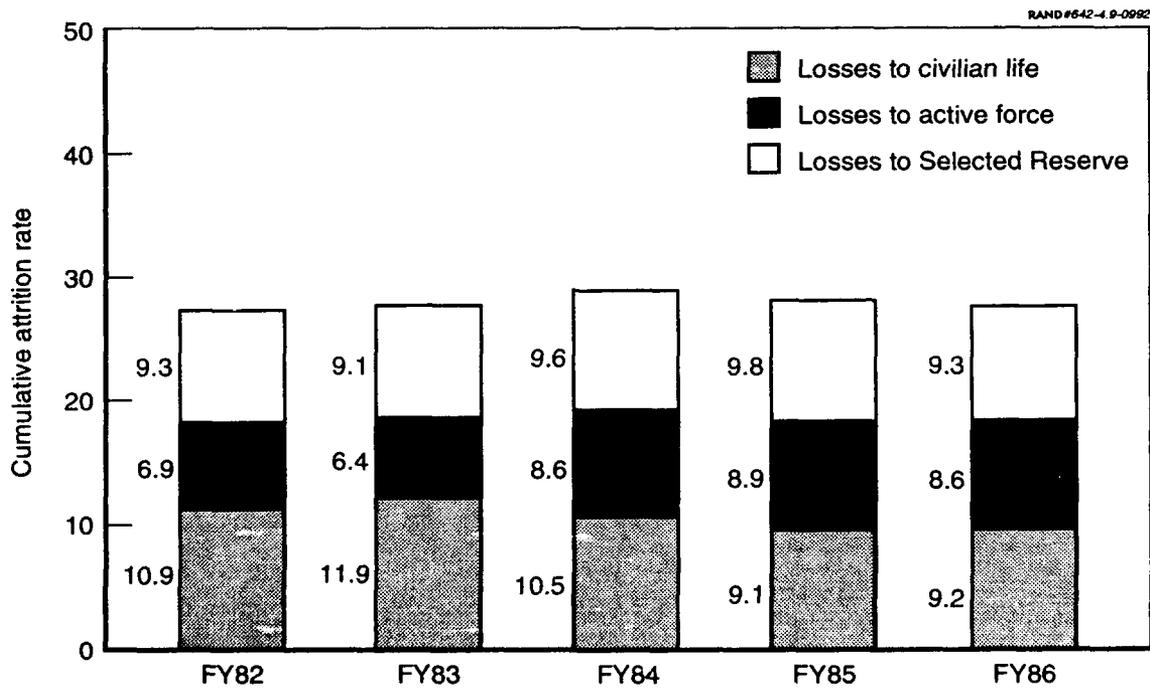


Figure 4.9—Two-Year Attrition in the Army Reserve, High-Quality Cohorts

components, civilian attrition is so low—between 7 and 10 percent—that it does not show a decline over this period. The proportion of high-quality cohorts leaving both the Air Guard and the Air Force Reserve for the active force seems to have declined over time.

Our data seem to suggest that more recent cohorts, irrespective of quality, remain in military service at much higher rates than earlier cohorts; overall attrition seems to have been declining over time and so has the loss to civilian life. We suggest that attrition to civilian life is quite low and may not be the real problem—what is needed is a structured policy to better manage transfers among components so as to maximize overall readiness of the total force.

## 5. A COMPARISON OF RESERVE AND ACTIVE ATTRITION RATES

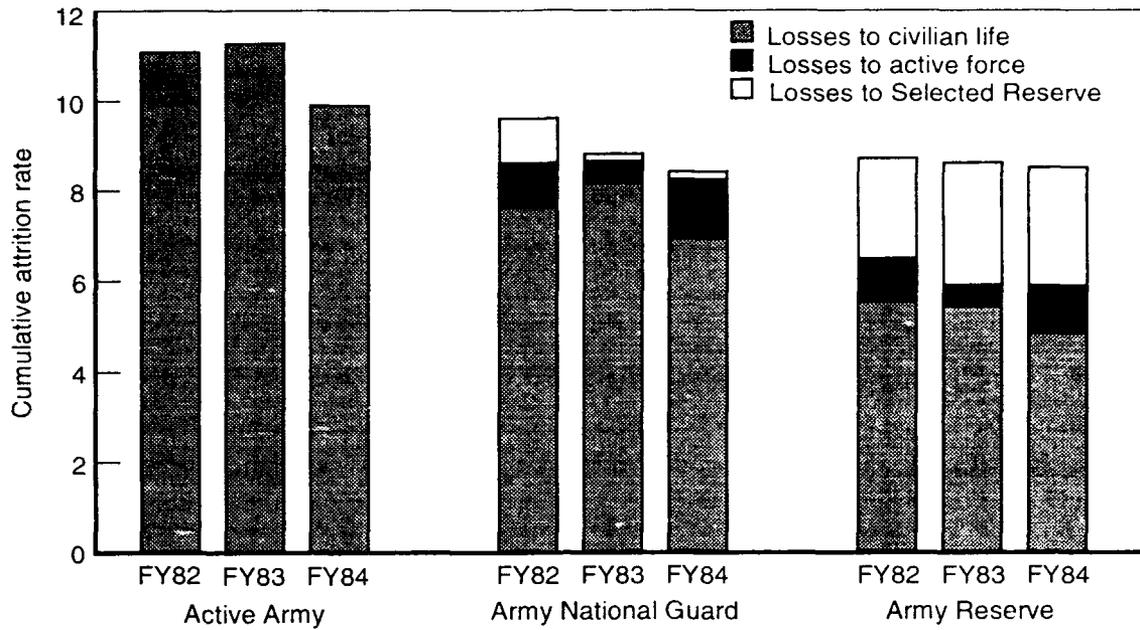
We mentioned above that there appears to be a general perception that the reserves suffer from much higher attrition than the active force. Our analysis suggests otherwise, although one must place several caveats on the findings. The most important one is the validity of comparing turnover rates for full-time and part-time jobs (although both relate to military service). The second is that we have examined only a specific group of individuals and for three cohorts only. We do not know how generalizable our results are. The third has to do with the difference in the enlisted term of service. The first-term active recruit serves three to four years on the active force; the reservist signs up generally for a six-year term. For the cohorts we examine, all the active recruits have completed their ETS; except for one cohort (FY82), none of the other reserve cohorts have completed their ETS. As a result, we compare ETS losses (which tend to be substantially higher) with non-ETS losses. Nonetheless, we feel the results are informative.

This section compares reserve and active attrition rates for similar services, cohorts, and individuals. To ensure comparability, we selected the FY82-FY84 entry cohorts in both the active force and the Selected Reserve—in each case, only high-quality (Categories I and II, high school education or better) 18-20-year-old males were selected. They were then tracked forward to look at the timing and the proportion who left. In the case of the active force, we were able to distinguish ETS from non-ETS attrition. Most non-ETS attrition is due to reasons that make these individuals ineligible to return to military service, so this measure is analogous to our measure of attrition to civilian life.

In the first year (Figure 5.1), we find that about 11-12 percent of active Army recruits have left. Overall attrition in the two reserve components is less than this figure (7-8 percent).

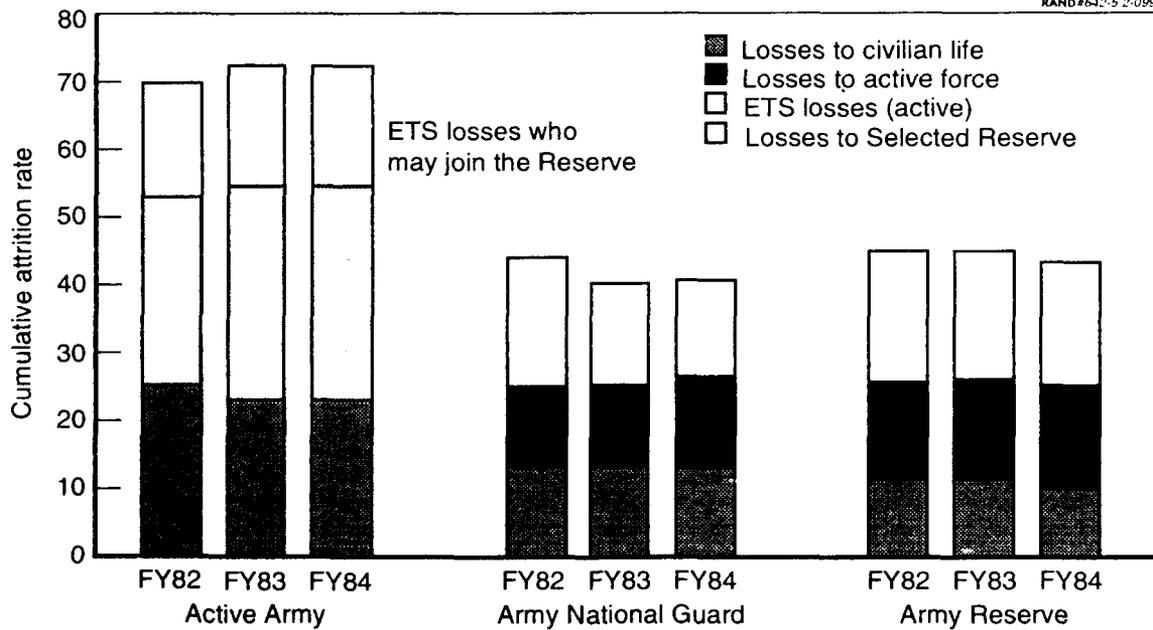
The question that immediately arises is whether the pattern holds true over time. Although the comparison is not as clear-cut over time as one would wish (because of the problem with ETS versus non-ETS losses mentioned above), we find that reserve attrition appears to be lower than active Army attrition (Figure 5.2). About 70-73 percent of the active Army cohorts have left at the end of four years—15-30 percent due to non-ETS attrition, the remainder at the end of their enlistment term. However, some ETS separations

RAND#642-5-1-0992



**Figure 5.1—First-Year Attrition in the Army Components Among High-Quality Young Males: Active Versus Reserve**

RAND#642-5-2-0992



**Figure 5.2—Four-Year Attrition in the Army Components Among High-Quality Young Males: Active Versus Reserve**

later return to service, either active or reserve. From earlier work done at RAND,<sup>1</sup> we estimate that about a third of all ETS separations from the active Army will enter the Selected Reserve, or approximately 15 percent of the cohort. Adjusting for this, we find that overall civilian attrition in the active declines to 55 percent (instead of 70–73 percent), compared to the 10–15 percent in the two reserve Army components. Although four-year attrition rates in the Guard and Reserve are close to 45 percent, it is clear that the overwhelming proportion of these losses have reentered military service. An important caveat on these findings is that we have not looked at how long individuals stay once they reenter—if they stay for short periods of time, then our estimate of attrition to civilian life may be a serious underestimate. However, a quick check of the data reveals that about 80–90 percent of individuals were still there five years after entry, so our civilian attrition at best is an underestimate by about 10 to 20 percent.<sup>2</sup>

Figure 5.3 shows that the two reserve Air components have first-year overall attrition rates that are about 25 percent lower than the active component. Attrition to civilian life is about 30 percent lower than the active.

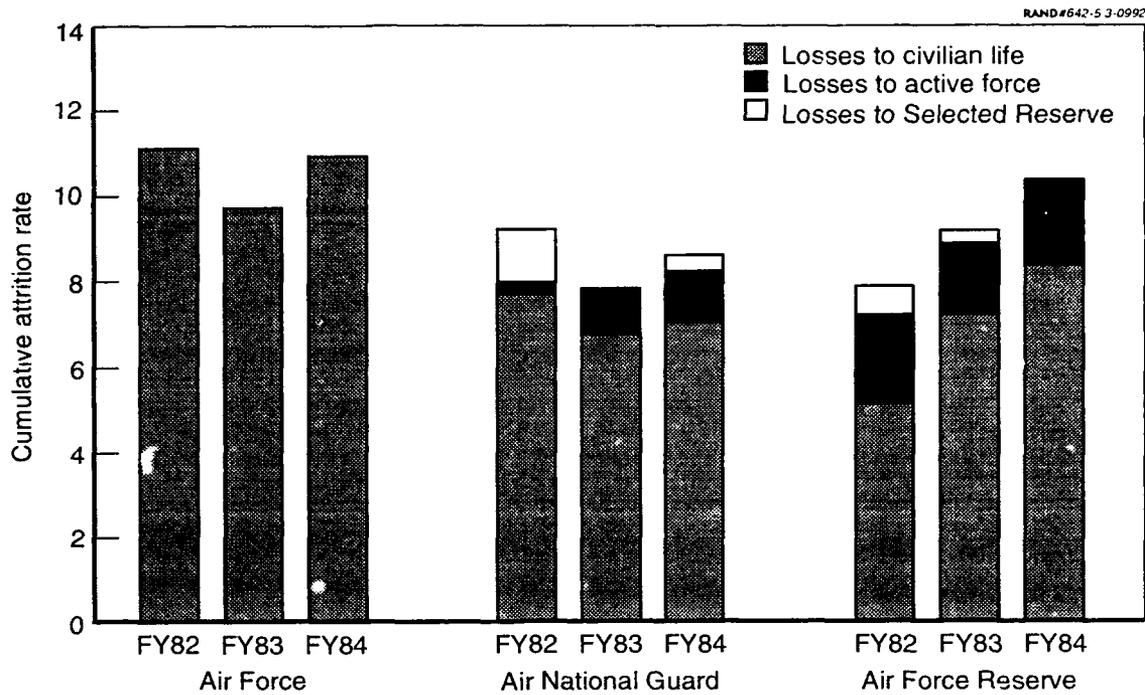
By the four-year point (Figure 5.4), differences in the Air components are quite marked, even allowing for later returns among the active ETS separations. About 45–50 percent of the Air Force first-termers leave by the end of the fourth year, compared to an overall attrition rate of 30 percent in the two reserve components. However, rates of attrition to civilian life are markedly different. Almost half of all losses from the Air Guard transfer to the Air Force Reserve; about half of losses from the Air Force Reserve transfer to the active force. Rates of attrition to civilian life in the two reserve components are extremely low (subject to the caveats we expressed above), below 10 percent compared to a return-adjusted rate of attrition to civilian life of a little under 40 percent in the active Air Force.<sup>3</sup>

---

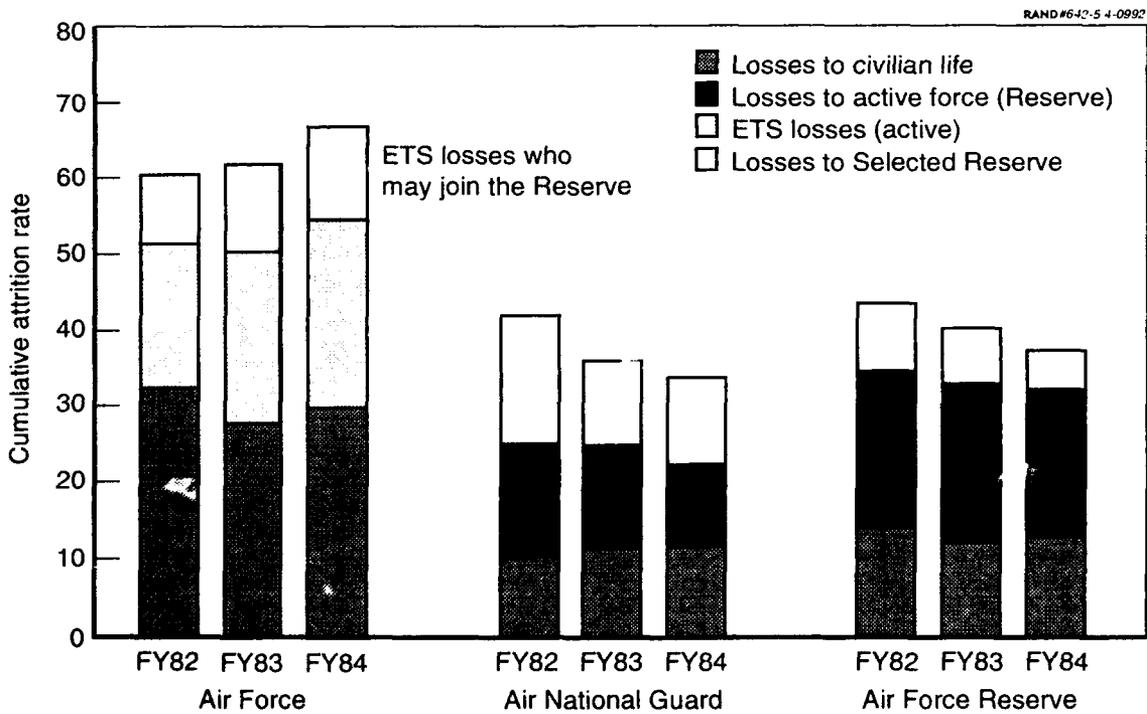
<sup>1</sup>M. Susan Marquis and Sheila Nataraj Kirby, *Reserve Accessions Among Individuals with Prior Military Service: Supply and Skill Match*, R-3892-RA, RAND, October 1989.

<sup>2</sup>We do not know, however, whether these individuals served continuously. If they tend to move in and out, they may impose substantial retraining costs on the components.

<sup>3</sup>We have assumed both here and in Fig. 5.3 that about a third of all active losses at ETS will later return to military service, based on the evidence we had for the active Army. However, because the Marine Corps Reserve and the two Air reserve components are much smaller than the Army reserve components, the proportion may actually be somewhat smaller.



**Figure 5.3—First-Year Attrition in the Air Components Among High-Quality Young Males: Active Versus Reserve**



**Figure 5.4—Four-Year Attrition in the Air Components Among High-Quality Young Males: Active Versus Reserve**

## 6. CONCLUSIONS

The major conclusion from our work on nonprior reserve attrition is that the general perception that reserve attrition is very "high" appears to be erroneous. Although it is true that a high proportion of the entering cohorts leave, we find that only a third to one-half of all losses are to civilian life. About 25 percent of all losses join the active force, somewhat lower in the Guard components where the losses are mostly to other reserve components. About one-quarter to one-half of all losses either return to the same component or join another Selected Reserve component.

Table 6.1 uses data on FY82-FY83 five-year cumulative attrition rates to illustrate the magnitude of the flows and the direction of these flows. The table clearly shows that there is considerable turbulence in the reserve and the magnitude of the flows among components is large.

Contrary to general perception, reserve nonprior service attrition compares rather favorably with that in the active force. We should place some caveats on this statement: (a) We have looked only at high-quality cohorts for FY82-FY84 (it would be interesting to see whether this pattern has held true over time), and (b) we have not accounted for returns among ETS losses in the active force, except in the most ad hoc manner. Among high-quality males, however, we do find that reserve enlistees tend to stay in the total force much longer than do active recruits.

Our two-year attrition comparisons show that reserve attrition to civilian life has declined markedly from FY82 to FY86. Although in absolute terms the decline seems small, it is important to remember that, if the decline continued over a six-year time period of enlistment, it would have a significant effect on the level of attrition and flows among components. Higher-quality accessions appear to be part of the answer; however, other factors are important as well because, even controlling for high quality, we find the same pattern of decline in attrition. We suggested some other factors, the most important among them being the effect of the G.I. Bill and the increased resources the reserves have spent on training and equipment.

There still appear to be differences in attrition among components that cannot be explained fully by the demographic differences in the accession cohorts. The two Air components have the lowest attrition rates; the Marine Corps overall has the highest attrition rate to civilian life, followed by the Army Guard and the Army Reserve.

**Table 6.1**  
**Separations and Returns over the First Five Years, FY82-FY83**  
**Cohorts, by Component**

	Army National Guard	Army Reserve	Marine Corps Reserve	Air National Guard	Air Force Reserve
All separations <sup>a</sup>	57,826	36,361	2,393	4,848	2,163
Status at end of 5 years: <sup>b</sup>					
Returned to same component	2,087	6,983	215	23	38
Returned to other Selected Reserve component	22,657	4,720	173	2,323	306
Returned to active force	9,475	10,973	380	964	950
Never returned to military service	23,607	13,685	1,425	1,538	869

<sup>a</sup>Cumulative separations during first five years after entry.

<sup>b</sup>The rejoining component reflects the first return after the first separation. Some individuals have multiple separations and multiple returns.

There are some key differences in the types and patterns of losses suffered by the Guard and the reserve components. The reserve components seem to supply the active force and the Guard their counterpart reserve components. This was evident in Table 6.1 where we showed, for example, that the numbers leaving the Guard components were equal to or greater than the numbers leaving for civilian life. The same is true for the Army and Air Force Reserve—the numbers leaving to join the active force are comparable to the numbers leaving for civilian life.

In conclusion, then, we would like to stress that a total force perspective is important in assessing reserve attrition, i.e., in deciding when a separation from a component really constitutes a loss to the force. There is, indeed, a great deal of turbulence in the reserves but there is much more return on training investment than the initial aggregated statistics would suggest. A forthcoming report will examine total years of service provided by an average recruit—a better measure of return than the years of service before the first break in service, the traditional measure.

Given these data, the main question is not how to reduce attrition to civilian life further but how best to manage these flows into and out of the force to make them cost-effective and to maximize readiness. Some thought needs to be given to the reasons for such turbulence and how best to reduce it to an acceptable level.

We have answered a number of questions with this analysis. Clearly much more needs to be done to reinforce or further these findings: (a) more analysis of facts—more recent cohorts, longer periods of time, inclusion of ETS losses, detailed profiles of who transfers or returns and when; (b) more analysis of the causes underlying patterns of attrition and changes in those patterns; and (c) teasing out the policy implications of the analysis—what management actions need to be undertaken to better manage the turbulence that seems to characterize the reserve forces.

REFERENCES

David W. Grissmer and Sheila Nataraj Kirby, with Priscilla M. Schlegel, *Changing Patterns of Nonprior Service Attrition in the Army National Guard and Army Reserve*, R-3626-RA, RAND, July 1988.

Government Accounting Office, *Reserve Components: Factors Related to Personnel Attrition in the Selected Reserve*, Washington, D.C., April 1991.

David W. Grissmer, Sheila Nataraj Kirby, and Man-bing Sze, *Factors Affecting Reenlistment of Reservists: Spouse and Employer Attitudes and Perceived Unit Environment*, R-4011-RA, RAND, 1992.

M. Susan Marquis and Sheila Nataraj Kirby, *Reserve Accessions Among Individuals with Prior Military Service: Supply and Skill Match*, R-3892-RA, RAND, October 1989.